

Teenagers at a crossroad: Exploring newcomer teenagers' identity as learners of mathematics and
English as an additional language

Olga Osnat Fellus

A thesis submitted to the
Faculty of Graduate and Postdoctoral Studies
In partial fulfillment of the requirements for the
Degree of Doctorate of Philosophy

Faculty of Education
University of Ottawa

© Olga Osnat Fellus, Ottawa, Canada, 2018

Abstract

This PhD thesis was set to examine newcomer teenagers' identity as learners of mathematics and English as an Additional Language (EAL) in the context of their transition into the Canadian educational system. Drawing on Ivanič (1998) who suggests a four-part model for the conceptualization of identity as a co-constitutive multi-dimensional framework, and addressing Ricoeur's (1992) etymological distinction between *idem* and *ipse* (identity as sameness and identity as selfhood), a research design was set up to allow for an exploration of newcomer teenagers' identity as learners of mathematics and of English as an Additional Language (EAL). The theoretical framework of this study draws on Ivanič's (1998) four identity-related dimensions of (a) autobiographical identities, (b) authorial identities, (c) discursal identities, and (d) socioculturally available selfhoods.

The research design comprised three sets of data collection through family and individual interviews and focus group discussions. Following a dissemination of a Call for Participants, six families who have recently emigrated from Israel to Canada expressed interest to participate in the research. In total, six sessions of 90-minute family-unit interviews, 16 sessions of 90-minute individual interviews, and two sets of all-parent and all-teenage focus groups lasting 90-minute each yielded 26 interviews of over 39 hours.

Data were organized according to the four identity-related dimensions that are developed in the theoretical framework of this study. Multiple, iterative rounds of analyses were conducted to first examine how identity is formulated in and through each of the four dimensions identified in the research literature and later explore the inter-relationship between the four identified dimensions and emergent themes. Findings reveal that teenage newcomers' identity as learners of mathematics and EAL is multifarious, multidirectional, and inter-animated. While the teenage newcomers struggle with their developing identities as speakers of EAL and learners of mathematics in a new educational system, their collective identity as Israelis who make it against all odds, their developing stances in relation to EAL and mathematics, and the socioculturally available selfhoods draw a complex picture that depicts identity work in its making. Given the findings, the study adds to our understanding of the multifaceted and multidirectional nature of identity as crucial in the learning of EAL and mathematics among teenage newcomers.

Acknowledgements

This work would not have been possible without the support, guidance, and inspiration I received from people I worked with during my studies. I would like to begin with Professor David Trumpower with whom I worked on students' naïve conceptual understanding of analysis of variance that can potentially be used to alleviate learners' anxiety of statistics. Professors Doug Fleming and Francis Bangou have rekindled my love and passion for the intricacies of teaching English as an additional language. Professor Richard Maclure with whom I worked on his important book *Children's rights and international development*. Last but not least, Professor Elena Polotskaia who has invited me to join her in the research on the legacy of the Russian psychologist Vasily Davydov in mathematics education. These research projects provided me with opportunities to hone my research skills, to crystalize my knowledge of learning theories and practice, and to bask in the work of inspiring scholars.

Thank you to my thesis committee that included Professor Raymond Leblanc, Professor Richard Barwell, and Professor Christine Suurtamm. Thank you for your availability and for your guidance. Thank you for suggesting readings that have deepened my understanding of what it is exactly that I want to do in my own research. You have both collectively and individually pushed my work further.

To my cohort of former fellow doctoral students—Dr. Amy Ying-Chaun Chen, Dr. Julie Comber, Dr. Eric Duku, Dr. Maria Gordon, Dr. Nathalie Gougeon, Dr. Joan Harrison, Dr. Jeela Jones, and Dr. Shari Orders—thank you for your support and just-at-the-right-time sense of humour. We promised each other to stick together and stick around to the very end of our PhD work to ensure constant stream of support and encouragement—and I am glad we did. I extend my heartfelt gratitude to my research participants. Thank you for coming forward and for sharing your experiences, insights, and dugri talk (straight talk) during the family interviews, one-to-one interviews, and focus group conversations.

To my soul mate and the love of my life, Youcef Maarabi Fellus, thank you for your belief in me and for your unrelenting support. To my children Daniel, whose love for words and wittiness help me see the funny side of life; Ilan, who has taught me what perseverance looks like; Sapir, whose resilience, sense of responsibility, words of wisdom, and clarity of thought are inimitable; and Rotem, whose sense of justice and commitment to making this world a better place for all are an inspiration to me. To my mother, who has raised six children by herself fighting like a lioness to provide for us and make us who we are today. To my siblings, Robik

Navé, Michal Grossvald, Aliza Zur, Ilanit Kleiman, and Nerya Lahav, for not hesitating to go the extra mile when needed. To my brothers in law, Shaul Grossvald and Gil Kleiman, for your insightful perspectives on how the world works.

Last but not least, Professor Barbara Graves whose inspiring words, extensive knowledge about education, teaching, and learning, and unquenched love for books and the written—and spoken—word have become a beacon in my thinking about the issues I have chosen to focus my research on. Throughout my more-than-two-decades of teaching in high schools and post-secondary institutions, I was always interested in how students talk about themselves as learners, how they describe themselves as capable—or not—of learning some things and not others, and how this talk shapes their engagement in learning and affects their academic achievements. These were some of the topics we discussed. I would like to take this opportunity to thank Professor Barbara Graves for the hours of inspiring conversations in her office, for her uncompromising push for deep understanding of the relationship between conceptualization and operationalization of identity, and for her immaculate words of wisdom.

Table of Contents

Abstract	ii
Acknowledgements	iii
Table of Contents	v
List of Tables.....	ix
Chapter 1 – Research Background and Context.....	1
THE CANADIAN CONTEXT	1
RATIONALE AND RESEARCH QUESTIONS.....	3
Research design.....	4
The researcher.	5
Chapter 2 – Literature Review	8
IDENTITY IN VOGUE	8
Theorizing identity: A shift from idem to ipse identity.	9
A shift in epistemologies.....	15
EXPLORING IDENTITY IN EAL	17
EXPLORING IDENTITY IN MATHEMATICS EDUCATION	23
TOWARD A NETWORK FRAMEWORK OF IDENTITY.....	29
Authorial identity.....	35
Authorial identity in EAL.....	37
Authorial identity in mathematics education.....	38
Autobiographical identity.....	42
Autobiographical identity in EAL.....	44
Autobiographical identity in mathematics education.....	45
Discoursal identity.....	47
Discoursal identity in EAL.....	51
Discoursal identity in mathematics education	54
Socioculturally available selfhoods.....	58
Socioculturally available selfhoods in EAL	61
Socioculturally available selfhoods in mathematics.....	63
CHAPTER SUMMARY	67

Chapter 3 – Methodology.....	68
RESEARCH QUESTIONS	68
RESEARCH DESIGN AND DATA COLLECTION	69
A Three-part research design	70
PARTICIPANT SELECTION	72
Participant Recruitment.....	74
A short description of Israel.	75
Data collection.	76
My role as the researcher.	81
ETHICAL CONSIDERATIONS.....	84
Participation.	85
Informed consent.	86
Confidentiality and anonymity.	86
Risks.....	87
Benefits.	87
VALIDITY AND RELIABILITY	87
Simulacra/ironic validity.....	89
Paralogical validity	89
Rhizomatic validity.....	90
Voluptuous validity.....	90
CHAPTER SUMMARY	90
Chapter 4 – Data Analysis and Findings.....	92
THE THREE APPROACHES USED FOR DATA ANALYSIS	93
RESEARCH QUESTION 1 – ‘TEENAGERS’ AUTHORIAL IDENTITY	98
Authorial identity in EAL: Expressing opinions and beliefs about EAL.	98
Authorial identity in regard to learning mathematics.....	101
RESEARCH QUESTION 2 – ‘TEENAGERS’ AUTOBIOGRAPHICAL IDENTITY	107
Autobiographical identity in EAL.	107
Redemption and contamination autobiographies in mathematics.	111
RESEARCH QUESTION 3 – ‘TEENAGE NEWCOMERS’ DISCOURSAL IDENTITY	116
Discoursal identity through 1st, 2nd, and 3rd address and attribution in EAL.....	117

Discoursal identity through 1st, 2nd, and 3 rd address and attribution in mathematics. .	122
RESEARCH QUESTION 4 – TEENAGE NEWCOMERS’ SOCIOCULTURALLY AVAILABLE SELFHOODS	126
Learning to sound like native speakers.	126
Scripted identities in socioculturally available selfhoods in mathematics.	129
TEENAGE NEWCOMERS AND THEIR FAMILIES AT A CROSSROAD	136
Making decisions: Looking back and planning forward.	136
What makes an Israeli? What makes a Canadian?	141
AT THE NADIR OF TRANSITION.....	143
Financial hardships.....	144
You are on your own: “What have we done?”	145
MAKING IT AGAINST ALL ODDS.....	147
Parents’ supporting their children: The importance of education.	147
Hope for a better future.....	151
CHAPTER SUMMARY	152
Chapter 5 – Reflections and Conclusions	155
ON THE PERILS OF TRANSCRIBING AND TRANSLATING RESEARCH DATA	156
ON THE ADDED VALUE OF THE PARTICULAR ORDER OF THE RESEARCH DESIGN.....	160
FROM UNI-DIRECTIONALITY TO A NETWORK FRAMING OF IDENTITY	161
CONTRIBUTIONS OF THIS RESEARCH	162
Theoretical.	162
Methodological.....	163
Empirical.	164
Practical.	165
LIMITATIONS.....	167
LOOKING FORWARD: FUTURE RESEARCH TRAJECTORIES.....	168
CONCLUDING NOTES	170
Bibliography.....	172
Appendices	194
PARTICIPANT RECRUITMENT LETTER (ENGLISH)	194
PARTICIPANT RECRUITMENT LETTER (HEBREW)	195

PARTICIPANT CONSENT FORMS (ENGLISH & HEBREW)	196
PARTICIPANT ASSENT FORM	202
PARENTS' CONSENT FORM ON BEHALF OF THEIR CHILDREN	204
INTERVIEW GUIDE.....	208
Family Interview	208
One-to-One Interview	209
Key Scenes.....	209
Turning Points.....	209
Imagined Future	209
Challenges	210
Reflection.....	210
Focus Group Discussions	210
RESEARCH DESIGN	212

List of Tables

Table 1: Research Literature in the four identity-related dimensions	34
Table 2: The Participants.....	79
Table 3: Interview Sessions: Types and Lengths	80
Table 4: Examples of Participants' four Identity-Related Dimensions in EAL and Mathematics.	94
Table 5: Conceptual and Operational Definitions.....	96
Table 6: Experience-Related Codes, Categories, and Themes.....	135

Chapter 1 – Research Background and Context

Many newcomer families go through the experience of transition into a new country trying to build better futures for themselves and for their children. While younger newcomer children may experience challenges of integration into the new educational system, older children have less time to adjust and to integrate into the new environment while still having to plan their future education and careers. In this chapter, I first describe the context and background of this research. I then frame the rationale of this study and present the research questions. Next, I provide a description of my research design and its significance in capturing identity work as a multidimensional construct.

The Canadian Context

Canada has become an increasingly diverse community comprising of newcomers from all over the world (Statistics Canada, 2010). This has also been the experience of the United States where in referring to the need to prepare all teachers for K-12 students' linguistic diversity, Jones (2002) has predicted the changing spread of enrolment of learners of English as an additional language (EAL¹) that gradually reaches suburban and rural areas as well. To ease the integration of newcomer children and their families into Canada, newcomers are required, upon their arrival, to have their school-age children assessed for English literacy and mathematics (see for example, British Columbia Ministry of Education, 2016; Ontario Ministry of Education, 2007). Focusing this entry assessment on English literacy and mathematics underlies the importance policy-makers attribute to these two school subjects.

In Ontario, where the current study has been conducted, this positioning of English and mathematics is corroborated by the province-wide EQAO (Education Quality and Accountability Office) test that evaluates students' mastery of the two school subjects. Students are required to take the EQAO test at Grades 3, 6, and 9 and pass the Ontario Secondary School Literacy Test

¹There are two main reasons why I chose the term EAL over other widely used terms such as ESL or ELL. First, many times, learners' English is not their second language. In fact, in cases of multilingual speakers, English may be their third or fourth language, which justifies the use of EAL over ESL. Second, in order to foreground an asset-oriented discourse rather than a deficit-oriented discourse that is embedded in terms such as ELL, I use the term EAL throughout for consistency and for the purpose of solidifying this transition in discourse.

(Education Quality and Accountability Act, 1996), which is one of the requirements for earning an Ontario Secondary School Diploma.

Within this context, the experience of teenage newcomers is of particular interest to me because career and educational planning takes up a significant part during high school years (Bardick, Bernes, & Magnusson, 2006; Gati & Saka, 2001; Lopez, 2001; Negru-Subtirica, Pop, & Crocetti, 2017). While the transition into a new country may seem to be associated with the mere process of acquisition of language skills, there is growing evidence that shows one's perception of self (read *identity*) plays a crucial role in one's engagement with and commitment to learning (Morita, 2004; Norton, 2000; Schwartz, Montgomery, & Briones, 2006; Sfard & Prusak, 2005). Hence, transitioning into a new country during high school years, where mathematics and English function as stepping-stones in obtaining formal education, renders particular importance to investigating teenage newcomers' identity as learners of mathematics and of EAL. Given the importance attributed to the integration of new immigrants in Canada and especially given their sometimes weak language skills in the target language (Picot & Sweetman, 2012), looking into the experience of transition among teenage newcomers and their developing identity as learners of mathematics and of EAL is compelling.

My choice to focus on newcomer teenagers' identity in EAL and in mathematics education calls for some further explication. Both school subjects are considered to be not only a proxy to having completed high school education but also a key to accessing specific future careers. This notion is expressed by Edward Doolittle's (Doolittle & Glanfield, 2007) remark on the potentially dominant and determining role literacy and mathematics play in navigating individuals' life trajectories. He aptly notes, "society's technological needs have made number and word critical to success" (p. 29). By bringing in Doolittle's remark, I do not claim that the way to socioeconomic success or social mobility can be achieved through formal schooling alone. Having said that, schooling—and especially literacy and mathematics—has become the gatekeeper to many professions (Ayalon, 1995; Doolittle & Glanfield, 2007).

Given this positioning of mathematics and literacy, and given the research in the intersection point of EAL and mathematics education that has identified learners' identity as an "emerging line of research" (Barwell, Moschkovich, & Setati-Phakeng, 2017; Langer-Osuna & Esmonde, 2017), and in light of recent theorizing about the strong association between identity and learning mathematics (Andersson, Valero, & Meaney, 2015; Boaler, 2002; Boaler, Wiliam, & Zevenbergen, 2000; Cobb, 2004; Darragh, 2016; Graven, Hewana, & Stott, 2013; Sfard &

Prusak, 2005) and identity and learning English as an additional language (Duff, 2001; Harklau, 2000; Le Ha, 2009; Norton, 2000; Shapiro, 2014; Yoon, 2008), I focus this study on teenager newcomers and their identity as learners of EAL and mathematics.

Rationale and Research Questions

In spite of the growing attention to the construct of identity in learning, research on learners' identity has remained lacking in the domains of mathematics education and EAL. The little research that does focus on learners' identity has mostly focused on learners' readily observable characteristics such as race, gender, and class (Sfard & Prusak, 2005). In the last two decades, however, it seems that researchers turn their attention to exploring identity through categories of analysis such as *a sense of belonging* (see for example, Darragh, 2013 in mathematics education) and *investment* (see for example, Babino & Stewart, 2017 in EAL). Such research increasingly points to identity as a multi-dimensional construct. To garner a better understanding of how identity work impact learners' decisions about where, how, and why to learn, I focus this study on teenage newcomers' developing identity as users and doers of mathematics and as learners of EAL. Such understanding can inform practitioners of the multidimensional nature of identity work and guide pedagogical practices that allow for growth and development. The purpose of this study was then not only to clarify what I mean when I talk and think about identity but also to employ a research methodology that will be conducive to operationalizing it in a manner that will shed light on its multidimensional aspects.

Perceiving identity as a complex construct entails, but does not guarantee, exploring it in a way that allows for its multiple dimensions to surface. While such efforts have been growing, the pool of literature that operationalizes identity as a category of analysis still needs to grow in scope (Lutovac & Kaasila, 2017) to gain recognition. To address this need and in order to be able to explore newcomer teenagers' identity as learners of EAL and of mathematics, I imported Ivanič's (1998) four identity-related dimensions. Specifically, Ivanič (1998) suggests that one's developing identity comprises of *autobiographical identity* that is defined as "not only the events in people's lives, but also their way of representing these experiences to themselves which constitutes their current way of being" (p. 24), *discoursal identity* that is defined as the way one is talked to and about (Ivanič, 2006), *authorial identity* defined as ones' "'voice' in the sense of [one's] positions, opinions and beliefs" (p. 26), and *socioculturally available identities* that are defined as the "prototypical

possibilities for self-hood which are available to [people] in the[ir respective] social context” (p. 27). Thus, in the context of newcomer teenagers’ developing identities as learners of EAL and mathematics, the following research questions were formulated:

1. How do teenage newcomers construct their authorial identity in regard to learning mathematics and EAL?
2. How do teenage newcomers craft their mathematics-related and EAL autobiographical identity?
3. How are teenage newcomers’ discoursal identities constructed as learners of EAL and of mathematics?
4. How are socioculturally available selfhoods scripted into the learning of mathematics and EAL among teenage newcomers?

Research design. With the purpose of researching identity as a multidimensional construct, I designed a three-part data collection format that would allow me not only to build rapport with my participants but also to gain deeper insights as to the relationship among the different identity-related dimensions. In light of the advantages of using their first language (L1) in research contexts when working with newcomers (McKay & Wong, 1996), and given I speak fluent Hebrew, I decided that newcomers from Israel would be recruited for this study. Following the approval of the Research Ethics Board, I disseminated a Call for Participants through Jewish community centres in two big cities. Even though only one family in each big city that met the criteria for participation contacted me following the Call for Participants, using the snowball technique, these families recruited another family, which, in turn, recruited another family.

Between the two big cities, six newcomer families participated in the research. Three types of 90-minute sessions were set up. The first session was a family interview where at least one dyad of a parent and a teenager participated in a conversation about the experience of transition into a new country and integration into a new educational system. Two of the six families had both parents participating in the research; two of the six families had two teenagers participating in the research. Altogether, there were eight parents and eight teenagers who shared their experiences of their transition as well as their perceptions, opinions, and beliefs about learning EAL and mathematics. In the second session, which mostly took place within a day or two following the family interview, I conducted in-depth

interviews with each parent and teenager. In the personal interview, each participant was asked to think of their past experience learning mathematics and EAL as book chapters (McAdams, 1995). This prompt has allowed the participants to choose which events to bring forth, identify key events and turning points (McAdams, Josselson, & Lieblich, 2001), and to organize them in a way that will reflect the relationship between past, present, and future (Bruner, 2002; Ivanič, 1998; Norton, 2000; Polkinghorne, 1988). The third session was an all-parent focus group and an all-teenage focus group—in each city—of between four to eight participants (Wibeck, Dahlgren, & Öberg, 2007).

The motivation behind determining the sequence of the types of sessions was to allow for participants to further develop things that were mentioned in passing in the family interview and to build toward their participation in the focus group. Altogether, data comprised of six 90-minute family interviews, sixteen 90-minute personal interviews, and four 90-minute focus groups. This yielded 39 hours of conversation. All interviews were conducted in Hebrew, transcribed, and translated into English.

Using a qualitative approach to data analysis, I employed both deductive and inductive processes of meaning making through iterative and cyclical readings of the transcribed and translated interviews to identify identity-related instances and emerging themes. A third analysis was conducted by clustering all instances by dimension and case to identify patterns across and within categories and cases (LeCompte, 2000).

The researcher. Coming to Canada with two teenage sons and two younger daughters, I knew the transition would not be smooth for any of us but particularly for my sons who were in grades 9 and 10, respectively, as the transition would leave them very little time to improve their English to such a level that will allow them to graduate high school and to continue their education or find a job. Indeed, looking back, the experience demanded substantial efforts on their part. A couple of weeks after arriving to Canada, we went to an assessment centre to assess my children's level of English and knowledge of mathematics. The assessment was conducted in down-town Toronto and my husband and I decided to make it a fun day for the kids trying to decrease the level of anxiety if there was any. The assessment results did not surprise me. My eldest son was deemed to master English to such a level that he did not need to go into any ESL classes. My second son whose English was good enough for a newcomer, was asked to take ESL-D and ESL-E—one term each—before being allowed to take English classes with regular

students his age. A similar pattern surfaced with my daughters. My elder daughter was sent to a regular Grade 6 class; my youngest daughter went to Grade 2 but was pulled out for her ESL classes during her first year in a Canadian school.

As an English teacher by profession, I watched as they gradually became fluent and confident speaking in English. As a mother, however, I was worried about the prospects of having them think they cannot do a good enough job at school to pursue the careers they wanted. The boys coming close to finishing high school, already had a clear sense of what they wanted to become—my eldest son wanted to become a psychologist and my younger son wanted to become a physician. I was worried that the difficulties associated with the transition into a new country and with the integration into a new educational system that had unfamiliar structure that was situated within an unfamiliar sociocultural context would make them push their past experience as top-A students prior to coming to Canada into the shadows and make them think of themselves as academically incapable in the face of the very little time they had to catch up with the Canadian high school requirements. What I could not do was give them more time to adjust to the new school system. What I could do was sit tight and be vigilant about their school experiences.

My eldest son, who was 15 years old at the time of transition, went straight to academic level English. As a 12-year old, he read the whole series of Harry Potter in English as he could not wait for the books to be translated into Hebrew. He has always been an avid reader and his mastery of English has always pleasantly astounded me. But for him, this was not enough. His love for ideas meant that he could engage in lively, sometimes heated, discussions with some of his friends over philosophical ideas. My younger son enjoyed his ESL classes where the teacher was very easygoing, friendly, and supportive. Upon completion of the two ESL courses, he took Academic-level English throughout the remaining years in high school. In mathematics, it was not much different. Both were allowed to take Academic-level mathematics courses in high school and both passed the Ontario Secondary School Literacy Test granting them a high school diploma after completing all required course work. My sons are now working on their degrees in psychology and medicine, respectively. Their success in achieving what they set themselves to achieve was something I could not take for granted.

Whereas my daughters were younger when we moved to Canada, their experience with the transition was not easier. They too had to learn a new language and they too had to struggle with issues that were directly and indirectly related to their transition to Canada. Looking back, I

realize that there has been far more to my children's academic achievements that paved the way for them in schooling. That is, in the face of going through a challenging experience of transition, and given the positioning of mathematics and English as gatekeepers to many professions, I became deeply interested in better understanding the interplay between identity work and learning. It is this curiosity catalyzed by my children's experiences, that motivated my interest in exploring the construct of identity among newcomers in general and teenage newcomers in particular.

Chapter 2 – Literature Review

Identity in Vogue

Historically speaking, following social, national, and political turmoil, the concept of *identity* has become a zeitgeist in the 1960s and has since been used as a conceptual and analytical tool in diverse fields (Brubaker & Cooper, 2000). Indeed, a simple search of the combined key words *identity education* in Google Scholar, a publicly accessible search engine of scholarly literature, yields more than three million hits. This avalanche of research can be explained by the fact that identity is increasingly recognized as a construct that plays a consequential and critical role in one's development (McAdams & Olson, 2010; Merrill & Fivush, 2016) and in one's wellbeing (McAdams & Olson, 2010; Mclean, Breen & Fournier, 2010). It is not surprising then that the field of education embraced the concept of identity as a tool to explore learning and development (Gee, 2001; Wenger, 1998) and that widespread attention to the construct in education has yielded important work in different content areas and disciplines such as academic writing (e.g., Ivanič, 1998), English as an additional language (e.g., Norton, 2000), science (Archer et al., 2010), and mathematics (e.g., Sfard & Prusak, 2005).

Given the concept of *identity* being in vogue and in light of the plethora of research literature on the concept and given it being an emerging research field in mathematics education (Barwell, 2017; Langer-Osuna & Esmonde, 2017), but less so in EAL (Norton, 2000) that has seen a proliferation in studies on learners' and teachers' identities, and in spite of its being a word everybody—everywhere—uses, identity seems to generate different meanings and interpretations that heavily depend on context, purpose, and user (Brubaker & Cooper, 2000).

This constantly morphing, enigmatic conceptualization of the term led to its “overproduction and consequent devaluation of meaning” (Brubaker & Cooper, 2000, p. 3)—a phenomenon dubbed *an amoeba word* by Ivan Illich in his conversation with David Cayley (Cayley, 1992), which has recently been used in Fellus and Glanfield (2017) in their conversation about identity-related challenges and opportunities in the context of linguistic and cultural diversity in research and publishing. Before we go any further, then, the question that I would like to ask is: when we speak of identity, what do we mean? Given the popularity of the term, this is not a trivial question to answer.

Theorizing identity: A shift from *idem* to *ipse* identity. In order to better understand the underpinning foundations for my thinking about identity, it will be helpful to look into the etymology of this term. To do so, I bring Ricoeur (1992) who distinguishes between the meaning of *selfhood* and the meaning of *sameness* that are embedded in the term *identity* and that are equivalent to “the Latin *ipse* or *idem*” (p. 2), respectively. For Ricoeur, the two meanings are so distinct that he writes, “The weight of this comparative use of the term ‘same’ seems so great to me that I shall henceforth take sameness as synonymous with *idem*-identity and shall oppose to it selfhood (*ipseity*), understood as *ipse*-identity” (p. 3). I find Ricoeur’s etymology-based distinction between the two meanings of identity helpful as it provides an insightful differentiation between two different ways of operationalization of *identity*.

This distinction was picked up by Brubaker and Cooper (2000) in their recognition of the difference between using the concept of identity as a *category of practice* and a *category of analysis*. Identity that is understood as category of practice is defined by the Brubaker and Cooper as “‘native’ or ‘folk’ or ‘lay’ categories. These are categories of everyday social experience, developed and deployed by ordinary social actors” (Brubaker & Cooper, 2000, p. 4). I use Brubaker and Cooper’s (2000) *category of practice* to reference Ricoeur’s (1992) *idem*-identity that takes the form of practices of ascriptions of qualities and characteristics that tend to group people together by same readily observable characteristics. On the other hand, identity that is understood as a *category of analysis* is defined as “all affinities and affiliations, all forms of belonging, all experiences of commonality, connectedness, and cohesion, all self-understandings and self-identifications” (Brubaker & Cooper, p. 2). For the purpose of this study, I use Brubaker and Cooper’s (2000) *category of analysis* to reference Ricoeur’s (1992) *ipse*-identity that takes the form of constructions of selfhood through self-alignment and continual perturbations reflecting the multifarious and multidirectional nature of the *identity* work. The former implies a sense of static continuity over time, the latter of continual development of sense of self; the former is oriented toward the past, the latter toward the future; the former sees identity as an independent variable, the latter as a dependent variable; the former elides individuals to create a unified façade, the latter brings forth the diversity between individuals (see Norton, 2000 in the context of language learning and Ivanič, 1998 in the context of academic writing).

Indeed, research in a variety of fields has demonstrated a shift toward an operationalization that builds upon the complex nature of identity work. In the field of psychology, for example, McAdams, Josselson and Lieblich (2001) explore identity through self-narration. In the field of anthropology, Holland, Lachicotte, Skinner, and Cain (1998) suggest a three-facet identity work that includes a cultural facet, a power and status facet, and a facet of qualified or disqualified identities. Analytically speaking, Holland et al. (1998) point to a distinction between figured or imagined identity on the one hand and one's social position on the other hand (p. 125) and show how these enact constant interaction. In the field of psycholinguistics and discourse analysis, Gee (2001) views identity as a manifestation of characteristics that help people identify themselves and others as "certain kinds of people" (Gee, 2001, p. 115). While all of the above-mentioned scholars underscore the complex nature of identity work, what remains to be explicated is how this complex nature takes form. Such explications open up many ways to understanding identity.

According to Gee (2001), for example, identity is a manifestation of what he calls *NIDA*, which stands for *Nature-identity* that refers to natural or biological characteristics an individual is born with; *Institutional-identity* that refers to institutionally assigned roles the person takes on; *Discoursal-identity* that references speech patterns that identify a person as a 'certain kind of person' (discourse with little 'd' and big 'D'); and *Affiliation-identity* that references what individuals affiliate with (for e.g., joining a group that has a common interest). Ivanič (1998) foregrounds a four-part identity that comprises autobiographical, authorial, discoursal, and socioculturally available selfhoods and demonstrates how these are used as tools to explore writers' identity work. Sfard and Prusak (2005) put forth the cultural aspect of identity work and explore learners' identity in mathematics as storied selves and the act of learning as moving from actual to designated selfhoods. The educational theorist Etienne Wenger (1998) uses a similar level of complexity by framing identity as a process of becoming a legitimate participant in a community of practice (Lave & Wenger, 1991), the definition of which references mutual engagement, joint enterprise, and shared repertoire (Wenger, 1998, p. 73).

While these scholars range in their interpretation of what identity means, they collectively situate identity within sociocultural theory and treat it in terms of discursive, situated, and figurative. Without risking an oversimplification of the plethora of perspectives and analytical frameworks, and drawing on Norton (2006), Gee (2001), McAdams et al. (2001), Holland et al., (1998), Wenger (1998), and the ensuing extensive work that has generated from their theorizing

and operationalizing of the concept of identity, it may be safe to qualify the work of identity as it has been researched within sociocultural theory as highlighting *identity* as assigned, interpretive, collective, and negotiated.

This is not to say that research studies should neatly fall into any particular or all of these four qualifiers. While the distinction is not mutually exclusive, it helps organize the multitude of perspectives researchers have developed in exploring identity. Gee's (2001) work, for example, focuses on understanding identity as it is assigned by others—or aligned with—by an individual. Some questions still remain, How do processes of assigning and aligning with identities look like? Who gets to engage in these actions of assigning and aligning with identities? What are potential consequences of cases where some identities are socioculturally available and others not? These questions cannot be fully answered using Gee's (2001) NIDA framework. This is because considering what group an individual was born into (read Gee's Nature Identity); what institutionally assigned roles a person is given and takes on (read Gee's Institutional Identity); what words and ways of speech one appropriates (read Gee's Big 'D' and small 'd' discourse); and what sociocultural groups one aligns with (read Gee's Affiliation Identity) blurs the much needed distinction among the assigner, the assigned, and the assignee, highlights identity as a product, and consequently pushes the exploration and understanding of identity as a process into the shadows.

Unlike Gee's (2001) perspective, McAdams and Bowman (2001) show how interpretation of past events shapes future actions and life trajectories thus making their work lean more toward the interpretive work of identity. Sfard and Prusak (2005) bring forth storied selves through cultural patterns of identity work thus shedding light on the collective aspect of identity. Ivanič (1998) puts forth the relationship among autobiographical identity, authorial identity, discursal identity, and socioculturally available identities thus leaning more toward the negotiated aspect of identity work.

In this context, it is important to note that in spite of the sweeping recognition that *identity* has multiple dimensions, and carries simultaneous multidirectional processes, it is constructed bottom-up as much as it is shaped by top-down processes and ascribed roles. This stands in stark opposition to its operationalization in research studies in education that has, more often than not, been reduced to methodologically locating identity within the *idem--identity* realm, that is, within readily observable constructs such as race, class, and gender (see for example, Wigfield et al., 2015, for a research review of between-group differences).

Hence, I argue, that learners' *ipse* identity can, and should, be explored to better understand how dispositions and attitudes toward learning develop. Ontologically, identity is understood in this study as stories told and shared through autobiographical, discursal, authorial, and socioculturally available selfhoods.

Of particular relevance to understanding the complex nature of identity work is Shih, Pittinsky, & Ambady's (1999) seminal study where 46 female Asian-American undergraduates were randomly assigned into two groups to take a quantitative test: one group evoked the participants' ethnic identity and the other evoked their gender identity. Both conditions were made salient through a questionnaire distributed to them in a lab by an experimenter that was blind to the specific manipulation. Comparing the test results from the two groups with those of a manipulation-free control group, the researchers found that when the students' Asian identity was prompted, quantitative performance was increased; whereas when their female identity was prompted, their quantitative performance decreased rendering 54%, 49%, and 43% correct answers in the Asian-identity salient condition, control condition, and the female-identity salient condition, respectively (Shih et al., 1999, p. 81). One cannot ignore the fact that Shih's et al.'s (1999) work has shown how widely endorsed identity-related narratives of and about social groups to which one belongs by choice or by chance shape performance and act as self-fulfilling prophecy. This work (that brought forth the *idem*-identity as it builds on similar identity-related characteristics rather than individual selfhoods) is important as it brings evidence to show that not only is identity context-dependent but that it is also assigned and evocative.

Similar work that builds on *idem*-identity, even though it is not called as such, and that shows that identity is assigned and situation-dependent is Aronson et al. (1999) who explain the persistent phenomenon of students deemed to be of "a certain kind," to cite Gee (2001), failing academically by arguing that "there is something special about being black, Latino, a woman, poor, or old that made these test takers underperform when confronted with stereotypes about their group" (Aronson et al., 1999, p. 32). Indeed, in an earlier work, Steele and Aronson (1995) showed that when African American college students were told that they were undergoing a diagnostic test to determine their intellectual abilities, their performance was significantly lower than their white counterparts'. This finding was contrasted with a condition where the same test was framed as a regular activity that did not carry any implications about their intellectual abilities and in which—consequently—African Americans performed just as well as their white counterparts.

Similarly, in their efforts to make a point about framing stereotypes (read *idem*—identity) as the engine for performance, Aronson et al. (1999) conducted two studies where white males who were taking an advanced course in calculus at the University of Texas at Austin and another group of students from the Stanford University student body underwent a similar experiment design as the one used in the study conducted by Shih et al. (1999). The researchers found that in the stereotype-evoked condition where participants were asked to read newspaper and journal articles about the Asian superiority in mathematics, white males did less well than their peers in the control group. This research is important as it suggests that socioculturally available identities are assigned and internalized—however ephemerally—thus casting a wider net that reaches members who do not traditionally belong to “historically stigmatized groups” (Aronson et al., 1999, p. 44).

Regardless of the conceptual framework and the interpretation, identity is used—more often than not—simultaneously as *idem* identity and *ipse* identity, or as Brubaker and Cooper (2000) put it as “both a category of practice and a category of analysis” (p. 4). This conflation between the two categories, according to Brubaker and Cooper, has generated an incompatibility between how identity is conceptualized and understood as being constantly in flux and how it is operationalized and explored as terminally static and flat. This is an important distinction because it helps us better understand how the concept of identity is used in different contexts and for different purposes. Identity is used as “a category of practice,” Brubaker and Cooper (2000, p. 4) explain, when it is used as a way for people to talk or think about themselves and others in one-dimensional adjectives that are flat, and readily observable. On the other hand, identity is used as “a category of analysis” (Brubaker & Cooper, 2000, p. 4) when it is used as a tool to investigate the multi-dimensional, action-oriented, and negotiated nature of identity work.

The problem of conflation that Brubaker and Cooper (2000) have identified results in a phenomenon that crowds out more complex theorizing and operationalizing of the construct. Brubaker and Cooper’s (2000) description of this issue is especially relevant here as it underscores the solidification of the underpinning limited and limiting perception of identity as depending on observable characteristics such as race, class, and gender what they call “the holy trinity” (2000, p. 3)—which raises ethical problems of vision and division:

The problem is that ‘nation,’ ‘race,’ and ‘identity,’ are used analytically a good deal of the time more or less as they are used in practice, in an

implicitly or explicitly reifying manner, in a manner that implies or asserts that ‘nations,’ ‘races,’ and ‘identities’ ‘exist’ and that people ‘have’ a ‘nationality,’ a ‘race,’ an ‘identity’ (Brubaker & Cooper, 2000, p. 6).

This conflation in scholarly work between identity as a *category of practice* with identity as a *category of analysis* needs to be surfaced to make space for an operationalization of identity that goes beyond grouping people by readily observable characteristics.

Against this backdrop that reflects the distinction between the two meanings and uses of identity, we can better recognize instances and contexts where each is used. Using identity as a category of practice has been identified as the driving force in identity politics and has garnered theoretical and empirical evidence (see for e.g., Goggin & Theodoridis, 2016; Graham, Haidt, & Nosek, 2009; Iyer, Graham, Koleva, Ditto, & Haidt, 2010; Lakoff, 2004; McGinley, 2009 that demonstrates how discourse in politics and election campaigns builds on *idem* identity to group people that share specific characteristics). These studies show how people vote sometimes against their self-interests to support policies or candidates whose identities seem to dovetail with their own thus substantiating the notion of the use—and potential abuse—of identity as a category of practice. Using identity as a category of practice leaves the work of identity as a process in the shadows and instead brings forth one-dimensional snapshots of who people are or who they can be.

Framing identity as a category of analysis pulls us away from treating it as a flat categorizing construct and pushes us toward an exploration of identity that builds upon its multidimensional nature. Harré and Gillett (1994) refer to this shift in focus as “the difference between the old idea of the self as something inside a person and the new idea of the self as a continuous production” (p. 110). Similarly, Polkinghorne (1988) draws on William James’ suggestion to conceptualize identity as “an idea that a person constructs” rather than “an underlying substance to be discovered” (James, 1890 in Polkinghorne 1988, p. 149). In the same vein, Bruner (1986) explains that identity “is not a bundle of autonomous traits but an organized conception, however much we may construct it from such scraps and clues as we can find” (Bruner, 1986, p. 38) thus framing identity work as bricolaging—a term coined by Levi-Strauss (1962) and adopted by Visscher, Heusinkveld and O’Mahoney (2017) in relation to identity work.

This shift in perception from conceptualizing identity as a substance to conceptualizing it as an idea that a person constructs is put forth by Polkinghorne (1988) who calls for a transition

from treating identity as “a flattened reality that consists of physical objects in time and space along with their relations” (Polkinghorne, 1988, p. 149) to seeing it as a “construction built on other people’s responses and attitude toward a person and is subject to change as these responses, inherently variable and inconsistent, change in their character” (Polkinghorne, 1988, p. 145). Thinking of identity in terms of “other people’s responses” allows us to explore the construct as a co-constructed, negotiated—however scripted and constrained—phenomenon (Burgess & Ivanič, 2010; Gee, 2001; Ivanič, 1998; Wenger, 1998).

A shift in epistemologies. In order to understand the different perspectives in treating identity as *ipse* in comparison to treating it as *idem*, it will be helpful to frame the difference within a short discussion on epistemologies. Discussing the differences in epistemological perspectives and how these inform understanding of what identity work means, Gergen (1991) distinguishes between how identity is framed within *Romanticism* and *Modernism* from how it is framed within *Postmodernism*. *Romanticism*, according to Gergen (1991), projects an image of how things should be and prescribes what one should become. *Modernism* provides a context where identity is perceived as something static that is framed both historically and culturally. Both, according to Gergen, limit the thinking about identity to the question of: *What* should or can one become? *Postmodernism*, on the other hand shifts the focus of the question to: *how* can one become? Gergen’s (1991) observation about the different questions we can ask about identity within the different epistemologies helps us turn our attention to those peripheral areas in identity work that were kept in the shadows and have not been the focus of attention.

In a similar token, Zygmunt Bauman (1996) recounts the historical shift in meanings of identity to distinguish between modern and postmodern perceptions of the term. According to Bauman (1996), if in modern times, identity was perceived as something “solid and stable,” then in postmodern times, it is perceived as something that is mostly about avoiding “fixation” and keeping “the options open” (p. 18). Bauman (1996) drives the nail home by metaphorically framing identity in modernity as “built in steel and concrete” and in postmodernity as built “in bio-degradable plastic” (p. 18). In keeping with the metaphorical representation of identity, Bauman (2009) discusses the metaphors of a tree and of a ship to distinguish between identity work in modernity and postmodernity, respectively.

According to Bauman (2009), metaphorically thinking about identity in terms of a tree with roots, a static locality, and a biologically predetermined—however ecologically

dependent—way of becoming, we focus attention to static constructs such as class, gender, and race, and other predetermined, fixed, canonical identity markers such as nationality and culture. That is, thinking of identity in terms of a tree, what the person is born into is expected to shape this person's future while excluding the possibility of any other identity. However, in metaphorically thinking about identity in terms of a ship that is mobile, free to roam seas and go on journeys of discovery, we focus attention to constructs such as mobility and affiliation to and alignment with other ways of being. Where the ship starts its journey may be evident in its shape and name, but this does not impact its ability to embark on explorations that will fill up the pages of its captain's log. Metaphorically framing identity as a ship highlights its being in transit between shores and localities seeking approval of entry. Bauman's (2009) observation is acutely relevant to viewing identity within the epistemology of postmodernism, "The ship's record and/or the captain's log are more often than not among the documents on which the approval depends, and with every next stop, the past (constantly swelled by the records of preceding stops) is re-examined and re-valued" (Bauman, 2009, p. 158).

Reviewing the literature on identity in this section reflects a shift from treating identity as static and flat to treating it as co-constructed, interpretive, negotiated, and action oriented. Epistemologically speaking, such an understanding of identity is made possible as a postmodern construct where the question to be asked when exploring identity is: *how a person can become* rather than *what a person can become*. Theoretically speaking, thinking of identity as an idea to be constructed (i.e., *ipse*) rather than a substance that a person possesses (i.e., *idem*). Against this backdrop of Brubaker and Cooper's (2000) calling attention to the incompatibility between how identity is understood as always being in flux and how it is explored as being flat is used here as a cautionary advice. Given Polkinghorne's (1988) definition of identity as dependent on other people's responses and attitudes, Bruner's (1986) perception of identity as an act of bricolaging from available scraps and clues, Gergen's (1991) view on identity through the different lenses of Romanticism, Modernism, and Postmodernism, and Bauman's metaphorical distinction between identity as a tree and identity as a ship, research studies on identity in EAL and in mathematics reflect an increasing shift in focus in the last two decades and more so in the last decade from treating the term as a concept based on vision and division to treating it as a concept that is premised on and subject to co-constructive interaction processes as I show below.

Exploring *Identity* in EAL

In her seminal work on identity and EAL, Norton (2000, 2001) demonstrates how learners' identity, and more specifically their autobiographical narrations and identification of selfhood shape choices they make in relation to learning EAL (see Norton, 2000, pp. 47-57 and Norton, 2000, p. 57 where she discusses the pivotal role self-identifying played in her participants' willingness to interact in English). Specifically, Norton's work showed how the EAL-related identity of the five immigrant women she worked with for 18 months was co-constructed not only through their autobiographies but also through verbal interactions where they, at times, experienced marginalization and engaged in identity-related resistance. Although Norton's (2000, 2001) work explores the notion of identity within adult education, she convincingly describes how identity is institutionally and co-constructively assigned by both teachers of EAL and adult EAL learners.

A telling example from Norton's (2001) work is Katarina, an immigrant from Poland, who was one of Norton's research participants. Norton demonstrates how Katarina organized and engaged in identity construction and negotiation through her instructor's validation of her future imagined identity. Norton describes how Katarina decided to quit her ESL course because her English instructor expressed skepticism when Katarina shared her dream of becoming a member of the information technology professional community in Canada. Following her leaving the ESL course, Katarina registered for a computer course thus positioning herself on route of becoming a member of the information technology professional community and transitioning her identity from an imagined one to an actualized one. While such freedom of choice may be more traditionally restricted in K-12 contexts, Norton's (2000, 2001) studies allow us to see that identity work within EAL is context-, discourse-, and narration-dependent. Norton's (2001) description of Katarina's actions of resistance to the identity assigned to her by the course instructor is revealing. This example illustrates that institutionally assigned roles of teachers and learners play an important part in the developing identities of language learners.

This is substantiated in Morita (2004), for example, who argues that learners' participation is strongly associated with learners' identity and that such participation depends on relational discourse with language instructors who can impede or facilitate engagement and positive identity as a learner of EAL. Morita (2004) worked with six Japanese female graduate students and their ten respective instructors in a Canadian university and demonstrated that

although silence is culturally related to gender in Japan, neither gender nor culture are static categories. In fact, Morita (2004) shows that institutionally assigned identities attributed by individuals such as language instructors in academic institutions play a determining part in the socialization process of learners of EAL and that using this power, instructors must consciously avoid ascribing learners with traits of gender- or origin-based deficits. Both Morita (2004) and Norton (2000) exemplify how ascribed characteristics that position language learners in dichotomous, flat terms as either capable or incapable and motivated or unmotivated to learn an additional language negate the complex nature of the association between learning EAL and one's concept of self as a learner and user of EAL.

In criticizing the use of the notion of motivation as a descriptor of learners' identity and their level of engagement in learning EAL, Norton Peirce (1995) and Norton (2000, 2001) suggest *investment* as an alternative term. The term has blazed a new research trajectory where the notion of investment, rather than motivation, is used to explain EAL learners' attitudes and decision-making in learning EAL (Angelil-Carter, 1997; Babino & Stewart, 2017; Bearse, & de Jong, 2008; Chen, Warden, & Chang, 2005; Gu, 2008; Nakamaru, 2011; McKay & Wong, 1996). For Norton (2000), it is not merely learning the grammatical structure, the semantics, or the syntax of a new language that learners take upon themselves when learning an additional language. Rather, it is focusing on identity-related acts of investment of time, energy, and financial resources as learners construct their identities, to close the gap—to use Sfard and Prusak's (2005) notion—between their actual identities and their designated identities (Sfard & Prusak, 2005, p. 16) thus pushing forward and underscoring the strong association between identity and learning EAL.

Methodologically speaking, the notion of *investment* and its relationship with learners' identity as users and speakers of EAL was more often explored among adult learners of EAL. For example, Angelil-Carter (1997) interviewed a young university student in South Africa; Chen et al. (2005) investigated it among college students in Taiwan who were learners of English as a foreign language (EFL); Gu (2008) worked with EFL college students in China; and Nakamaru (2011) investigated the construct among community-college students who were taking a remedial course in English. In regard to younger students, Babino and Stewart (2017) investigated the construct of *investment* among bilingual Grade 5 students in the United States; Bearse and de Jong (2008) looked into the construct among bilingual secondary school children; and McKay and Wong (1996) investigated how four 12-year-old

immigrants from Taiwan and China co-constructed their identities as learners of EAL exercising agency in the face of their teachers' practices of labeling them as either good students or weak students. While this body of research on *investment* is instructive, it points to the need for additional studies that looks into the construct of *investment* among EAL school children in general and high school students in particular.

Investment is an important construct in understanding learners' identity as users and speakers of EAL because such a construct may, at least partially, address some of the limitations that using the term *motivation* imposes on making sense of learners' developing identities as learners and users of EAL (Norton, 2000). More specifically, Norton (1997) and Norton and Gao (2008) rationalize that rather than asking "Is the learner motivated to learn the target language?" and "What kind of personality does the learner have?" (Norton, 1997, p. 411)—that orient the observer or researcher toward the more etic-like, static, dichotomous "representation" of learners' identities as either *motivated* or *unmotivated*, for example, asking questions that orient our attention toward learners' acts of investment have the potential of yielding far more emic-like, agentive, and multidimensional manifestations of students' developing identities as learners of an additional language. Such questions may be, "What is the learner's investment in the target language? How is the learner's relationship to the target language socially and historically constructed?" (Norton, 1997, p. 411).

Indeed, in her work with Cambodian women learning EAL, Skilton-Sylvester (2002) explains why the term *motivation* no longer suffices to make sense of students' identities as learners of EAL and argues that focus should rather be put on learners' *investment* and on "the interaction between who learners are, [and on] which identities are acknowledged and recruited in and out of the classroom" (Skilton-Sylvester, 2002, p. 11). The shift from using *motivation* to using *investment* when speaking of learners' disposition to learning an additional language is vital as it allows us to see EAL learners as agentive not only in instances of acceptance but also in expressions of resistance. To wit, the treatment of the concept of *motivation* among language learners has been identified as providing tools for research that are not sufficiently adequate to explore the complex nature of students' developing identity as learners of an additional language. This realization of the inadequacy of the term *motivation* in investigating learners' identity has also been seen among researchers who have continually argued for the utility in exploring learners' motivation. For

example, Ushioda (2016) who has long been exploring learners' motivation explains that the construct has suffered a decline in research:

because the analysis of motivation and its role in language learning has largely been at the level of global learning behaviours and L2 achievement outcomes, and motivation research has tended not to address more fine grained processes of language acquisition or linguistic development (Ushioda, 2016, p. 567).

Ushioda's (2016) stance corroborates Norton's (2000) and Norton Peirce's (1995) push toward using *investment* when making sense of identity-related learners' decision making in accepting or resisting pedagogical practices employed in language learning contexts.

An additional important identity-related construct that was developed by Norton (1997) is the construct of *ownership* in using and speaking EAL. Norton (1997) explains,

[E]very time language learners speak, they are not only exchanging information with their interlocutors; they are also constantly organizing and reorganizing a sense of who they are and how they relate to the social world. They are, in other words, engaged in identity construction (Norton, 1997, p. 410).

Drawing on Bourdieu's (1977) work Norton (1997) makes it clear that "If learners of English cannot claim ownership of a language, they might not consider themselves legitimate speakers of that language. By extension, there is an important relationship among language, identity, and ownership of English" (Norton, 1997, p. 422). Associated with the notion of *ownership* in learning English are the notions of *imagined communities* (Wenger, 1998) and *figured worlds* (Holland et al., 1998), which reference individuals' future aspirations and visions of belonging into groups and their taking ownership over the process of becoming a full member in figured communities. Wenger (1998) specifies that it is a sense of belonging that shapes processes of identity, that there are three distinct modes of belonging that include *imagination*, *engagement*, and *alignment*, and that neither entails any of the others (Wenger, 1998, p. 179). Researchers, such as Kharchenko (2014) and Cohen (2012), picked up the notion of belonging and of imagined communities as identity-related among learners. However, while Kharchenko (2014) critically discusses the potential "destructive and consolidating roles" (p. 24) of imagined communities as, often, people "are offered a very limited range of possibilities of imagined identities and communities" (p. 32) and consequently are short-changed, Cohen (2012) provides empirical support to demonstrate how the imagined community of English speakers

informs the actions—or inactions—of three teenage Spanish-speaking ESL girls in the United States. Both studies contribute to our understanding of the notion of *imagined communities* and its relevance in the exploration of learners' agentic decision-making but at the same time they also point to constraints imposed on learners in regard to their learning. Using the constructs of investment, ownership, and imagined communities in understanding newcomers' developing identities as learners and users of English provides vocabulary that not only helps us understand the complex nature of the relationship between learning and identity but also sheds light on the intersection point among learners' identity, their past events, present experiences, and future trajectories.

Theoretically speaking, researchers who drew on Norton's (1997, 2000) and Norton Peirce's (1995) notions of learners' *investment*, *ownership*, and *imagined communities* to explore learners' identity among EAL school students worked within sociocultural theory. In fact, Norton (2006) defines identity as a sociocultural construct in and of itself. Evidence to support this claim has been mounting. Cohen (2012), for example, demonstrates how socioculturally embedded experiences shaped and developed the future images of self in the three adolescent Mexican English learners he has worked with. He showed how the three teenagers became disillusioned with their high school ESL classes realizing that these did not guarantee their learning in regular non-ESL classes where they felt they belonged. These insights were substantiated through rigorous methodological work where Cohen (2012) collected data through daily observations of in-class interactions between the three students and their ESL teacher. Altogether, he compiled 75 hours of classroom reports as well as memos where he recorded his reflections of what he saw and heard. In addition, Cohen (2012) conducted numerous semi-structured interviews with the three students and two 90-minute interviews with the girls' ESL teacher. Like other studies that explore EAL learners' identity through vocabulary such as *investment* and *ownership*, Cohen's (2012) work adds empirical support to Norton's (1997) assertion that "teachers need to conceive of their students as having social needs and aspirations that may be inseparable from linguistics needs" (Norton, 1997, p. 415).

But imagined communities go beyond EAL learners' developing a sense of belonging of self through acts of imagination, engagement, and alignment (Wenger, 1998) to include nation-wide and world-embracing imagined communities. Such imagined communities sometimes include images that relate to the global future at large and the formation and reformation of

nations. Norton and Kamal (2003) conducted their research on imagined communities in Karachi, Pakistan among middle-school Pakistani students who spoke Urdu and English. They collected data through questionnaires, interviews, and observations. The authors found that imagined communities extend beyond mere wishing to belong in a not-yet-accessible community to include a sense of belonging to a larger not-yet-fully developed all-encompassing international community that shares the same religious decrees.

Specifically, the authors found that the young adolescents in Pakistan, while wishing for a society that is literate so that “people could think” they also wished that the future world community at large would be based on Islamic decree. For these Pakistani adolescents, their imagined future had two sides. On the one hand, learning English was a tool to achieving better possibilities; on the other hand, spreading of Western culture was “a bad sign” (Norton & Kamal, 2003, p. 310). Norton and Kamal’s (2003) contextualized treatment of the potential meaning of imagined communities ties back to Kharchenko’s (2014) conclusion that “imagination is not always a constructive and beneficial driving force” (p. 38) and, in turn, underscores axiology-related considerations as important among EAL learners.

In exploring the experience of young newcomers to Canada, Naraghi (2013) and Gallucci (2016) identified several identity-related issues that were important in the experience of the transition. Specifically, Naraghi (2013) interviewed ten ESL adolescents who came from a variety of countries and who took ESL courses at one point of the transition. The interviews she conducted were all in English. This is important to note because, by Naraghi’s (2013) admission, the use of English-only in the interviews precluded the sharing of experiences that could have been brought to light had the interviews been conducted in the participants’ respective L1. Similarly, Gallucci (2016) has also interviewed ten young adults who have immigrated to Canada between the ages of five to 17. While four of her participants immigrated to Canada when they were at high school age, they all had already been in Canada for many years at the time of the study. Gallucci (2016) too had conducted the study in English only. Both Naraghi (2013) and Gallucci (2016) have found that the use of English among the newcomers was associated with their identity—that is, with how they saw themselves as users and speakers of English. While the issues they raised pertained to *ownership* and feeling confident with their speaking in English, they did not seem to focus on other relevant identity-related constructs such as *investment* and *imagined communities*.

What we have learned from this literature review can be summarized into the following points: That identity-related categories such as culture and gender are not static; that we now have new and renewed constructs such as *investment*, *ownership*, *imagined communities*, and *belonging* that allow for the investigation of identity as agentive, emic-like expressions of resistance or examples of acceptance; that exploring these constructs allows us to see how identity is ascribed, recruited, and co-constructed through interactions; and that EAL learners' identity is socioculturally, discursively, and contextually embedded. I now turn to identity in mathematics education.

Exploring *Identity* in Mathematics Education

The concept of identity in mathematics education has gained increased attention in the last two decades. In introducing the concept of identity into mathematics education as a category of analysis, to use Brubaker and Cooper's (2000) term, Sfard and Prusak (2005) discuss storied selves as a tool to examine learners' actual and designated identities. To formulate this framework, they used data collected from an advanced course in mathematics in a high school that comprised veteran Israeli teenagers and Russian teenagers who had recently immigrated to Israel. They show that culture plays an important role in learners' mathematics identity. Specifically, they demonstrate how among veteran Israelis mathematics is perceived as a means to prestigious post-secondary programs whereas among their Russian counterparts, mathematics is perceived as an end in and of itself. Methodologically speaking, this realization was substantiated by an analytical framework that used stories that were mutually constructed about the students as learners of mathematics by the students, their teachers, and their parents (Prusak, 2003). These stories comprise what Sfard and Prusak (2005) call "actual and designated identities" (Sfard & Prusak, 2005, p. 18) that reflect imagined and expected identities that are continually negotiated with current identities.

According to Sfard and Prusak (2005), closing the gap between actual and designated identities is made possible through learning. Both actual and designated identities are constructed, ascribed, or self-assigned "narratives about individuals that are reifying, endorsable, and significant" (p. 16). Sfard and Prusak (2005) suggest that culture plays a determining role in collectively shaping students' identities as learners of mathematics. Even though Sfard and Prusak's analytical framework is helpful as it provides a useful operationalization of a much-

needed construct, Graven, Hewana, and Stott (2013) note that it still needs to be adopted as an analytical framework for it to gain empirical substance.

Similar to Sfard and Prusak (2005), McFeetors and Mason (2005) locate the work of identity in the construction of narratives. They, however, do not associate it with cultural background but with experiences of success. McFeetors and Mason's (2005) work in Manitoba, Canada, on constructing identity narratives of success through interactive journal writing, students' portfolios, and teacher's field notes reveals that "succeeding in school mathematics is less a matter of learning mathematics content than it is a quest for a more positive sense of identity in mathematics class" (p. 17). Through the "amplification," to use their term, of students' voices, students developed identities as successful learners of mathematics who trust their mathematical thinking thus contributing to our understanding identity work through positive personal experiences, opportunity to trust their thinking, and identifying of self as mathematically abled. McFeetors and Mason's (2005) description of how one teacher's expectations, demands, and a steady stream of positive feedback and of how students' success narratives about themselves in mathematics changed the students' identities as learners of mathematics resonates with Bauman's (1996) definition of identity as "being looked at by others, being framed and moulded by their scrutiny, demands and expectations" (p. 18). What constructed the students' mathematics identity as successful learners was the teacher's way of framing the students, her scrutiny, demands, and expectations to construct narratives of success in regard to school mathematics.

Narratives of a different kind than those described by McFeetors and Mason (2005) are those described by Graven et al. (2013) who draw on Wenger's (1998) notion of *communities of practice* and in particular his term *learning trajectories* to build on the relationship between learning and identity. This group of researchers focuses on the relationship between students' identities as learners of school mathematics and the numeracy crisis in South Africa. The authors claim that the stories told by the learners about their experiences of school mathematics formulate their dispositions toward this school subject and their identities as learners and doers of school mathematics. The instrument Graven et al. (2013) used for their research was students' written autobiographical records of their experience of school mathematics since the beginning of elementary school.

I consider these studies through the lens that shifts our attention from the exploration of learners' identity as a cognitive- or psychological-dependent to exploration of the construct as a sociocultural concept (see Lerman, 2000, 2006; Reuman, Mac Iver, Eccles, & Wigfield, 1987;

Sfard, 2006). This shift in focus laid down a new trajectory of research that explored mathematics identity through, inter alia, narratives (see Andersson, Valero, & Meaney, 2015; Di Martino & Zan, 2010), processes of socialization (see Betz & Sekaquaptewa, 2012; Lernerll, 2016; Martin, 2007; McGee & Martin, 2011; Nasir & Shah, 2011; Stinson, 2006, 2008), cultural differences (see Pepin, 2011; Sfard & Prusak, 2005), pedagogical practices (see Boaler & Selling, 2017; Boaler, Wiliam, & Brown, 2000), and discourse (see Heyd-Metzuyanim, 2013, 2017; Heyd-Metzuyanim & Sfard, 2011; Mason & McFeetors, 2007).

These studies and others have helped in blazing research paths that are increasingly gaining recognition in mathematics education (see Fellus, 2018; Fellus et al., 2018). Looking at the publications of the NCTM's (National Council of Teachers of Mathematics) *Journal for Research in Mathematics Education*, one can see that out of twelve papers that were published in the five 2017 issues, four papers explicitly focused on learners' identity (Boaler & Selling, 2017; Langer-Osuna, 2017; Leyva, 2017; Radovic, Black, Salas, & Williams, 2017). Compare this to the one paper out of about ten published in 2016 (Larnell, 2016) and the one paper out of thirteen published in 2015 (McGee, 2005), to no papers on identity in 2014, to five papers on identity-related issues out of 28 papers published in 2013, four of which were published in the special issue on equity (Nasir & McKinney de Royston, 2013; Stinson, 2013; Turner, Dominguez, Maldonado, Empson, 2013; Walshaw, 2013; Wood, 2013) thus rendering them as foregrounding an etic-like focus on identity as opposed to the papers published in 2017 that are more oriented toward the emic-like perspective of identity, i.e., one that focuses on understanding identity from the point of view of the learners.

The identity-related dimensions that were explored in the five 2017 papers are of particular relevance. While Boaler and Selling (2017) show that pedagogical practices in mathematics—project-based program versus traditional teaching—impact students' identity as users and doers of mathematics and, in turn, their professional trajectories, Leyva (2017) and Radovic, Black, Salas, and Williams (2017), explore mathematics identity through the lens of the socialization of myths and socioculturally available identities, and Langer-Osuna (2017) shares work on the concept of authorial identity in mathematics education. Considering all these perspectives points to a treatment of identity through multiple dimensions that are distinct but inseparable.

Looking back, research in the 70s, 80s, and 90s of the twentieth century that explored students' identity-related attitudes and dispositions toward mathematics focused on the cognitive

aspects of learning through learners' output (Lerman, 2000). Such investigations tended to take the form of quantitative measurements. For example, Reuman et al. (1987) conducted a longitudinal study where they had 1,490 students answer a Likert-type questionnaire about their feelings, thoughts, and perceptions of the transition to high school mathematics as well as their feelings toward possible scenarios from school mathematics. While shedding light on the experience of transition to high school mathematics by capturing context-dependent—and identity-related—reactions, such studies failed to illuminate the incremental nature of developing dispositions toward school mathematics because they tended to be limited in terms of directionality focusing on causal relationship rather than encompassing a more complex network of socioculturally multi-directional identity-related dimensions.

Similar tools of large-scale data collection on students' identity-related concepts such as attitudes and dispositions toward mathematics are widely used in national and international standardized tests such as PISA (Kanes, Morgan, & Tsatsaroni, 2014). It goes without saying, however, that the use of large-scale tools that are aimed at capturing students' dispositions about mathematics, by default, leave many important identity-related dimensions opaque (Sjøberg, 2015). Nevertheless, in spite of the challenge of capturing the dynamic nature of identity work through such tools, a recent study did just that. The study was conducted by Nollenberger, Rodríguez-Planas, and Sevilla (2016) who looked at the performance in PISA of second-generation female immigrants and revealed that gender-gap in mathematics disappeared among girls of families who emigrated from more gender-equal cultures. Even though, methodologically speaking, this study explored identity (i.e., gender, country of origin, age) through nominal and ordinal scales, and even though “users of numerical information are thus habitually overlooking the potentially significant differences hiding beneath uniform numerical surfaces” (Sfard, 2009, p. 13) thus deemed to be unrepresentative of the dynamic nature of identity work (Sfard, 2009), this study foregrounds the strong association between socio-cultural contexts and socioculturally available selfhoods and achievements in mathematics.

In broad terms, identity-related constructs were explored in mathematics education with association to, among other things, pedagogical practices (Boaler, Wiliam, & Zevenbergen, 2000), socioculturally and historically constructed collective identities (Sfard & Prusak, 2005), learners' language and language of instruction (Moschkovich, 2002; 2007; 2013), race (Berry, Thunder, & McClain, 2011; Larnell, 2016; McGee, 2015; McGee &

Martin, 2011; Nasir & Shah, 2011), gender (Rodd & Bartholomew, 2006; Solomon, 2007a, 2007b), class (Atweh & Cooper, 1995; Jones & Myhill, 2004; Oakes, 1990) and imagined futures (Black et al., 2010; Williams et al., 2007).

Operationally speaking, these studies vary as well. Exploring identity through narratives and personal accounts is prevalent. Larnell's (2016) insight, for example, as to the use of narratives is revealing when he defines mathematics identity "as a set of personal narrativizations about mathematics-learning or mathematics-teaching experiences that reify, endorse, and signify their subject as a certain kind of mathematics user or doer" (p. 239). This is an important definition as it not only alludes to Gee's (2001) perception of NIDA identity, but it also echoes Sfard and Prusak's (2005) conceptualization of learner's mathematics identity as an ongoing process of reification of a mathematics identity narrative that is done through expressions of conjugations of the verbs *being* or *having*. For example, saying of a student that "he has a gift for mathematics" is reifying his mathematics identity as a certain kind of user and doer of mathematics who possesses a knack for mathematics. Like Larnell (2016) whose work focuses on exploring learners' mathematics identity among African American students, Martin (2000, 2007) and Berry, Thunder, and McClain (2011) locate it in the socialization processes that propagate metanarratives and stereotypes. They show how African American children who are successful in mathematics draw on socioculturally available selfhoods to continue investing in their learning of mathematics.

Larnell (2016) collected data through observations and interviews in a remedial course at a 4-year university and showed how institutional practices that are framed as remedial programs perpetuate deficit-oriented metanarratives of mathematics identity. He brings the stories of Vanessa and Cedric, two African American students taking a remedial course in mathematics, whose accounts demonstrate how institutionally framed practices substantiate and transmit "a deficit-oriented and identity-threatening master narrative about the experiences of African American students in [remedial] mathematics courses" (Larnell, 2016, p. 259-260). This institutionally assigned identity, to echo Gee's (2001) term of *institution identity*, is exacerbated by the fact that by Larnell's (2016) admission, "this mimetic master narrating was happening year after year under the auspices of an institutional support system" (Larnell, 2016, p. 260). Although Larnell (2016) does not explicitly explore the notion of discursal identity, he nonetheless acknowledges how the way institutions discursively frame African American students contributes to perpetuating stereotypes and metanarratives of deficit. In other words,

without specifically putting forth discursual frameworks to understanding identity, Larnell (2016) suggests that inadvertently, “the institution itself can present barriers to black learners and their identities” (Larnell, 2016, p. 261).

While Larnell’s (2016) work leans toward discursive and socioculturally available identities in mathematics, other scholars highlight other identity-related dimensions. Reporting on their work on identity in mathematics education, a group of researchers in England describes a two-year-long series of seminars that were coordinated throughout England on the topic of *Mathematics relationships: Identities and participation*. The book, which was edited by Black, Mendick, and Solomon (2009), focuses on three identity-related perspectives: sociocultural, discursive, and psychoanalytic to explore the question of: What can a focus on identities and relationships bring to understanding issues of inclusion in and exclusion from mathematics? Black, Mendick, and Solomon’s (2009) work is helpful in that it shifts attention from static proxies of identity to complex ones that include individuals’ interpretations of their respective experiences in mathematics, their actions of and reactions to identifying of self in mathematics, and their sociocultural contexts. While each of these aspects can be explored as a stand-alone dimension, each is an essential part in the puzzle of the construction of identity.

Whereas the studies discussed here as well as others that I mentioned earlier contribute to our understanding of identity in EAL and in mathematics as including aspects of ownership and autobiographical, discursual, and sociocultural dimensions, the following questions remain open: How does learners’ identity develop continually through acts of authorship that are used in this study to reference a speaker’s positions, opinions, and beliefs, to draw from Ivanič (1998)? How does one’s autobiography shape one’s identity as a learner? How does identifying of self through discourse frame one’s identity? And, how do socioculturally available selfhoods open or close options for what one can become? To answer these questions, I import Ivanič’s (1998) work that suggests a unified framework of four simultaneously inter-animated, identity-related dimensions of authorial, autobiographical, discursual, and socioculturally available selfhoods (these are defined in the following sections). I find Ivanič’s (1998) work valuable because she positions these four identity-related dimensions as complementary rather than as contesting each other very much like a puzzle whose pieces need to be put together to create a picture however ephemeral.

Toward a Network Framework of Identity

As shown in the previous sections, identity in the last two decades was understood and conceptualized within sociocultural framework as a co-constructed, interpretive, collective, action oriented, and negotiated construct. However, as Brubaker and Cooper (2000) have pointed out, there has been a conflation between identity as a category of practice and identity as a category of analysis, which caused the incompatibility between how identity is conceptualized as being in flux and how it is operationalized as a flat construct that focuses on using qualifiers of the “holy trinity” (Brubaker & Cooper, 2000). In the context of mathematics education as well as in the context of learning EAL, scholars have repeatedly and explicitly stated their conceptualization of identity as co-constructed and negotiated. However, to use Brubaker and Cooper’s (2000) distinction, while the conceptualization of identity passed the threshold between seeing identity as a category of practice and seeing it as a category of analysis, the analytical frameworks employed seem to still be in transition to the realm of researching identity as a category of analysis.

Indeed, Andersson et al. (2015) argue that the incompatibility between theorizing identity as dynamic and operationalizing it as static cements individuals in their respective assigned identities. Specifically, they use Sfard and Prusak’s (2005) seminal paper as an example, [M]any analyses use a static description of identity narratives, as reified, intrinsic characteristics of the students’ self. For example, Sfard and Prusak (2005) investigated the cultural differences in the identities of “new-comers” and “old-timers” in relation to their performance in mathematics education in Israel. Their theoretical framework was discursive and pointed to the relationship between personal identity narratives and the discursive field of relations where those identities emerge. Yet, the way in which the analysis used the labels to describe a student/group of students seemed to be in opposition to the idea that identities change as students move between groups (Andersson et al. 2015, p. 145).

Andersson et al. (2015) seem to understand Sfard and Prusak’s (2005) notion of reified identities as labeling. While this may be the case in some real-life contexts where cultural or racial backgrounds are used as identity-related labels in the context of mathematics education, I see here two distinct—however, inseparable—identity-related dimensions. One highlights identities that are socioculturally available; the other highlights identities that are discursively ascribed or

self-assigned. One references socioculturally available selfhoods, the other discursual identity. What Andersson et al. (2015) may see as contradictory, I see as complementary. These scholars' reference to the possibility to move between groups, can also be conceptualized as the availability of socioculturally framed selfhoods learners recruit, accept, or resist. Using the terms discussed in previous sections is helpful in seeing how Andersson et al. (2015) turn our attention to practices of labeling that discursively assign identity-related ideas highlighting the need to shed light on the very blind spots erected by the treatment of identity as a category of practice. This speaks to the compelling need to highlight the simultaneously multidirectional nature of identity work. To do that, we need to further discuss ways that are conducive to the treatment of identity as a *category of analysis*, to use Brubaker and Cooper's (2000) term to shed light the four identity-related aspects offered in this study.

This is not to say that efforts to do so are not in full motion. Consider, for example, the work of Berry et al. (2011). Drawing on Martin (2007), Berry et al. (2011) define mathematics identity as one's endorsed beliefs about "(a) their ability to do mathematics, (b) the significance of mathematical knowledge, (c) the opportunities and barriers to enter mathematics fields, and (d) the motivation and persistence needed to obtain mathematics knowledge" (Berry et al., 2011, p. 13). In addition, Berry et al (2011) focus their exploration of mathematical identity on "racialized forms of experience" (p. 13) as the focal point. These researchers demonstrate how metanarratives create spaces for individuals to find possible identities. Similarly, Noble (2011) shows how vicarious experiences (i.e., taking the place of another person through imagination) appear to be more influential than enactive attainment (i.e., academic performance) in developing positive identities in learning mathematics among African American university students. Noble (2011) asked six African American participants aged 18-23 to fill out a form that contained a few questions to elicit their mathematical autobiography. Once he received the participants' written mathematical autobiographies, he conducted a 30-minute to an hour interview with each. Noble's (2011) work demonstrates that "academic role models" in the form of teachers and family members offer available identities for learners to align with. While these studies support a broader understanding of identity work that includes autobiographical identities and socioculturally available identities, they also suggest a fragmented treatment of identity, which blurs the working of other dimensions and leaves them in the shadows thus rendering them as somewhat missing.

In the field of EAL, Norton's (2000) work has convincingly treated identity as a category of analysis by describing the immigrant women's personal autobiographical stories while using, without overtly referring to them as such, these women's discoursal identity and socioculturally available selfhoods. Even though Norton did not explicitly use the terms *autobiographical identity*, *discoursal identity*, or *socioculturally available identities*, her work brings forth these very dimensions of identity work. By describing the women's narratives of struggle in moving to a new country and having to learn English as an additional language; by highlighting instances where the women constructed their identity as learners of EAL through acts of ownership of English; by identifying themselves as individuals who can, and will, use EAL and successfully close the gap between their "actual identities and designated ones" to quote Sfard and Prusak (2005), Norton—however tacitly—pulls together a multimodal construction of self as a learner of EAL, a model that Ivanič (1998) has formulated almost two decades ago.

It is important to note at this point that even though Ivanič's work was conducted in the field of academic writing, I find it helpful for the purposes of exploring identity work in mathematics (see Fellus, 2017) and in EAL. This border crossing between understanding identity in academic writing and understanding it in mathematics education and learning EAL may seem to some as connecting unrelated disciplines. However, drawing from the work of Roth (2010), who discusses, in detail, the notion of *discipline*, its etymology, and its imposed constraints on research, I pull down the disciplinary barriers to be able to import Ivanič's model to mathematics education and to EAL in order to cater to the context of teenage newcomers. Ivanič's (1998) work is situated within the sociocultural theory that contends that we develop in and through interaction. In her study, Ivanič (1998) offers the following four facets that are in a constant relation of simultaneity (Holquist, 1985) in the development of a writer's identity: authorial self, autobiographical self, discoursal self, and socioculturally available selfhoods. In her work, Ivanič (1998) demonstrates how writers continually shape their writer's identity, how they construct their autobiographical story that they choose to put forth, how they appropriate ideas and take ownership over what they write, how they position themselves in relation to others, and how they choose who and what to align their writing with.

Ivanič (1998) shows that while these are distinct dimensions of identity work, they are mutually co-constructive and simultaneous. In mathematics education, Andersson et al. (2015) formulate a similar understanding that identity includes past experiences, identifying of self, and available selfhoods. However, unlike Ivanič (1998), they bundle all in narratives rather than in

distinct dimensions of autobiographical, authorial, discursual, and socioculturally available selfhoods. People's identities can be taken to be narratives as these are expressions both of the submission of the person to his/her cultural, political, and institutional relationships, and of the possibility of agency—including resistance—that the person can gain in re-inscribing his/her stories in a given practice. While the term identity narrative allows us to emphasize the inseparability of identity from its discursive, cultural, and institutional context (Andersson et al., 2015, p. 146), it only allows for a narrow “representation” of the different identity-related dimensions very much like a rubber band that has patterns on it that are not clearly visible when the rubber band is relaxed. I use this analogy to explain the necessity of individually treating the four distinct but inseparable identity-related dimensions.

Ivanič's (1998) model, suggests a fourth construct of authorial identity in addition to those mentioned by Andersson et al. (2015) thus offering an important building block in identity work in mathematics and in EAL. Using Ivanič's (1998) four interwoven dimensions, it will be helpful to see how these dimensions were explored in the research literature on identity in EAL and in mathematics. The following sections first provide background on the dimension and then a description of research studies that explored this dimension in EAL and in mathematics. I then provide a summary and a conclusion that uses the four identity-related dimensions as a unified framework before turning to my own research.

Exploring the research literature that studied identity through any of the four identity-related dimensions that Ivanič (1998) has put forward, I identified relevant work and compiled about 100 studies. It is important to note that as I was reading and rereading Ivanič's work, I kept asking myself what the concepts of authorial, autobiographical, discursual, and socioculturally available identities mean? How are these theorized as constructs of identity? And how are they operationalized? In the following sections I answer these questions. The theoretical and empirical studies described below buttress each dimension as an identity-related terrain for exploration. For example, my understanding of autobiographical identity draws on Bruner (2004), McAdams and Bowman (2001), Ochs and Capps (1996), and Polkinghorne (1991); in understanding discursual identity, I draw mainly on Harré & Gillett (1994), Boaler, Wiliam, and Brown (2000), Norton (2000), and Sfard and Prusak (2005); in making sense of authorial identity, I draw on Bakhtin (1981, 1999), Holquist (1983), Langer-Osuna (2017), and Vitanova (2005); and in framing socioculturally available selfhoods, I draw on Heath (1983), Ochs (1990), Sfard and Prusak (2005), and

Wenger (1998). Following the compilation of the studies that I describe below, I categorized them according to Ivanič's (1998) four-dimensional framework in order to create a coherent picture of relevant research done in each dimension.

Notably, more than two thirds of the studies that I cite in this research were published in the last two decades potentially indicating a shift in gears in the treatment of the concept of identity to address its use as a construct of analysis rather than as a construct of practice. Even though the authors cited do not use Ivanič's (1998) four-part identity framework I found it helpful in categorizing the literature into one of her four categories. This categorization was guided by the following criteria: the work explores the notion of identity and it operationalizes identity through constructs that go beyond treating identity as a category of practice. Following a careful reading of each work, I categorized it under one of Ivanič's four-part identity framework depending on the work's main perspective. Table 1. presents the distribution of the compiled publications according to their focus of investigation of identity. I would like to note, though, that this categorization is by no means exhaustive or mutually exclusive. Understanding identity as multidimensional and in constant flux (Ivanič, 1998; Norton, 2000; Wenger, 1998) only helps us frame the construct in terms that highlight its simultaneous multi-dimensional, multi-directional, and inter-animated nature.

Nevertheless, each work was placed in only one of the four columns drawing on the work's main theoretical frameworks or empirical support. In addition, not all the theoretical work that is included in this compilation of studies was included in Ivanič's (1998) work. Such sources include, inter alia, Bruner's, McAdams', and Derrida's respective works. The reason for inclusion of these works here is that they add theoretical or operational substance to the respective identity dimensions. The exercise was aimed at using Ivanič's (1998) four-dimensional identity-related network to offer a unified framework for the investigation of learners' identity among teenage newcomers as they develop their identities as users and doers of school mathematics and as learners of EAL.

Table 1: Research Literature in the four identity-related dimensions

The four identity-related dimensions	Dimension	Discipline	Scholarly Work
	Authorial Identity	Theory	Bakhtin, 1981, 1999; Holquist, 1983;
		Mathematics education	Boaler, 2002; Boaler & Greeno, 2000; Cobb et al., 2009; Dreher, 2012, 2015; Gresalfi & Cobb, 2006; Gresalfi et al. (2009); Jones, 2008; Langer-Osuna, 2015, 2016; 2017; Langer-Osuna & Esmonde, 2017; McFeetors & Mason, 2005; Menard-Warwick, 2005;
		EAL	Angelil-Carter, 1997; Norton, 1997; Rubdy et al., 2008; Vitanova, 2005;
	Autobiographical Identity	Theory	Bruner, 1986, 1990, 2004; Erdinast-Vulcan, 2008; Ochs & Capps, 1996; Polkinghorne, 1991; 2004; McAdams & Bowman, 2001;
		Mathematics education	Berry et al., 2011; Davis, 2008; Di Martino & Sabena, 2011; Di Martino & Zan, 2010; Graven et al., 2013; Towers et al., 2016; Williams et al., 2007; Zazkis, 2015;
		EAL	Norton, 2001; Safford & Costley, 2008; Vitanova, 2013;
	Discoursal Identity	Theory	Bourdieu, 1977; Derrida, 1985; Harré & Gillett, 1994; Ivanič & Camps, 2001;
		Mathematics education	Andersson et al., 2015; Atweh, 1997; Barwell, 2016; Ben Yehuda et al., 2005; Bishop, 2012; Boaler 2005, 2013; Boaler et al., 2000; Damarin, 2000; Graven & Heyd-Metzuyanim, 2014; Heyd-Metzuyanim, 2013, 2017; Heyd-Metzuyanim & Sfard, 2011; Hodgen & Marks 2009; Hogan, 2008; Larnell, 2016; Sfard, 2009; Sfard & Prusak, 2005; Street et al., 2005;
		EAL	Dillon, 2001; Harklau, 2000; Nakamaru, 2011; Norton 2000; Ortmeier-Hooper, 2008; Shapiro, 2014; Toohey & Derwing, 2008; Turner et al., 2013; Yoon, 2008;
	Socioculturally Available Identities	Theory	Heath, 1983; Lave & Wenger, 1991; Ochs, 1990; Wenger, 1998;
		Mathematics education	Betz & Sakaquaptewa, 2012; Black et al., 2010; Epstein et al., 2010; Hall, 2012; Larnell, 2016; Leyva, 2017; Martin, 2000; McGee & Martin, 2011; Mendick, 2004, 2005; Nasir & Shah, 2011; Noble, 2011; Nollenberger et al., 2016; Radovic et al., 2017; Rodd & Bartholomew, 2006; Sfard & Prusak, 2005; Sheffield, 2015, 2017; Shih et al., 1999; Solomon, 2007a, 2007b; Solomon et al., 2016; Stinson, 2006, 2008, 2013; Walkerdine, 1998; Williams et al., 2007;
		EAL	Cohen, 2012; Cook, 1999; Fang, 2016; Gao, 2014; Kharchenko, 2014; Marx, 2002; Norton & Kamal, 2003; Piller, 2002;

In order to create a coherent categorization, I used a two-cycle categorization process. First, I categorized the studies by dimension then I categorized them by discipline. To wit, the focus of this study is to combine all four dimensions to explore learners' identity. Ivanič's (1998) framework helps in making this possible. This is not to negate the utilitarian purpose of other models for understanding identity but only to point to the relevance of Ivanič's (1998) model to the context of schooling and education where learners' autobiographical identity, authorial identity, discorsal identity, and socioculturally available selfhoods all play an interlaced and inter-activated role as students develop their identity as learners and doers of mathematics and as speakers and users of English as an additional language. I describe the studies by dimension and discipline in the following sections. It is important to note that as these dimensions are equally important in learners' identity work, the order in which they appear does not imply order of importance. I thus organized them alphabetically for ease of reference. In the following sections, I review these studies to show how they examine identity in and through a broad platform that includes storied selfhoods, ownership and authorship, discourse, and sociocultural contexts in the context of mathematics education and EAL.

Authorial identity. While some scholars understand 'authorship' in the sense that turns attention to who authors one's identity; in other words, who and how identities are formed to create a story line of development and change (see for example, Vitanova, 2005), this study uses the construct of authorial identity to reference the stance one takes, and opinions and beliefs one expresses (Ivanič, 1998, p. 26). This should not be conflated with the reifying, endorsable, and significant stories (Sfard & Prusak, 2005) people use to identify themselves and others, which is used in this study as the operationalization of discorsal identity that references how people are talked to and about (Ivanič, 2006).

In order to understand authorial identity, Ivanič (1988) applies Bakhtin's notion of ownership and authorship to the field of academic writing by demonstrating that the nouns *authorship* and *ownership* shape action. It is through acts of alignment with ideas and words and through the development of new meanings that authorship and ownership develop. She notes, "Writers have to recognize that they are involved in a process of self-attribution: forging their own allegiances to particular traditions and sets of values by their language choices" (Ivanič, 1998, p. 3). While raising concerns that specifically pertain to the field of academic writing, she

draws attention to the practice of writers “drawing the voices of others into their writing” (Ivanič, 1998, p. 181) and underscores this essential function of this activity as a building block in the identity of the writer. In a similar vein, Wenger (1998) affiliates authorship-related activity to the “ability, facility, and legitimacy to contribute to, take responsibility for, and shape meanings that matter in a social configuration” (Wenger, 1998, p. 197).

In addition to Ivanič (1988) and Wenger (1998) who frame authorial identity as appropriation of words and ideas and as taking responsibility for meaning making, I draw on Bakhtin’s (1981) notion of authorship that positions speakers as ‘owning’ their words when they populate them with their own accents and intentions. According to Bakhtin, says Holquist (1983), “A speaker is to his utterance what an author is to his text” (Holquist, 1983, p. 315). Indeed, Bakhtin (1981) writes:

The word in language is half someone else’s. It becomes ‘one’s own’ only when the speaker populates it with his own intention, his own accent when he appropriates the word, adapting it to his own semantic and expressive intention. Prior to this moment of appropriation, the word does not exist in a neutral and impersonal language (it is not, after all, out of a dictionary that the speaker gets his words!), but rather it exists in other people’s mouths, in other people’s contexts, serving other people’s intentions: it is from there that one must take the word, and make it one’s own (pp. 293–294).

Bakhtin’s (1981) notion of appropriation of words is essential to the understanding of authorial identity because it reflects the process by which individuals become equal members of groups they would like to have access to (see Bauman, 2001; Holland et al., 1998; Rogoff, 1990). This notion of becoming members of a community by way of appropriation of words and ideas is further developed by (Wenger, 1998) who provides the link to our understanding the role of appropriation of words in getting access to a community. Specifically, Wenger (1998) suggests that “a shared repertoire” (p. 73) is one of the three sources “of coherence of a community” (p. 72) that he identifies. I thus put forward the relationship between acts of appropriation and ownership of the meaning of words and ideas and the process of becoming full members of groups that share this repertoire. This process is made possible by acts of appropriation and ownership of ways of expressions and communication in these groups as Bakhtin explains, “These words of others carry with them their own expression, their own evaluative tone, which we assimilate, rework, and re-accentuate” (Bakhtin, 1999, p. 130).

Holland et al. (1998) who have extended Bakhtin's idea of authorship to anthropological explorations of identity state that "[i]n the making of meaning, we 'author' the world" (p. 170) thus attributing meaning-making to ownership of ideas and authorship. In the next sections, I first discuss how the construct of authorial identity was explored within EAL and then within mathematics education.

Authorial identity in EAL. Wenger's (1998) notions of legitimacy to contribute, taking responsibility, and shaping meanings have been extended within the field of learning EAL to include the development of a sense of ownership of and authorship in the target language. Within authorial identity, the following key questions arise: Who has the right to claim ownership over their English and thus see themselves as able to contribute as full and equal participants in social contexts? How do learners of English author their identities as owners of English? And how do they perceive the affordances and obstacles of learning the target language in the development of authoring their selves?

Norton's (2000) work points to some answers to these questions. She explains, "It is only by understanding the histories and lived experiences of language learners that the language teacher can create conditions that will facilitate social interaction both in the classroom and in the wider community, and help learners claim the right to speak" (Norton, 2000, p. 142). Norton (1997) also notes that ownership in learning EAL is measured and constructed by learners' investment in learning the additional language, and their social and historical contexts that dictate learners' relationships with the language (Norton, 1997, p. 411). For Norton, (1997; 2000) the notion of ownership of a target language is a function of the legitimacy attributed to the learner to use the language. This notion of *ownership as legitimacy* was explored in processes of indigenization, for example, where English becomes the official language in countries whose populations are not native speakers of English. There too, the question of who owns the target language and the question of legitimacy to craft and author ideas and content in the target language become relevant in the dynamics of language use. Take for example the case of Singapore that has made English its official language even though most of its population spoke Mandarin, Malay, and Tamil (Rubdy, McKay, Alsagoff, & Bokhorst-Hang, 2008).

Rubdy et al. (2008) who have explored the question of ownership of English in the Singaporean context found that Singaporean speakers of English own English and "project

themselves as legitimate speakers with authority over the language” (p. 50). In a similar token, in a study with eight pre-service English teacher students, Le Ha (2009) demonstrates how sense of ownership formulates the identity of learners of EAL. For these future English teachers, English was valued on equal terms with other languages the participants spoke. This is an important finding as it points to the value-laden meaning associated with the learning of English as an additional language.

In this context, the question that arises is, what actions shape ownership over a language? According to Menard-Warwick (2005), authorial identity is defined as ongoing, long-term, and agentive. Indeed, in her study of Russian immigrants in the U.S. Vitanova (2005) found that in spite of and because the immigrants she studied could not practice as professionals in their respective fields of expertise, they engaged in authoring their selves in their new lives taking on new professional identities by appropriating relevant vocabularies and jargon. Vera, for example, one of Vitanova’s (2005) research participants could not practice as a journalist as she did in Russia. She then decided to open a catering business appropriating a new set of discourse through which she took ownership over her English learning and engaged with an ongoing process of authoring of her selfhood in her new profession.

Drawing on this sense of appropriation of words, ownership over a new language, and authorship of ideas in the new language that has been developed within the learning of EAL, I turn now to considering the notion of ownership and authorship within mathematics education.

Authorial identity in mathematics education. Authoring and mathematics may seem to some as an oxymoron. It cannot be further from the truth if we consider the act of authoring as the driving force behind doing real mathematics. Consider Feynman’s (1965) reference to sense making, questioning, reasoning, and exploration as he frames these as the lynchpin of learning mathematics. Interestingly, research shows that when students get a chance to practice *freedom of thought* as Feynman (1965) puts it, they attain higher achievements in mathematics. This strong association between authoring and ownership and learning mathematics was substantiated in research. Consider, for example, the work of Wirtz and Kahn (1982) who had three groups of elementary school children work on word problems. One group worked on word problems by closely following the textbook. The second group did not do any textbook word problems at all. The third group was asked to author their own word problem for a whole year. Wirtz and Kahn

(1982) found that the third group attained the highest achievements on standardized tests thus highlighting the relationship between authorship and learning.

Other, more recent studies such as Boaler (2002), Boaler and Greeno (2000), Cobb, Gresalfi, and Hodge (2009), Gresalfi and Cobb (2006), Gresalfi, Martin, Hand, and Greeno (2009), Langer-Osuna (2017), Mann (2006), Prusak (2015), and Silver (2006) also highlight actions of authoring problems in mathematics, of defending one's understanding of a mathematical concept, or as Langer-Osuna and Esmonde (2017) put it, of practicing "conceptual agency" and "intellectual authority" (Langer-Osuna & Esmonde, 2017, p. 60) of mathematical concepts. Even though these scholars did not explicitly use the term *authorial identity* in their work, their studies are relevant here as they provide support for the relationship between learning mathematics and actions of in the context of mathematics education.

Most recently, Langer-Osuna's (2017) work harnesses the construct of authorship to frame what it is that students are expected to do in mathematics classes. She draws attention to the fact that when learners reason, argue, provide explanations, and defend their respective stance, they, in actual fact, engage in work on authorial identity. This association of authorial identity with sense making, reasoning, and arguing is reflective of Bakhtin's (1981, 1999) notion of appropriation of words, which is also advanced by Ivanič's (1998) perspective of authorial identity as a manifestation that "Concerns the speaker's 'voice' in the sense of the speaker's position, opinions, and beliefs" (Ivanič, 1998, p. 26). Operationally speaking, I use this construct by drawing on Bakhtin's notion of 'appropriation' of words, of 'answerability' and 'authorship' (Bakhtin, 1981; Holquist, 1983; Vitanova, 2005). The self as author is particularly relevant in learning as it reflects whose voices, ideas, and meanings learners adopt as their own. It is this notion of "students' opportunities to author, justify, and debate mathematical ideas [that identifies] them with mathematical authority" (Langer-Osuna & Esmonde, 2017, p. 645).

Going beyond procedural, well-rehearsed school mathematics, when students receive opportunities to embark on a quest of mathematical meaning making (Boaler, 2002) or to experience "knowledge ownership" (Hogan, 2008, p. 110), they get a chance to author—and own—mathematical ideas. Hogan (2008) demonstrates how opportunities to formulate (read *author*) one's own ideas in the context of mathematics provide one student the space to take ownership for her own learning of mathematical ideas and to make conceptual connections.

Hogan also shows how taking away these opportunities—when a new teacher and procedural mathematics came into the picture—made the student feel “far less ownership in her learning than she did” before (Hogan, 2008, p. 107).

Similarly, McFeetors and Mason (2005) working with four “non-academic” Grade 10 students showed how these students’ “[e]xperiencing success and giving voice to how they achieved their successes enabled all four students to engage in (re)forming their identities as mathematical thinkers, mathematical learners, individuals, and students of mathematics” (McFeetors and Mason, 2005, p. 22). In a later study, Andersson et al. (2015), found that when students had a say in choosing their own topics of mathematical investigation, they tended to participate more thus reflecting ownership and authorship. They bring the example of Malin, a Swedish high school student, who thrived when given a chance to select a societal issue to explore mathematically. She could reason and provide mathematical arguments in relation to her own work as well as her classmates’ work. The notion of ownership and authorship is alluded to, although not explicitly described as such, in the curriculum of mathematics education. When students reason mathematically, they engage in acts of authoring.

Relevant to authoring in mathematics, some notes in regard to making mistakes are required. Because making mistakes in mathematics is not usually tolerated or recognized as essential in the process of learning (Sheffield, 2015), it is worthwhile to make the connection between making mistakes and authorship because, at times, acts of authorship are accompanied by making mistakes, which should be used as opportunities for learning. According to Sheffield (2015, 2017), students who are allowed to make mistakes and at the same time “construct viable arguments and critique the reasoning of others...have greater enjoyment and a much deeper and long-lasting understanding of mathematical concepts as well as a willingness to attack difficult problems and persevere in their solutions” (Sheffield, 2015, p. 116). Taking charge mathematically by sense making is a manifestation of authoring the self as a learner of mathematics. Indeed, the NCTM (2000), while not explicitly using the term *authoring*, lists expected authoring-related actions such as *developing ideas, exploring phenomena, justifying results, and using mathematical conjectures* (NCTM, 2000, p. 56).

Mathematics authorship also takes place during work on multiple representations of mathematical ideas, an activity that was identified as dominant in mathematical thinking (Ainsworth, 2006; Davydov, 1991; Dreher & Kuntze, 2015; Dreher, Kuntze, & Lerman

2012). In order to be able to engage in multiple representations Seufert (2003) explains: “Learners must interconnect the external representations and actively construct a coherent mental representation in order to benefit from the complementing and constraining functions of multiple representations” (p. 228). To facilitate such engagements that are conducive to the practice of *freedom of thought*, to echo Feynman (1965), in the form of ownership and authorship in the context of mathematics education, Jorgensen (2014) calls for a paradigm shift in mathematics education that will allow for researchers, practitioners, and policy makers to adopt a “knowledge-making epistemology” (Jorgensen, 2014, p. 316) so that “theorizing the identities of learners will help advance mathematical learning for all students” (Jorgensen, 2014, p. 314).

This emphasis on the relationship between acts of reasoning, making mistakes, making sense, and explaining on the one hand, and learners’ identity as users of mathematics on the other hand was suggested by Jones (2008) who conducted a nine-week study with eighteen Grade 7 students who were institutionally labeled as “underachieving middle and high school students” (Jones, 2008, p. 31). When she was unexpectedly assigned to teach this class, she decided to apply the same pedagogical practices that she used with her mathematically gifted students whom she worked with for the last ten years, i.e., she asked the students to keep daily journals where they recorded—for 15 minutes—their explanations and justifications to their mathematical solutions (Jones, 2008, p. 36). Jones (2008) conducted a pre- and post-test and classroom observations, and collected students’ work and journal entries to gauge their learning of mathematics. She found that when students were allowed to openly communicate, rationalize, defend their ideas, and freely use (read author and own) mathematical ideas, they experienced “growth of mathematical and strategic knowledge” (Jones, 2008, p. 39) hence changing her perception of their identity as learners and users of mathematics. In a similar vein, Maher and Martino (1996) state that when students are allowed to “offer proof and justification for their answers, disparate and distinct structures of knowledge interact and eventually become integrated” (p. 197) thus reflecting ownership over mathematics.

In sum, in the context of learning EAL and mathematics education, the questions I ask are how do learners engage in acts of authoring and ownership of EAL and mathematics?

Traditionally, such ownership is granted to textbooks, and other sorts of publications and to the teachers who mediate the curriculum that is dictated by policy makers. However, shifting

attention to acts of authorship and ownership within EAL and mathematics, may allow these to take front stage position so that they can be noticed as identity work.

Autobiographical identity. In his book, *Acts of Meaning*, Bruner (1990) frames narrative as “a mode of organizing experience” (Bruner, 1990, p. 43) and provides a fascinating account of humans’ meaning making through narratives and, by extension, through autobiographies. In his comprehensive treatment of this idea, Bruner (1990) writes,

It begins to be clear why narrative is such a natural vehicle for folk psychology. It deals with the stuff of human action and human intentionality. It mediates between the canonical world of culture and the more idiosyncratic world of beliefs, desires, and hopes. It renders the exceptional comprehensible and keeps the uncanny at bay—save as the uncanny is needed as a trope. It reiterates the norms of the society without being didactic (p. 52).

Given that storied selfhoods can open a window to viewing the relationship between human action and human intentionality, cultural contexts and beliefs, and behaviours and social norms, it is not surprising that using the stories people tell about themselves as a construct in researching identity was perceived as a promising research field in psychology and other fields toward the end of the twentieth century. In the beginning of the 21st century, storying life experiences, that is used interchangeably with narrative identity, has taken front stage position (McAdams, Josselson, & Lieblich, 2001).

The reason why narrative identity or storying life experiences gained importance lies in the affordances it generates in making sense of life events and people’s intentions and actions. In *Oneself as Another*, for example, Ricoeur (1992) states that narrative should be considered from the point of view of “its contribution to the constitution of the self” (p. 114). Similarly, Ochs and Capps (1996) underscore the important role that narrative plays in making sense of one’s actions and reactions. They explain, “One of the most important functions of narrative is to situate particular events against a larger horizon of what we consider to be human passions, virtues, philosophies, actions, and relationships” (Ochs & Capps, 1996, p. 30). Riessman (2008) echoes this assertion when she says “what individuals do in the world (behavior) is linked to the meanings events and experiences have for them” (Riessman, 2008, p. 203, n. 48). McAdams and Olson (2010) promote a more refined perspective on narratives that sheds light on the

relationship between past events and future trajectories. They contend, “Narrative identity is the storied understanding that a person develops regarding how he or she came to be and where he or she is going in life” (McAdams & Olson, 2010, p. 527). Similarly, Vitanova (2013) frames this connection between past, present, and future in storied life as “a tool for repositioning, resistance, and agency” (Vitanova, 2013, p. 242).

Erdinast-Vulcan (2008) adds yet another function to identity narrative, which puts forth the creation of sense of otherness as it “is an attempt to delineate the boundary-lines of selfhood, to stake out a territory of subjectivity and trace a line of filiation from the past to the present” (Erdinast-Vulcan, 2008, p. 4). She makes an important observation in regard to the role of the listener in co-constructing the narrative identity, i.e., she points to the determining role of the ears that are tuned into the speaker’s telling the story thus arguing for the need to “replace the ‘auto’ of ‘autobiography’ with ‘oto,’” (Erdinast-Vulcan, 2008, p. 6) and forwarding the notion of the crucial part played by others’ listening and reacting to one’s telling the story of self. According to Erdinast-Vulcan (2008) then, the story of the self is in the ear of the beholder as much as it is in the mouth of the teller thus claiming that it is through autobiography that humans fulfil the “need for an other / author who would render them whole” (Erdinast-Vulcan, 2008, p. 6).

In addition to an acute attention to who the listener is, another issue to consider that is relevant to my research refers to how the story of self is framed in the first place. To this end, McAdams and Bowman’s (2001) work on contaminating and redemption self-narratives is instructive. They claim that the framing of identity narratives as a reconstruction of “positive” or “negative” past events that impact the present and shape the future opens a window to how past events are perceived either as redemption events—generating positive outcomes—or contaminating ones—generating negative outcomes. Indeed, Dunlop, Guo, and McAdams (2016) and McAdams and Bowman (2001) suggest that the way people interpret their life events—either as carrying negative impact, i.e., contamination, or as carrying positive impact, i.e., redemption—is positively correlated with their negative or positive life trajectories. This association of an autobiographical (or identity narrative) recount of redemption or contaminating past events with present and future actions has been explored in psychology (Bruner, 1990; Lilgendahl & McAdams, 2011; McAdams & Bowman, 2001). Lilgendahl and McAdams (2011), for example, extend the redemption and contaminating model. They suggest a two-part framework of: “positive processing” by ascribing positive interpretations to past events, and

“differential processing” by using past events to provide reasons for actions taken and decisions made. This helps identify not only what past events are selected but also how these events affect present and future actions and decisions.

I would like to insert here a word of caution in regard to the relationship between identity and storied selfhoods, as these are not carved in stone. That is, the interpretation of lived experiences, much like any aspect of identity, may change across time and space (Polkinghorne, 1988). Drawing on William James, Polkinghorne reminds us that identity is “an idea that a person constructs” rather than “an underlying substance to be discovered” (James, 1890 in Polkinghorne 1988, p. 149). Similarly, Bruner (1990) highlights this sense of the ephemeral nature of an autobiographical identity when he writes, “‘Self of a life was a product of our narrative rather than some fixed but hidden ‘thing’ that was its referent” (Bruner, 1990, p. 112). It is worth bringing Polkinghorne’s quote again in this context for us to understand that such construction is “built on other people’s responses and attitude toward a person and is subject to change as these responses, inherently variable and inconsistent, change in their character” (Polkinghorne, 1988, p. 145). Using these studies as a lens to understanding autobiographical identity, I now turn to exploring autobiographical identity in EAL and in mathematics education.

Autobiographical identity in EAL. The use of autobiographical identity in learning EAL has taken a turn in the last two decades. Norton’s (2000, 2001) work, for example, builds on the autobiographies of the immigrant women she worked with. She collected her data through diverse tools that included diary entries, informal meetings, and essays the women wrote. This collection of data yielded a substantial body of informative text that Norton drew on to compile the biographies of the immigrant women. Even though Norton (2000) did not use McAdams and Bowman’s (2001) notion of the difference between contaminating and redemption stories of autobiographical identity, the women’s autobiographies that Norton (2000, 2001) brings forth feature this notion nonetheless and it will be helpful if I use them as examples to explicate the notion. Consider the autobiographical identity of Katarina (Norton, 2001) that can be framed as a redemption identity narrative because Katarina turned the initially described negative experience into one that had a good ending—by her account—her completing the computer course that her ESL teacher did not think she was capable of doing.

The use of autobiographical identity among learners of EAL is perceived as a method to better understand the development of identity as learners of EAL. Unlike Connelly and Clandinin (2006), who perceive narrative inquiry as “the study of experience as story” (Connelly and Clandinin, 2006, p. 477), I foreground a different emphasis on identity work through autobiographical narration that continually changes and that conceptualizes narrative as a space where one continually constructs their identity as a user and learner of EAL as new experiences are registered and new interpretations are crafted. In line with this perspective, Ivanič (1998) defines autobiographical identity as a narrative that “locates identity in the events and experience, rather than reifying it as a quality or attribute” (Ivanič, 1998, p. 16). Even though Norton’s work on identity among newcomers has become seminal in the field, research among EAL learners that explores autobiographical identity is still scarce. Notably, Safford and Costley (2008) interviewed 17 and 18-year-old newcomers to the UK to identify surviving strategies. While adding to the literature of autobiographical identity among learners of EAL, it points to the vast void in research that explores autobiographical identity among newcomers.

Autobiographical identity in mathematics education. In a recent literature review on the use of autobiographies in mathematics education, Towers, Hall, Rapke, Martin, and Andrews (2016), searched for studies that explored autobiographical narratives that are related to learning mathematics (rather than teaching it). The search that lasted from November 2013 to December 2014 yielded 31 peer reviewed publications of which only a handful focused on K-12 students. Towers et al. (2016) revealed that empirical research studies on autobiographical identity in mathematics education have tended to explore teachers’ autobiographical identity of mathematics rather than K-12 students’ storied selves in the context of mathematics. This yields a picture that depicts a vast terrain of uncharted paths in research on autobiographical identity within K-12 learners of mathematics. Specifically, Towers et al. (2016) found that whereas research on teachers’ autobiographical mathematics identity has been extensive in scope and method, comparable research among K-12 students has remained scant and counted, as of 2014, four papers only. Fast forward four years since the last search, and the research landscape has not changed much showing that K-12 learners’ autobiographical identity in mathematics is still lacking.

One of the few works that was done on K-12 learners' mathematics identity is Di Martino and Zan (2010) who collected essays titled *Me and mathematics: My relationship with mathematics up to now*. Di Martino and Zan (2010) collected these essays from 1,496 students in Grades 1 to 13 in Italy. In analyzing the essays, the authors identified the following three interlaced dimensions: emotional (most students reported on negative emotions in regard to mathematics); vision of mathematics (most students saw mathematics as theoretical rather than practical); and perceived competence as doers and users of mathematics (students self-attributed identities of being or not being successful in mathematics). Alternatively, Davis (2008) interviewed 44 students between the ages of 16 to 19 four times over a course of one year to capture students' decision-making in regard to learning mathematics. Using Holland et al.'s theoretical framework of *figured worlds*, Davis (2008) concluded that students' mathematics-related autobiographical decisions whether to pursue further education in mathematics or not was dominated by a cultural model of performativity. That is, students' decisions in regard to mathematics was embedded in the utility of the subject to their autobiographical identity in relation to future careers and further education.

Both Di Martino and Zan's (2010) work and Davis' (2008) work position autobiographical identity at center stage. However, while the former collected data from the general student population at large, the latter collected data from students who were already successful in mathematics and had solidified plans in regard to their further education and future careers. This difference is important because it suggests that "discourse of performativity" (Davis, 2008, p. 11) is associated with one's autobiographical identity as a learner of school mathematics that affects engagement or disengagement with mathematics thus rendering research of autobiographical identity in different contexts and age levels important.

Given the dearth of research on autobiographical identities in K-12 mathematics education, I searched for studies that can lend deeper insights into this identity-related dimension. While K-12 mathematical autobiography is underexplored (Towers et al. 2016), there are more studies that focus on the relationship between teachers' mathematical autobiography and their relationship with it (see for e.g., Di Martino & Sabena, 2011, and Zazkis, 2015). The study that I describe next was conducted by Zazkis (2015) who brings forth a method of eliciting past experiences of doing and learning mathematics using the method of personification of mathematics based on past experiences with it. Teaching a class of pre-service teachers, Zazkis

(2015), wanted to explore his students' relationship with mathematics to develop a sense of empathy with their experiences. Summarizing the elicited input and employing a method of conceptual blending, which "involves taking the elements of two mental spaces and blending them together to form a new space" (p. 34–35), Zazkis (2015) found that the pre-service teachers have personified mathematics as either an evil beast, a former friend, or a secret lover who is loathed by others. These elicitations shed light onto the teacher candidates' autobiographical identities as learners—and future teachers—of mathematics. Zazkis' (2015) method of personification of mathematics reflects McAdams and Bowman's (2001) notion of contamination or redemption past events. It is worth emphasizing that while Zazkis' (2015) research was not conducted among K-12 students, it nonetheless contributes to our understanding of the necessity, promise, and embedded possibilities in exploring students' autobiographical stories regarding their experiences learning mathematics.

Another study on learners' mathematical autobiography was conducted by Berry, Thunder, and McClain (2011) who worked with 32 Grade 5 to Grade 7 African American boys for the two weeks these boys spent in a summer program for mathematically strong kids. Unlike the previous studies discussed in this section, this study uses the construct of racial identity to argue that it is through resisting socio-culturally scripted identities that these African American boys have developed a mathematics-related autobiographical identity of being successful in school mathematics. This study suggests that identities that are available through metanarratives can be resisted or accepted, thus making it possible to notice how students co-construct autobiographies and develop authorship and ownership in spite of scripted narratives of mathematical identities.

Research on autobiographical identity suggests learners' experiences can be interpreted as positive or negative and that learners' autobiographical identity is action oriented rather than something static people refer to. I have discussed the constructs of autobiographical identity and authorial identity. I now turn to the third facet of identity work.

Discoursal identity. The idea that one's identity is framed through discourse was the centre of research and scholarly work toward the end of the twentieth century (Harré & Gillett, 1994). Bruner (1990), for example, elaborated on the pivotal role discourse plays in shaping one's identity. He writes,

Is not Self a transactional relationship between a speaker and an Other, indeed, a Generalized Other? Is it not a way of framing one's consciousness, one's position, one's identity, one's commitment with respect to another? Self, in this dispensation, becomes "dialogue dependent," designed as much for the recipient of our discourse as for intrapsychic purposes? (Bruner, 1990, p. 101).

Looking at identity through the lens of discourse, then, provides a useful tool in making sense of individuals' developing identities.

Drawing on Vygotsky and Bakhtin, Holland et al. (1998) argue that "[i]n explaining what an 'I' is, position, rather than content, is important" (p. 173). That is, according to how individuals identify themselves when they interact with others is more important than the content of what they are saying. Bakhtin, according to Holland et al. (1998), specifies that one's identity is orchestrated through the way people speak of, "I-for-myself," "I-for-others," and "other-for-myself" (p. 178). These refer to what I tell about myself to myself, what I tell others about myself, and what others tell me and others about me, respectively. The use of discourse as a tool to construct one's identity was identified as a turning point in research and practice (Harré & Gillett, 1994) and was developed theoretically and supported empirically in a wide variety of disciplinary fields such as management and organizations (Ashforth & Schinoff, 2016), psychology (Cresswell & Smith, 2012), philosophy and education (Davies & Harré, 1990; Harré & Gillett, 1994), and linguistics and psycholinguistics (Kupferberg & Gilat, 2012; Wetherell, 2007).

Considering the constructive nature of discursive identity and the fact that identities are socially and jointly constructed (Gee, 2001; Ivanič, 1998; Wenger, 1998), and to allude to Gee's (2001) definition of discourse with a capital 'D' and discourse with a lowercase 'd,' the question that arises is how does discourse construct one's identity? Drawing on Bakhtin, Erdinast-Vulcan (2008) suggests that one's identity is constructed by self-talk: "We are, to put it briefly, 'authored,' configured by an internalized Other in much the same way as a hero is authored by the writer of fictional narratives" (Erdinast-Vulcan, 2008, p. 4). Ivanič (2006), however, locates the other in interlocutors and formulates discursal identity to reference how identity is co-constructed by the way people are talked to and about. She brings the story of Logan to demonstrate that one's identity is constructed by address, i.e., how individuals are talked to by others; by attribution, i.e., how individuals are talked about by others; and by affiliation and alignment, i.e., how individuals sound like others. Examining Ivanič's (2006) perception of the

three discursual means of identity construction and Erdinast-Vulcan's (2008) inclusion of an internalized Other reveals that while Ivanič (2006) locates the construction of identity on people other than the individual, Erdinast-Vulcan (2008) locates it within the individual. It is the combination of the two—the internalized and externalized Other—that I seek to explore among learners of EAL and of mathematics.

This combined consideration of the two is relevant to education because interaction is the main mode of teaching and learning (Vygotsky, 1978), which makes it important to understand how learners' identity is constructed in and through interaction with self and others. The question is, however, how can we operationally identify discursual identity in action. To answer this question, I bring Sfard and Prusak's (2005) triple model for identity-related references that "are reifying, endorsable, and significant" (Sfard & Prusak, 2005, p. 16). These references can be represented by a configuration of B^AC , when A is the object of the story told, B is the author, and C is the recipient (Sfard & Prusak, 2005, p. 17). This model provides a helpful tool to operationally explore discursive identity that combines, at once, Ivanič's (2006) discursual means of identity construction (i.e., address, attribution, and affiliation) and Erdinast-Vulcan's (2008) inclusion of an internalized Other.

Unlike address and attribution, alignment may carry a different meaning to identity work. Building on Vygotsky and Bakhtin, scholars such as Norton (e.g., 2000), Ivanič (1998), and Wenger (1998) demonstrate that choices of alignment play an important part in identity—an idea that was picked up by other scholars as well to frame and explain individuals' actions and reactions. In order to understand what actions shape alignment, it might be helpful to bring in Gee's (2001) differentiation of discourse with an upper-case 'D' from discourse with a lowercase 'd.' In other words, it is through actions of alignment that individuals' discourse (with lower-case 'd') sounds like larger patterns of discourse (with upper-case 'D'). Richardson (2009), for example, describes the struggle of one African American female in negotiating her identity through her choice of discourse. She demonstrates how the struggle associated with the decision of if and when to align with prescribed and scripted speech for an African American teenage female reflects the relationship between discourse with a capital 'D' and discourse with a lower-case 'd.' Similarly, Ibrahim (1999) shows how the notion of alignment with socioculturally scripted discourses and behaviours plays a determining role in the co-construction of identity among African American teenagers.

However, considering Gee's (2001) differentiation between lower-case 'd' and capital 'D,' raises some questions that pertain to instances where speakers do not have the option to choose between capital 'D' discourses because such discourse patterns are linguistically or socioculturally ascribed. An example for such contexts is Ochs' (1990) work on indexing that shows how identifying of the self is sometimes language dependent. She brings the example of the use of end-of-sentence particles such as *wa* that index femininity in Japanese (see also Inoue, 2002, 2003; Itakura, 2015). Japanese women are expected to take on this discorsal identity leaving them no option in choosing a different pattern of interaction. Another example of scripted and limited discorsal identity can be found in Heath's (1983) work where she shows how the two communities she spent ten years living with "have different ways of using language in worship, for social control, and in asserting their sense of identity" (Heath, 1983, p. 10), thus providing robust evidence that ties ways of being in the world through socioculturally assigned ways with words, to allude to the title of Heath's (1983) classic book.

Indeed, Heath (1983) provides ample examples from daily life in the two communities she studied that show how "parents bring up their children in the drama of life by carefully scripting and rehearsing them for the parts they expect them to play" (Heath, 1983, p. 346). This is important because when we consider an individual's identifying of self through discourse, choice of alignment and affiliation, and ways of address and attribution, we need to be cognizant of the discorsal patterns that are linguistically or socioculturally ingrained in an individual's speech. In fact, Heath's (1983) work demonstrates that it is more about particular discourses or "ways with words" that the school privileges and less about the cultural, linguistic, or socio-economic backgrounds children and learners bring into school that determines the academic success or failure of students. That is, how school identifies learners of different sociocultural and linguistic backgrounds reflects discorsal identity in the form of labeling through address and attribution.

If I need to summarize this section in one sentence, I would say that one's identity does not exist ontologically in separation from semantically loaded attributions that are socioculturally embedded. Rather, the works of Heath (1983), Gee (2001), and Ivanič (1998, 2006) show that identity is continually generated by how and what we speak (that includes a diverse array of semiotic artefacts of interaction), how we are talked to and about, and what we affiliate ourselves with. Now that we have established that identifying, indexing, and

affiliation are different modes of discorsal identity, I ask how these are used in the context of EAL and mathematics education to which I turn next.

Discorsal identity in EAL. How learners of EAL perceive themselves and are perceived by others affects their learning and shapes their experiences (Norton, 2000). In a recent study, Shapiro (2014)—who criticizes the stronghold perspective of scholarly work that frames learners of an additional language within a discourse of deficit rather than a resource—examined how English language learners in one high school resist this labeling discourse of deficit that was assigned to them. Noting that English language learners comprise more than 20% of the U.S. student population—a proportion that Jones (2002) predicted to continually grow—Shapiro (2014) underscores the gaping achievement gaps between English learners and other students and identifies the roots for this gap in the system-wide labeling of deficit that “simultaneously essentializes [English language learners] as linguistically deficient and disregards their proficiencies in languages other than English” (Shapiro, 2014, p. 387). The notion of labeling EAL learners as linguistically deficient is not new. Dillon (2001) explains that while the use of labels is often practiced with good intentions, often policies and practices get stuck in ruts and it is listening to how learners perceive this deficit discourse that can help break out of these ruts.

In particular, Dillon (2001) refers to the policy of New York City raising the cut-off point for a passing mark in its language assessment battery test that all English language learners need to pass in order to be able to continue to post-secondary education. Dillon (2001) argues, “Rather than looking at what was happening in regular English classes, perhaps adjusting curriculum and instruction to better serve all students, a decision was made to raise the ‘standards’ for a traditionally disenfranchized group” (Dillon, 2001, p. 94-95). This practice of labeling, Dillon (2001) explains, forced him and his students to “confront the reality that that measure would influence [the students’] academic careers and range of possibilities open to them” (Dillon, 2001, p. 95). Working with teenage newcomers from Bangladesh, China, Dominican Republic, and Russia, he reminds his readers, “Too often, we inhibit real success by ignoring students’ reactions to their own learning” (Dillon, 2001, p. 97) and concludes, English language learners “are tired of being segregated from other students because of where they were born or how they speak and write in English” (Dillon, 2001, p. 103).

Similar to Dillon (2001), Shapiro (2014) points to the pervasiveness of discursively labeling English language learners as “a problem” particularly at the secondary level (Shapiro, 2014, p. 387) and argues that this deficit discourse prevails because of misunderstanding about what EAL students need and because this approach “shelters mainstream teachers from having to accommodate a more linguistically and culturally diverse student population” (Shapiro, 2014, p. 387). Shapiro (2014) situates her research within the Critical Race Theory that looks at how issues such as representation, inequality, social class, and citizenship are related to race. To shed light on the discursal dimension of identity work, she used three sources of data that included media footage of a demonstration carried out by a group of EAL former refugee students from African countries; their meeting with two journalists and the school principal; interviews with nine of these African American EAL students; publicly available documents and newspaper articles; as well as personal participation in conversations and meetings. Shapiro (2014) concluded that deficit discourse can be experienced as racial discrimination by the target population indicating that how one is talked to and about by others shapes one’s identity as a learner of EAL. Specifically, Shapiro references common beliefs perpetuated by newspaper articles about refugees from Africa that more often than not frame African refugees as having no or lacking any experience of schooling and as lacking literacy in any language. This discourse about educational deficit, Shapiro (2014) argues, is particularly damaging to EAL refugees’ sense of belonging as it “denies [refugees’] identities as active seekers of educational opportunity” (p. 395).

In order to construct a coherent picture as to how discursal identity can be applied theoretically and empirically in the field of learning EAL, it may be helpful if we first understand what kind of discourse students of EAL are expected to master and appropriate. This can be done if we use Gee’s (2001) distinction between Discourse with a capital ‘D’ that refers to patterns of speech that help recognize the speaker as a “certain kind of person” and discourse with a lower-case ‘d’ that refers to somewhat idiosyncratic stretches of speech (Gee, 2001, p. 110) that render an individual as “a certain kind of person” to use Gee’s (2001) words. To take a stretch of words and decide that it sounds like talk from a specific kind of group is to engage in ascribing group-specific characteristics to an individual (Ivanič & Camps, 2001).

Consider Norton’s (2001) example of Katarina that I discussed in previous sections. Even though Norton (2001) did not explicitly use the term discourse in the sense I use it here, i.e.,

through address and attribution, she did highlight the direct relationship between Katarina's perception of how her teacher addressed her and what attributions she assigned to her as a learner and user of EAL. Teachers, then, are important agents in the process of co-constructing EAL learners' identities. In their research on ESL teacher candidates' beliefs, Fleming, Bangou, and Fellus (2012) found that in the context of teacher education programs, such beliefs are shaped and formulated by prior beliefs, interaction with peers, the course textbook, lectures, and the teaching practicum. Fleming et al. (2012) demonstrate, for example, that for the teacher candidates, "Being a good language-learner meant that one was able to describe and accurately use correct forms of phonology, morphology, syntax, and grammar" (p. 41) rather than one who was able to use language as "a resource that provides sets of meaningful choices" (Fleming et al., 2012, p. 42). This finding resonates with Yoon's (2008), work that demonstrates how classroom teachers identify learners of EAL as "uninvited guests" through their discourse thus (unintentionally) perpetuating disengagement and failure against efforts of EAL learners to identify themselves as knowledgeable. Similarly, Harklau (2000) demonstrates how the address and attribution of EAL learners get to be reproduced and propagated or resisted and not appropriated by EAL learners and their peers.

But, it is not only teachers' beliefs that play an important factor in the configuration of discursual identity in EAL. Toohey and Derwing (2008) point to misleading meta-narratives that attribute academic achievement to learners of English by assigning specific characteristics to certain ethnic groups and not to others (for example, Mandarin-speaking students versus Vietnamese students) thus "masking difficulties" (Toohey & Derwing, 2008, p. 179) that can, and should, be addressed. This attribution of ethnic-specific cognitive abilities, according to Toohey and Derwing (2008) is a manifestation of a discursual identity that takes place even outside of British Columbia and Alberta where Toohey and Derwing (2008) collected their data. In fact, the authors claim that evidence of such attribution can be found in other Canadian provinces as well. Examining the socioeconomic background of newcomer students (location of residence for example), they found that failing English was more a matter of available resources for learning, acquiring social proficiency, and home-school compatibility than about ethnic-specific capabilities in learning.

In this context, a relevant question that Ortmeier-Hooper (2008) asks is "when, if ever, does a student stop being an ESL student?" (Ortmeier-Hooper, 2008, p. 390). She aptly notes that the labeling of students as ESL students is not stripped of underpinning assumptions as "The

term ‘ESL’ is not only a descriptor, it is also an institutional marker, pointing to a need for additional services and also to the status of someone still marked as a novice in the English language” (Ortmeier-Hooper, 2008, p. 390). In fact, like Shapiro (2014), Dillon (2001), and others, she claims that the labeling as ESL identifies learners within a deficit framework—an assigned attribution that many ESL students want to lose. In many cases, ESL learners do not even want to self-assign themselves as ESL because such self-attribution raises in them the following questions, “[W]ill the instructor expect less of them? Hold them to lower standards? Separate them from their peers? Be on the lookout for markers of non-native proficiency?” (Ortmeier-Hooper, 2008, pp. 413–414). Such questions and the studies described here are important as they allow us to see how identities are trapped in the trammels of discourse and to consider how we can treat the identification of newcomers not as “singular products of their native culture and language” (Ortmeier-Hooper, 2008, p. 415) but rather as individuals whose identities multifarious comprising autobiographical identity, authorial identity, discoursal identity, and socioculturally available identities. Research on discoursal identity within mathematics education is as revealing.

Discoursal identity in mathematics education. In order to better understand the potential of research on discoursal identity in the context of mathematics education, it is helpful to consider an amalgamated framework that includes Ivanič’s (2006) *address, attribution, and affiliation*, Davies and Harré’s (1990) *positioning*, Sfard’s (2000) conceptualization of “learning as gaining an access to a certain discourse” (p. 160), and Gee’s (2001) *discourse with a capital ‘D’ and a lower-case ‘d.’* When we consider discourse as a manifestation of address, attribution, affiliation, positioning, identification, learning, and alignment, we can more clearly see the relationship between discourse—as it is broadly defined here—and identity. For example, Damarin’s (2000) work convincingly criticizes the two types of mathematics-related discourses of power on the one hand and of deviance on the other hand that prevail in Western societies. She specifically attends to how those who can do mathematics are addressed and identified as mathematically-abled while those who are believed they cannot do mathematics are addressed by socioculturally endorsed metanarratives as mathematically disabled. These categories—or acts of labeling—Damarin (2000) argues, perpetuate stereotypes through discourses that are counterproductive to what mathematics is really about. Indeed, in his identification of “learning as identity formation”

(Lerman, 2006, p. 179) as one of three main research areas that will develop in the 21st century in mathematics education, Lerman argues:

Subjectivity focuses on how individuals are both the subject in the sense of the actor in a discourse but are also subjected to the possibilities and limitations, the affordances and constraints, of that discourse. Identity is therefore produced in discourses and the notion of subjectivity captures that regulation (Lerman, 2006, p. 180).

While Lerman (2006) does not limit himself to any particular aspect of identity, he does seem to underscore the complex nature of identity work in the context of mathematics education.

This shift in the perception of identity may be analogous to looking at an image as it is captured in a still photograph in comparison to looking at the same event as it unfolds in a video. The former, gives a one-moment, static snapshot of an experience that may entice the viewer to make do with a one-dimensional, cause-and-effect, input-output understanding and treatment of identity; the latter, reveals directionality, reflexivity, and dialogicality thus yielding a better manifestation of developments as they unfold. Applying this analogy to my point, it is critical that we analyze identity work as it continually unfolds before our very observing eye. Using this analogy, helps, to my mind, establish a useful framework as it more effectively demonstrates the compatibility between our conceptualization of identity and our operationalization of it and allows the transition from treating identity as a category of practice to treating it as a category of analysis.

Relevant work in this respect reveals how institutional practices of labelling propagate and continually reproduce discursal identities that realize the very characteristics assigned in the labelling. Ben-Yehuda, Lavy, Linchevski, and Sfard (2005), for example, describe work they did with Mira and Talli—two 18-year old high school students—and demonstrate how institutionally propagated labelling in the form of records in school files, and echoed and continually reproduced labelling by school staff, school social worker, and school psychologists reinforce one's self-assigned discursal identity by address and attribution as mathematically disabled and feed back to constructing narratives of failure thus creating a vicious cycle of an autobiographical mathematics identity that forms and informs discursal mathematics identity. Similarly, Bishop (2012) shows how labelling is also self-assigned in classroom discourse by discursal practices such as uptake of ideas that render, however tacitly, one student as “smart” and the other as “dumb.”

Not only classroom practices but also schools' structure produce and reproduce labelling students' mathematics identity as either gifted or failing. Hodgen and Marks (2009) discuss institutionally assigned identities in the context of tracking. They found that there is strong relationship between the practices of ability grouping and making students believe they are not cut out to do mathematics. They then conclude that "[a]s pupils move toward the end of their primary school careers and secondary selection looms, any bridge between these two positions diminishes as imposed national and local assessments practices set what any one pupil can be" (p. 40).

Indeed, Boaler (2005) and Boaler, Wiliam, and Brown (2000) discuss the effects of tracking on learners' discorsal identity. They show how positioning of students who are assigned to ability grouping in mathematics as mathematically abled, or less abled or disabled, carries social and psychological lasting effects of labelling. Of particular relevance is the research Boaler carried out in six UK schools (Boaler, Wiliam, & Brown, 2000) where it was found that (1) even students who were assigned to the highest ability groups discursively identified themselves as disadvantaged by their placement; (2) students assigned to lower levels of ability grouping stopped identifying themselves as capable of doing mathematics; (3) lower level ability groups were populated by students coming from lower socioeconomic levels; and (4) attributing fast pace to doing mathematics positioned many students as disabled mathematically (Boaler, Wiliam, & Brown, 2000, pp. 633–634). How students are addressed when assigned to ability grouping in mathematics is a manifestation of discorsal identity that gets infiltrated into students discorsal identity and self-assigned by students. This notion of self-assigned discorsal identity was also empirically corroborated by Mason and McFeetors (2007), who conducted a study among students in a class of applied-level mathematics in a Canadian high school and found that the attribution of applied mathematics had the students self-assign the characteristic of less-abled users of mathematics.

Street, Baker, and Tomlin (2005) collected data among young children and their families in England to explore how families and their children mathematize at home. Like Heath (1983) whose work made it possible to explicate gaps in between-groups achievements, they too found that ability attribution was less associated with learners' ability and far more associated with how students were talked about, their socioeconomic strata, and by extension, the identities assigned to them and their families by institutional discourse. Whereas children who came from poorer families did engage in mathematizing at home, the fact that it was not the type of mathematics the

school privileges positioned them as less abled mathematically. Gerdes (1994), an ethno-mathematician, points to a similar issue of privileged school mathematics that positions users and doers of other kinds of mathematics as less abled mathematically.

In addition to institutionally assigned discursual identities that position students as abled or disabled mathematically, research has also revealed that curriculum and classroom practices generate discursual mathematics identities as well. Hogan (2008) demonstrates how educational policies and curriculum content translate into classroom practices that animate teachers' attribution of students' mathematical ability and, in turn, frame the way students are addressed by their teachers. Hogan (2008) brings the story of Nora, who was "differently constructed as a math learner" in Grade 6 when she was called "a genius in math" compared to how she was constructed as a mathematics learner in Grade 7 when she was referred as a "D+ student" (Hogan, 2008, p. 94). Hogan (2008) provides theoretical and empirical support to demonstrate how students' academic achievements in mathematics are "less about [their] intrinsic abilities and more about how [they are] constructed as learners by [their] teacher" (p. 95), i.e., students' mathematical ability is determined by discursual identity through attribution and address.

In addition to labelling through school structure, contexts of multiple languages have also been identified as label-inducing spaces where models of deficit were more traditionally applied to speakers of languages other than the language of instruction. Having said that, scholarly work on the intersection point between learning mathematics and contexts where the language of instruction is different than the learners' spoken language has seen a shift from deficit discourse to resource discourse (Barwell, 2003, Moschkovich, 2002, 2007, 2013). This shift was made possible by attentively listening to the mathematics used by learners of EAL rather than to the grammaticality of their language (Barwell, 2003, Moschkovich, 2002, 2007, 2013). In a recent paper, however, Barwell (2016) goes beyond perceiving difference between language of instruction and spoken language as a resource. He highlights a wider range of issues that include practices of "stratification" and "marginalization" through "scale jumping," to use his terms, that position languages that are different than the language of instruction—and their speakers—at a socio-political marginalized status.

Looking back to what we have covered up until now, identity, then, is less about one-dimensional characterization of the individual and more about a complex interaction among multiple identity-related dimensions that focus on learners' developing an authorial identity

(authorial identity), learners' past experiences (autobiographical self as they are seen, sequenced, and interpreted by the individual), and learners' positioning relative to others (discoursal self). All these take shape within available selfhoods to which I turn next.

Socioculturally available selfhoods. Socioculturally available selfhoods can empower or constrain one's potential trajectories. Bauman's description of identity and its dependency on cultural contexts is revealing:

Let me note that identification is also a powerful factor in stratification; one of its most divisive and sharply differentiating dimensions. At one pole of the emergent global hierarchy are those who can compose and decompose their identities more or less at will, drawing from the uncommonly large, planet-wide pool of offers. At the other pole are crowded those whose access to identity choice has been barred, people who are given no say in deciding their preferences and who in the end are burdened with identities enforced and imposed *by others* (emphasis in original); identities which they themselves resent but are not allowed to shed and cannot manage to get rid of (Bauman, 2004/2012, p. 38).

It is this perception of identity as available for the taking within sociocultural contexts that this dimension maps out for us. Bauman's insight about the distinction between cultural contexts helps us consider sociocultural contexts by means of what they offer to individuals as available selfhoods. Some sociocultural contexts allow individuals "to choose what [they] desire and renounce what [they] resent," (Bauman, 2004/2012, p. 38) others are stapled with identities imposed on them. Conceptualizing identity as such, in sociocultural contexts that allow for identity mobility "The job of an identity-constructor is, as Claude Lévi-Strauss would say, that of a *bricoleur*, conjuring up all sorts of things out of the material at hand" (Bauman, 2004/2012, p. 49). It is important to note that our understanding of identity as socioculturally available was possible only when possibilities of mobilization and processes of urbanization and industrialization have generated new ways of being and becoming. Indeed, Bauman explains,

It was not always like that. Once modernity replaced premodern *estates* (which determined identity by birth and hence provided few if any occasions for the question of 'who am I?' to arise) with *classes*, identities

became tasks which individuals had to perform, as you rightly suggest, through their biographies (Bauman, 2004/2012, p. 49).

Given this dimension of identity work, Bauman, framed it as “*means oriented*” rather than “*goal oriented*” (Bauman, 2004/2012, p. 48) thus underscoring “resources already in [one’s] possession” as the very artefacts Lévi-Strauss was referring to in the work of the bricoleur. In this section, I describe how such available selfhoods are co-constructed by cultural, historical, and sociological frameworks (Ivanič, 1998). These may include cultural heritage, family stories, historical events, metanarratives or literary characters that take forms and shapes in fiction, literature, movies, and social and cultural narratives. All these function as repositories for identities that are contextually and socioculturally available (Ivanič, 1998). The unique affordances of socioculturally available identities are that they are open for selection and appropriation. In his (1992) *Oneself as Another*, Ricoeur qualifies fictional characters as human beings: “Characters in plays and novels are humans like us who think, speak, act, and suffer as we do” (p. 150) and in spite of qualifying differences between fiction and real life, Ricoeur (1992) admits, “they do not seem to me to be such as to abolish the very notion of the *application* of fiction to life” (p. 161) [emphasis in original].

Similarly, Bruner (1986) attributes connection between humans and fictional characters, “Characters in story are said to be compelling by virtue of our capacity for ‘identification’ or because, in their ensemble, they represent the cast of characters that we, the readers, carry unconsciously within us” (Bruner, 1986, p. 4). According to Bruner (1986), sociocultural contexts play an important role in providing available storylines. He explains, “Narrative deals with the vicissitude of human intentions,” that are “inherent in the minds of writers and/or readers (what one is able to tell or to understand), or that the limits are a matter of convention” (Bruner, 1986, p. 16). For Bruner, then, characters in fiction—and I include here movies and other popular media—function as repositories of available narratives to emulate or identify with.

Both Ricoeur (1992) and Bruner (1986) allude to the interactive nature of humans shaping and being shaped by stories they listen to, read, and tell. To use an analogy, this is comparable to a process of selection of products in a supermarket where the shelves are loaded with different options of merchandise to be picked up by the customer. It is important to note that very much like shopping in a supermarket, one’s choices of specific products over others do not happen in a vacuum. That is, questions such as where products are placed,

how they are packaged, what associations and imagined realities they promote, what needs they “promise” to fulfill, as well as what monetary affordability they offer very often affect decisions of purchase. In the same token, one’s choice of socioculturally available identities depends on which identities are available, how they are packaged in terms of the context-dependent social and cultural values, and what would be the social cost in aligning with the selected identities. This ability of selection is culture dependent. To wit, if in the Western culture, identities are more open for selection, in non-Western societies and cultures, such freedoms for choice are far more limited and constrained (see Gardiner & Kosmitzki, 2002, p. 142, for example, for associating this distinction with different levels of stress in identity transition within two communities).

The question that arises at this point is, once a selection of a socioculturally available selfhood is made, how is such an identity recruited? The answer to this question lies in adopting scripted roles (or the upper-case ‘D,’ to use Gee’s (2001) distinction). In *The Presentation of Self in Everyday Life*, Goffman (1959) conceptualized and operationalized *self* as an act of performance and role-playing. To convey the idea that scripted role-playing takes an important part in one’s presentation of self, he cites Robert Ezra Park to bring forth the etymology of the word person:

It is probably no mere historical accident that the word person, in its first meaning, is a mask. It is rather a recognition of the fact that everyone is always and everywhere, more or less consciously, playing a role...It is in these roles that we know each other; it is in these roles that we know ourselves (Park, 1950 in Goffman, 1959, p. 19).

In this respect, Goffman (1959) later says, “if we know the regions into which an individual had access we would know the role he played and the information he possessed about the performance” (Goffman, 1959, p. 145). Providing evidence that supports the relationship between context and available ways of being, Goffman (1959) frames scripted identities as identities we “give off” (p. 2) and recognized by others.

Identity is, then, understood as a sociocultural construct (Norton, 2006), i.e., as something that one does by a continuous enactment and re-enactment of socioculturally and historically available identities (see Heath, 1983; Sfard & Prusak, 2005; Visscher, Heusinkveld & O’Mahoney, 2017). This perspective supports Ochs and Capps’ (1996) particularly insightful reference as they write, “The boundaries between selves and other entities are porous” (p. 31).

How such available selfhoods take form within EAL and mathematics education will be addressed in the following sections.

Socioculturally available selfhoods in EAL. The notion of socioculturally available selfhoods in the context of EAL attends to the question of who does one want to sound like when learning a language? Collecting questionnaire data from multiple countries and conducting interviews in Leeds, Timmis (2002) shows how students of EAL want to sound like native speakers and how they see it as “a benchmark of achievement” (Timmis, 2002, p. 242). In a similar vein, Piller (2002) discusses the phenomenon of learners who want to sound like native speakers and uses the term *passing for a native speaker* to convey a constant struggle to be perceived as a member of the target-language community. Fang (2016) brings in the perspective of Chinese students learning English and shows how the ideology of using English as a native speaker is still “somewhat entrenched in students’ minds” (Fang, 2016, p. 76) even though their identity as Chinese plays an important part in the way they communicate. A relevant question that arises here is how such an ideology of speaking like a native speaker drummed into learners’ perception of their identity as learners of EAL? The answer to this question may be situated within the understanding of the important role that socioculturally available identities play in the co-construction of students’ identities as learners and users of EAL.

Cook’s (1999) classic work demonstrates that in the context of learning a language, curriculum materials, teachers, and learners use the role model of the native speaker when learning English as an additional language. To wit, in the context of EAL, the socioculturally available identity is the one of a native speaker. A somewhat different perspective is taken by Marx (2002) who suggests that this process of sounding like a native speaker is a process of establishing what she calls *multimembership*, that is, developing a sense of belonging to multiple linguistic groups at once. While Cook (1999) and Gao (2014) describe what they call the native speaker models in EAL and invite both researchers and practitioners to consider alternatives to the native speaker model to allow more opportunities for success for language learners, Marx (2002) underscores the question of how and why learners wish to sound like native speakers. Considering both perspectives is helpful in better understanding the importance allotted to who one wants to sound like when using EAL.

The perspectives of both scholars may carry different theoretical and pedagogical implications to the context of language learning. For Marx, for example, the theoretical component of one's learning an additional language involves six stages that fall onto two major processes of changes in one's identity. In the first phase, learners' identity change "involves progression towards a type of linguistic and semantic vacuum" (Marx, 2002, p. 270); the second involves "the appropriation of others' voices" (Marx, 2002, p. 270). What is relevant to our discussion of socioculturally available selfhoods is Barwell's (2016) pointing to notions of stratification, marginalization, and scale jumping. Indeed, recording her own experiences becoming a speaker of German, Marx (2002) notes that she tried hard to use her French accent over her English accent when learning German because she knew that French learners were "perceived by Germans more positively" (p. 271) than English learners and so she admits she wanted to "cloak the fact that [she] was a native speaker of English" (p. 272) thus supporting Barwell's (2016) notion that use of languages carries socio-political and sociocultural considerations.

For Cook (1999), on the other hand, the emphasis is put on mastery of linguistic patterns—that is, on one's efforts in sounding like a native speaker no matter what. Cook (1999) thus suggests a more pedagogical oriented perspective on including overt discussions with the language learners over the benefits in learning a language that go beyond "sounding like native speakers" and that provide EAL speakers of the target language (L2) as potential figures to look up to (Cook, 1999, pp. 198-200). In rationalizing the move away from the native speaker model, Cook explains, "It is, to say the least, unhelpful and unmotivating if the only L2 user models that the students see in the classroom are incompetent and ignorant" (Cook, 1999, p. 200). He thus recommends that teaching materials "demonstrate that L2 users exist in the world as role models for students to emulate" (Cook, 1999, p. 200).

The question that I ask at this point relates to the accessibility of socioculturally available identities of L2 users of English within the learning process of EAL. Cook (1999) suggests that teaching and learning materials include stories of successful L2 users who "exist in their own right and are not just pale shadows of native speakers" (Cook, 1999, p. 200). In this respect, non-native-speaker teachers may also function as socioculturally available selfhood as they "present a more achievable model" (Cook, 1999, p. 200). In sum, Cook (1999) suggests that emphasis is put on the use of EAL by successful others rather than on the imitation of native speakers (Cook, 1999, p. 204).

Not much research has been done on socioculturally available selfhoods in the context of EAL. Building on the work of Cook (1999) and Marks (2002), I turn to socioculturally available selfhoods as they are presented in popular media such as movies and politics. Consider, for example, the story of Michaëlle Jean, the 27th Governor General of Canada, who emigrated with her family from Haiti and learned English as an additional language growing up in Canada. Other successful EAL learners can be the actors Chan Kong-sang who was born in Hong Kong and is known as Jackie Chan and Arnold Alois Schwarzenegger, another famous actor, who did not speak much English when he moved to the U.S. at the age of 21, but nonetheless, was a successful actor who even became the 38th Governor of California. Such stories of famous EAL learners can provide available identities for learners to identify with and emulate. Bringing together the works of Barwell (2016), Marx (2002), and Cook (1999) is helpful in that it provides a framework to understanding the dynamic nature of socioculturally available identities that is, to cite Ivanič (1998), “like a drop in the ocean, infinitesimally redefining the possibilities for selfhood, which will, in turn, be available to future [individuals]” (Ivanič, 1998, p. 28). Let me turn now to how socioculturally available identities was explored in the context of mathematics education.

Socioculturally available selfhoods in mathematics. Learners of mathematics emulate others who do mathematics and are institutionally recognized as legitimate users and doers of mathematics. These others can be told about through cultural or family stories (Sfard & Prusak, 2005) or the popular media (Mendick, 2004) and propagated through institutionally privileged ways of doing mathematics (Carraher, Carraher, & Schliemann, 1985; Gerdes, 1994; Steet et al., 2005). Research that pertains to socioculturally available selfhoods has explored such identities mostly through racialized (see for e.g., Larnell, 2016; Martin, 2000; McGee & Martin, 2011; Nasir & Shah, 2011; Noble, 2011) and gendered mathematics identity (Hall, 2012; Solomon, 2007a, 2007b; Solomon, Radovic, & Black, 2016; Walkerdine, 1998). Hogan (2008), for example, demonstrates how sociocultural and historical scripted roles dictate and continually reproduce what one can become, do, or say mathematically. She aptly concludes, “In the absence of a culturally relevant, empowering environment, teacher *and student* have fallen into the default script and performance of gendered identity” (p. 109) [my emphasis]. In a similar way, Betz and

Sekaquaptewa (2012) demonstrate how available role models impact girls' identities as learners of science and mathematics.

However, Ernest (1998), in his introduction chapter in Walkerdine's (1998) book, explains how in spite of the closing gaps between boys' and girls' attainment in mathematics, people still believe that mathematics is something boys do. He points out that beliefs about such differences in attainment emanate from myths that shape and sustain sociocultural views that further perpetuate a belief system where mathematics is perceived as a masculine subject. This, in turn, positions women in situations where they "must choose to be feminine or choose to be successful at mathematics" (Ernest, 1998, p. 10; Solomon, 2007a, 2007b). Ernest (1998) continues and argues that "[t]his belief system plays a key role in how the woman/girl views herself with regard to mathematics and performs as a learner of mathematics" (Ernest, 1998, p. 11). Walkerdine (1998) shares the same idea when she suggests, "we can examine how facts, fictions, and fantasies have been constituted and how these have affected the ways in which we have been positioned, understood and led to understand ourselves" (Walkerdine, 1998, p. 19).

In addition to gendered socioculturally available identities, Damarin (2000) points to socioculturally perpetuated myths in regard to available identities that render some as mathematically abled and others as mathematically disabled. She describes identities that concern "the place of the mathematically able: a discourse of power deeply rooted in the structures of capitalism (business, government, military, science), and a discourse of deviance spread rhizomatically through the popular culture" (Damarin, 2000, p. 78). Similarly, Andersson et al. (2015) describe how students are viewed as either engaged or not engaged in mathematics and how these are associated with the tendency to view students in terms of either humanistic- or scientific-oriented. Andersson et al. (2015), who underscore the determining role of contexts in forging students' identities as learners of school mathematics, bring Malin's identity narrative where she explicitly positions herself in the dichotomous scale of mathematics orientation: "What I am sure of is that I will not study anything containing mathematics. I would much rather study something within the social sciences, as for example Human Rights" (Andersson et al., 2005, p. 150).

This stands in stark opposition to recent studies that highlight the use of mathematics in understanding phenomena in the social sciences (see for example, Albert, Jeong, & Barabási, 1999, for their use of mathematical terms such as directed graph, vertices and edges, power law

and more to make sense of the interconnected nature of the world-wide web). Interestingly, Malin herself is reported to have recognized the relationship between mathematics and social issues when she learns of a woman in Sudan who was flogged for wearing pants and declares, “How can one use mathematics, to have impact for women, to prevent discrimination? I have never thought about that before, no one has ever told me that” (Andersson et al., 2005, p. 153). However, in spite of such work in demystifying myths about mathematics, what’s left standing strong in the limelight, taking front stage, is collapsing the conceptualization of learners’ mathematical identity into one-dimensional qualifiers of mathematics oriented or not. Research that explores how these actually change students’ identity as users and doers of mathematics as it unfolds remains limited in scope.

Drawing on Bruner (1986), Goffman (1959), and Ricoeur (1992), who have pointed to the role of fiction in producing socioculturally available identities, I now turn to works of fiction that depict such identities to be recruited or rejected. In analyzing four movies that focus on the lives of mathematicians (*A Beautiful Mind*, *Enigma*, *Pi* and *Good Will Hunting*), Mendick (2004) found that movies perpetuate myths such as that mathematics is gender specific. Mendick (2004) shows how this portrayal of mathematics offers very limited and limiting presentations of possible sources for identification. She specifically points to how “the process of doing mathematics is presented as individual, fevered, mysterious, and intuitive” (Mendick, 2004, p. 46) and how “inner calm” and being “mathematically active” (Mendick, 2004, p. 46) are incongruous. Similarly, Epstein, Mendick and Moreau (2010) show how mathematics is represented in the popular culture as a “secret language” (Epstein et al., p. 45) that is “always obscure” (Epstein et al., p. 52), and as mathematicians who are “as isolated, obsessed, possibly autistic but certainly socially inept” (Epstein et al., p. 52), and explore how young learners use these to negotiate their identities as learners and users of mathematics.

It will not be too far-fetched to argue that mathematics and mathematicians are assigned very particular identities in the popular culture. Consider Ramanujan’s biography written by Kanigel (1991) and the movie produced based on this book. Ramanujan is depicted in both movie and biography as someone who simply knew mathematics and whose mathematical ideas came to him through his family deity *Namagiri Thayar*. Kanigel (1991) reports what Ramanujan himself said about his mathematics, “It was goddess Namagiri, he would tell friends, to whom he owed his mathematical gifts. Namagiri would write the equations on his tongue. Namagiri

would bestow mathematical insights in his dreams” (Kanigel, 1991, p. 36). In an answer to his friend’s query about how he so fast found a solution to a problem that they discussed, Ramanujan’s attribution is revealing: “Immediately I heard the problem it was clear that the solution should obviously be a continued fraction; I then thought, Which continued fraction? And the answer came to my mind” (Kanigel, 1991, p. 215). The biographer’s depiction of Ramanujan’s response is equally revealing:

The answer came to my mind. That was the glory of Ramanujan—that so much came to him so readily, whether through the divine offices of the goddess Namagiri, as he sometimes said, or through what Westerners might ascribe, with equal imprecision, to ‘intuition’ (Kanigel, 1991, pp. 214–215). This mystic halo associated with Ramanujan’s doing mathematics was corroborated by a testimony of one of Ramanujan’s acquaintances telling about Ramanujan’s insistence that after dreams associated with the goddess Namagiri, “scrolls containing the most complicated mathematics used to unfold before his eyes” (Kanigel, 1991, p. 281).

This mystic inspiration is also reflected in other popular media. Consider the movie *Hidden Figures* (Melfi & Schroeder, 2016). The movie recounts the story of three female African-American mathematicians—Katherine Johnson, Dorothy Vaughan, and Mary Jackson—whose mathematical and non-mathematical knowledge, skills, perseverance, and wit gained them appreciation and recognition. The very first scene in the movie shows Katherine Johnson, the child, sitting on a bench in, what seems to be, a school hallway waiting for her parents who are sitting in what looks like the office of the school principal. In this scene, Katherine is seen sitting on the bench, looking at the geometrical shapes adorning the walls around her, and calling the shapes by name confidently and with gusto “equilateral, trapezoid, isosceles, tetrahedron” (Melfi & Schroeder, 2016). At the same time, the principal is shown saying to the parents “I’ve never seen a mind like the one your daughter has. You have to see what she becomes.” The next scene shows her, still a child, scribbling a long mathematical formula on the blackboard in a classroom with classmates who are much older than she is. The scene then transitions to showing her still scribbling, this time as a mature woman as the principal’s last words “what she becomes!” echo in the background.

Unlike other movies that depict mathematicians as socially awkward, *Hidden Figures* (Melfi & Schroeder, 2016) depicts three women mathematicians as shrewd and street-smart—

qualities that are not usually associated with mathematicians (Epstein, Mendick, & Moreau, 2010). Whereas *Hidden Figures* (Melfi & Schroeder, 2016) presents socioculturally available mathematics identities, I argue that it nonetheless, unintentionally or conveniently, portrays mathematics as a gift—that one either has or does not have—rather than a learnable skill, thus, again, limiting socioculturally available selfhoods in learning and doing mathematics. This message is consistently conveyed through many similar movies that focus on the lives of mathematicians.

Chapter Summary

The theoretical framework of the current research was imported from Ivanič's four-part model of identity in the field of academic writing and traced the use of each of the identified identity-related dimensions in theoretical and empirical literature. Whereas research, more often than not, collapsed these dimensions into one of the four, I suggest that a combined model that brings all four dimensions together to the fore but at the same time keeps them distinct may not only reflect the dynamic nature of identity work but also showcase its simultaneity as well as its dynamic, complex, multi-dimensional, and multi-directional nature. Doing so within mathematics education, specifically responds to Lutovac and Kaasila's (2017) call to draw on research on identity outside of mathematics education.

Metaphorically speaking, I think it is helpful to use the image of a rubber band with *identity* ticked off on it. When the rubber band is relaxed, one only sees the word *identity*. In such a condition, we cannot really see what is collapsed into it. However, stretching the rubber band reveals smaller marks that stand for autobiographical identity, discursal identity, authorial identity, and socioculturally available identities. It is important to bear in mind that while these are distinct, they are, in fact, inseparable. The operationalization of these constructs provides the following tools: authorial identity in the form of authoritative statements, beliefs, and stances expressed; autobiographical identities in the form of contamination or redemption stories that form and inform learners' actions and reactions; discursal identity in the form of how one sounds like and how one is spoken to and about; and socioculturally available selfhoods that indicate actions and choices of affiliation. In using this as a theoretical and analytical framework, particular attention needs to be paid to the research design and approaches to data analyses that can more readily encompass all four dimensions. These will be discussed in the following sections.

Chapter 3 – Methodology

It is given that the formulation of research questions depends on the theoretical framework one adopts (Seidman, 2006). A careful choice of the theoretical framework is critical because it is the theoretical framework that provides the concepts, constructs, and tenets that one can work with. In other words, choosing a framework is like choosing a pre-packaged tool kit that provides specific instruments to work with and not others. The purpose of this research was to explore teenage newcomers' identity as learners of mathematics and of EAL in a Canadian context. A sharpened understanding of what shapes and informs identity work may be advantageous in the process of teenager newcomers' smoother integration into the Canadian educational system. In order to be able to explore identity work among teenage newcomers, I have imported a unified identity-related framework that brings together four distinct but inseparable dimensions that include authorial identity, autobiographical identity, discursal identity, and socioculturally available identities.

Using this unified theoretical framework, I coalesced relevant research literature in EAL and mathematics education that focused on any of these dimensions. Within the framework of this unified model to understanding identity, the research questions were formulated around teenage newcomers' authorial identity, autobiographical identity, discursal identity, and socioculturally available identities in mathematics and in EAL.

The research design that was crafted for the purpose of this research was aimed at allowing participants that included the teenage newcomers and their parents to talk about their experiences and engage in the co-construction of the four identity-related dimensions as they shared their experiences from the past, expressed their opinions and beliefs, identified themselves as learners of EAL and as learners and doers of mathematics, and recruited socioculturally available selfhoods. Specifically, a three-part design was employed. The following sections describe the research questions, research design and data collection, participants, ethical considerations, and reflections about the constructs of validity and reliability. The chapter concludes with a summary.

Research Questions

The purpose of this qualitative research was to focus on teenage newcomers' identity work as learners of EAL and of mathematics as they transition into a new educational system. This transition at this stage in life of the teenagers' final years of formal K-12 schooling is most

probably accompanied by decisions that may have an impact over their plans in further education or future careers. Understanding identity as a relatively stable but also a dynamic construct that is situated within the sociocultural framework that contends people develop through interactions using socioculturally embedded semiotic artifacts, and framing this understanding of identity within the epistemology of postmodernism where identity-related thinking tends to answer the question of how one can become rather than what should or can one become (Gergen, 1991), I imported Ivanič's (1998) four-dimensional identity framework to explore teenage newcomers' identities as learners of EAL and of school mathematics. I thus ask the following research questions:

1. How do teenage newcomers construct their authorial identity in regard to learning mathematics and EAL?
2. How do teenage newcomers craft their mathematics-related and EAL autobiographical identities?
3. How are teenage newcomers' discursal identities constructed as learners of EAL and of mathematics?
4. How are socioculturally available selfhoods scripted into the learning of mathematics and EAL among teenage newcomers?

In order to answer these questions, a three-part research design that included family focus group, one-to-one interviews, and an all-parent, and all-teenage focus groups was employed. In the next section, I explain the rationale behind employing this particular research design that involved considerations of the relationship between content of data collected and structure of research design.

Research Design and Data Collection

What stands out from the discussion in the literature review is not that identity is conceptualized as complex, dynamic, and fluid. Rather, what stands out from the discussion on the literature is the issue of how identity is operationalized and analyzed (Andersson et al., 2015; Brubaker & Cooper, 2000). In addition, reviewing identity-related research, and to the best of my knowledge, the extant research on identity offers limited knowledge about teenage newcomers' developing identities as learners. It also largely overlooks the intersection of experiences of learning high school mathematics while

learning an additional language among high school-age newcomers as they integrate into school at a key point in their life.

This intersection area has consequently remained underexplored and under-represented in scholarly literature. In order to be able to investigate how and in what sense teenage newcomers' identity as learners of mathematics and of EAL are constituted and co-constructed, I looked to frame my research within a theoretical and an operational model that foregrounds identity as a multidimensional relational activity—i.e., to explore identity as a construct of analysis, to echo Brubaker and Cooper's distinction of how identity is perceived and how it is operationalized.

For this end, I used the mode of interview for data collection in a way that would be substantial enough in body and scope so that as much of the teenagers' perceptions and sense making of past experiences and identity work—however ephemeral—is shared at the time of data collection. Adhering to Mishler's (1986) warning against relying on a "one-shot interview," which is like "a meeting between strangers" that "does not provide the necessary contextual basis for adequate interpretation" (p. 24), I formulated a research design that would allow for building rapport and familiarity.

A Three-part research design. In crafting the structure of the research (see Appendix 6), I drew on Seidman (2006) who suggests employing a three-part research design to increase the breadth and depth of collected data (Seidman, 2006, pp. 16–19). According to Seidman (2006), each of the three interviews has its own specific purpose: the first interview focuses on getting a recount of the life history of the participant; the second interview focuses on eliciting detailed descriptions of particular experiences; and the third interview focuses on meaning making. Building on the premise that identity plays a defining role especially among intermediate- and high school children, and that identity is inseparable from relationship with other immediate members of the family (Pratt, Arnold, & Mackey, 2001), it made sense to recruit families and their teenage children for the purpose of this research.

The first session of data collection in this study was aimed at getting to know the families. This first step in building rapport was thus designed as a family interview to get a glimpse of what Bruner (2004) calls the family's "miniature culture" (Bruner, 2004, p. 700). The family interview included at least one dyad of a teenager and a parent from each family. In the second session, participants were interviewed one-to-one. In this phase of data collection, I aimed for

the participants to provide specific details about key events and turning points in their learning of mathematics and EAL.

To facilitate the retrieval of past experiences, participants were asked to think about their experience in terms of book chapters (McAdams, 1995). This analogy of experience to book chapters not only was aimed at allowing them to choose which events to bring forth but also to reflect on their experience, identify key events and turning points (McAdams, Josselson, & Lieblich, 2001), and organize them in a way that will reflect the relationship between past, present, and future (Bruner, 2002; Ivanič, 1998; Norton, 2000; Polkinghorne, 1988).

In the third session of data collection, I conducted all-teenage and all-parent focus group discussions. In preparing for the focus group, I drew on the work of Wibeck, Dahlgren, and Öberg (2007) who offer important guidelines in regard to the size of the group and balance between homogeneity and heterogeneity among the participants. These guidelines were followed to more feasibly explore “how people engage in collective sense making” (Wibeck, Dahlgren, & Öberg, 2007, p. 250).

The motivation behind choosing these particular formats in the research design in this particular order was twofold. First, starting off data collection at the level of the family unit was aimed to allow me to see how families—as units—as well as individual family members co-construct their autobiographical identities in relation to school mathematics and learning EAL. Second, leaving some time between sessions for contemplation and deliberation to both the participants and me was another way to ensure depth and breadth of data collection as we moved from session to session. The one-to-one interviews were aimed at providing personal space to participants to talk about their own viewpoints as well as an opportunity to pick up topics that were not adequately addressed in the family-unit session. The third session was aimed at having all participating parents and teenagers in each city come together to talk about school mathematics and EAL.

Each of the sessions lasted for about 90 minutes. The interview guide in Appendix 6 includes the data collection guidelines and prompts. Using prompts rather than questions was intentional as it opened the floor to as many possible trajectories and emerging topics. Each type of data-collection session provided a different type of prompt. In the family-unit session, the families were asked to share their experience of transition and integration and to talk about their experience learning EAL and school

mathematics. In the one-to-one interviews participants were asked to reconstruct their experiences in a form of a table-of-content that includes as many chapters as they wish but at least four chapters (McAdams, 1995). They were then asked to elaborate on each chapter. In the all-parents, all-children focus groups that were conducted successively on the same day in each of the two big cities, I introduced prompts to garner more insights on identity-related dimensions in mathematics and EAL.

In sum, the rationale behind this three-part research design involved considerations of both content and structure. My objective was to allow enough time to build rapport (Seidman, 2006, pp. 96–99) and minimize, what Elliot Mishler (1986) calls, “the gap between naturally occurring conversations and interviews” (1986, p. 29). The interviews were semi-structured but took on the form of an “organic discussion” (Hogan, 2008, p. 107) and “knowledge as conversation” (Kvale, 1996) as some of the questions took on “particular and context-bound shades of meaning” (Mishler, 1986, p. 53) thus allowing for a certain level of adaptability in order to generate co-constructed insights and as much content as possible.

At times, however, when I sensed that the conversation veered off to topics that did not seem to be relevant to the topic at hand, I gently redirected the conversation by asking to elaborate on a point that the participant had mentioned before thus bringing the conversation back into focus (see Kvale, 2006 on power dynamics in interviews but also Mishler, 1986 on joint construction of meaning). This balance between adaptability and strictly following the research protocol resonates with Larnell’s (2016) description of how he “readily adapted the rhythm of the interview” (p. 242) to forge connectedness with his participants—something that I felt with my own participants as we engaged in conversation at the three different times we met to talk.

Participant Selection

Deciding who to invite as research participants is not a trivial issue. In fact, such considerations are crucial not only to answering the research questions but also to not creating biased representations of specific voices over others. In discussing potential participants for this study with my thesis committee members, it was suggested that newcomers from developing countries would be most interesting to research as their transition to Canada may be associated with challenges that are not yet surfaced in the research literature. However, whereas the prospects of

investigation of identity among newcomers in the context of mathematics education and EAL are valid among all newcomers regardless of country of origin, and whereas we could theoretically hire independent interpreters who will help us elicit data from any group of newcomers, regardless of language spoken, and whereas some studies that are aimed at exploring newcomers' experiences do it in the target language (see for e.g., Gallucci, 2016; Naraghi, 2013; Norton, 2000), I decided to start off with a group that speaks the language I speak so that language barriers do not preclude communication or cause to have some issues unvoiced. (See Naraghi's (2013) and Riessman (2008) discussion on the methodological drawbacks and constraints of not using participants' L1 in data collection and McKay & Wong's (1996) discussion of the added value in conducting interviews and data collection in participants' L1.)

Additional considerations that were relevant to participant selection stemmed from my conviction that using newcomers' L1 during data collection would contribute to deeper insights of the relationship between teenage newcomers' identity and learning school mathematics and EAL. In addition, it is important to note, that speaking the same language goes beyond sharing a linguistic code because communication in such contexts builds on shared historical, cultural, and social knowledge, which, in turn, allows for a culturally sensitive data interpretation (McKay & Wong, 1996) that confers robustness to the knowledge and experiences of both the researcher and the participants. I thus decided to recruit Hebrew-speaking participants.

Three inclusion criteria were formulated. In order to ensure that experiences of transition are relatively recent, it was decided to include an inclusion criterion of arriving to Canada within two years before data collection. Another criterion was that the participating teenager had attended high school in Israel and in Canada for at least one year in each country. Finally, in order to evoke family dynamics, at least one dyad of a teenager and a parent from each family would need to agree to participate in the research. Thus, inclusion criteria were formulated as follows:

- (a) the family has moved to Canada from Israel within two years before participation in the research;
- (b) the participating teenager has had at least one-year experience of intermediate or high school in Israel and at least one year in a high school in Canada;
- (c) each family has at least one dyad of one parent and one teenager who expresses interest in participating in the research.

Participant Recruitment. In order to recruit participants for the purpose of this research, I contacted two local Jewish community centres in two big cities and asked them to disseminate the Call for Participant through their listserv. Waiting for families to reach out and express interest in participating in the research seemed to me like a long time as a few days went by after I got confirmation that the invitation was sent and not a single family contacted me to inquire about the research. This silence made me worry about the prospects of finding families who would be interested in participating in the research. However, since there was nothing I could do, I sat patiently and waited. A few days into the wait, I got a phone call from a parent asking about the research. That was the first out of five other phone calls and emails. Three of the first five families that contacted me did not meet the inclusion criteria; two, who were from two different cities, did.

After waiting for what seemed, at the time, to be a long time, I had only the two families—one in each big city—that met the criteria. I realized that in order to recruit the number of families that I was hoping to work with, I would have to use the snowball technique (Atkinson & Flint, 2001). Following the family-interview session with each of the first two families, I inquired whether they knew any other families with teenagers who have moved to Canada in the last two years. I intentionally did not ask for these families' contact details for the following two reasons: (1) I did not want to position them in a situation where they could potentially feel discomfort in explaining why they could not participate in the research, and (2) I wanted to leave it up to the families to decide whether they wanted to be contacted. Indeed, within days, two additional families that were referred to me by the first family in each of the two big cities contacted me. With them, as with the first families, following the conclusion of the family interview, I asked whether they knew one other family that moved to Canada with teenage children in the last two years. Here, too, I had two additional families referred to me through these “second generation” recruits, as Noy (2008) calls them.

Using the snowball technique, Noy (2008) argues, carries its own significant ways in reconceptualising what we mean by *social networks* and *power relations*. The fact that I had to rely on the first cycle of recruits to access my second- and third-generations of recruits meant that there could potentially be an impact over who got to be recruited eventually and who was excluded from the pool of potential recruits because they did not happen to be networked with my first- or second-generation recruits (Noy, 2008). In addition, having to rely on my first- and

second-generation recruits also meant that I had to relinquish “control over the sampling phase to the informants” (Noy, 2008, p. 332).

This loss of control over the process of recruitment left me worried, on the one hand, in regard to not being able to recruit six families for my research. On the other hand, however, this concern was somewhat mitigated by my sense of the families’ enjoyment of the family interview and the benefits, by their admission, the interview carried in regard to family dynamics between the parents and the teenagers—a sense I was sure passed on to the referred families by the first- and second-generation recruits. Indeed, within a matter of days following the family interviews with the first two families in each of the big cities, an additional family from each respective city reached out and expressed interest in participating in the research. Or as Noy (2008) would probably put it, it was the first family that was recruited from each big city that “drove the [recruitment] process onward” (Noy, 2008, p. 332).

Altogether, nine families reached out and expressed interest in participating in the research. Out of the nine families, two did not match the first inclusion criterion and one was about to return to Israel. Of the other six families, two reached out through the initial dissemination of the Call for Participants and the other four were recruited through the snowball technique. These six families took part in all the phases of data collection.

A short description of Israel. Following the recruitment of each family, the first interview—with at least one dyad of a parent and a teenager—took place. In order to contextualize the educational system and the socio-cultural background of families coming from Israel, I provide the following short description of Israel.

Israel is situated in the south-western side of Asia, hugging the eastern parameter of the Mediterranean Sea, and is surrounded by four Arab countries Egypt, Jordan, Syria, and Lebanon. A land formerly known as the kingdom of Israel and Judah and that has gone through multiple hands of conquerors for a few centuries regained independence as a Jewish State in 1948. Unlike its neighboring countries, Israel citizenry is a mosaic of ethnicities and is composed by both Jews and non-Jews. According to the 2015 census, Israel’s population is an estimated 8.5 million people, of which 75% are Jewish, 21% Arab, and 4% other ethnicities. Of the Arab population, 84.1% are Muslims, 7.8% are Christian-Arabs, and 8.1% are Druze (Central Bureau of Statistics, 2016a).

The official languages in Israel are Hebrew and Arabic but the country comprises diverse populations that speak different languages including, but not limited to, Amharic, English, Farsi, French, German, Romanian, Russian, Spanish, Turkish, Uzbek, and Yiddish. Being a member of the Organization for Economic Co-operation and Development (OECD), Israel shares global perspectives with many other Westernized countries (see Hemmings, 2010). Some of these shared perspectives pertain to educational mission statements in regard to literacy and mathematics education.

For its small size—it takes about two hours to go from East to West and about six hours to go from North to South—it is ranked fourth (at 49%) by the OECD among member countries in the percentage of 25-to-64-year-olds with tertiary education compared to Canada that is ranked first with about 56% and to China and Indonesia that rank last with less than 10% (OECD, 2016, p. 37). In terms of educational attainment, Israel has experienced a notable move towards academia and education between 1990 and 2015 when the number of people receiving a higher-education diploma increased 4.8-fold (Central Bureau of Statistics, 2016b). The percentage of 25-to-34 year olds with vocational training is 5% in comparison to 58% in the Slovak Republic, 51% in Germany, and 43% in Austria (OECD, 2016, Table A1.4). This focus on education is materially supported in Israel's budget—the national expenditure on education in Israel is high compared to the OECD member countries. In 2013, Israel spent 6.8% of its budget on education, whereas the OECD's report on the average expenditure on education in other countries was 5.8% (OECD, 2016), demonstrating that Israel is a highly education-conscious country, which values its human capital and the development of its population's education and progress.

Compulsory education in Israel is from 5 to 17 years of age. In order to be eligible for a high school diploma in Israel, each student needs to accumulate at least 21 units of study in mandatory and elective school subjects (Director General's Circular, 2015). Two of the seven mandatory school subjects that are required to obtain a high school diploma are mathematics and English. There are three levels offered to students in mathematics and English, the lowest of which is three-unit level and the higher levels are four- and five-unit levels.

Data collection. At the completion of the family interview, a time was set up for the individual interviews with the parent and the teenager (see Appendix 6 for structure of data collection and interview guide). Most interviews were conducted in the homes of the participants at a time that was convenient to them. In most cases, the individual interviews

were conducted within a day following the family interview. During the interviews, I let the conversation flow while keeping track of the questions I had formulated beforehand. The purpose for this strategy was twofold. On the one hand, I wanted to allow the participants to provide rich, uninterrupted descriptions of their experiences, interpretations, and perceptions of learning mathematics and EAL; on the other hand, I wanted to make sure that the conversations do not veer off to directions that may not be relevant to the research study.

After the completion of the six family interviews and 16 individual interviews, a time for an all-teenage focus group and an all-parent focus group was set using Doodle. Altogether, there were four age-specific focus group discussions—these were conducted in a quiet room that was specifically reserved for the purposes of the focus group discussion in a local community centre in each of the two big cities. Between the three types of data-collection sessions that I employed in this research design, I conducted twenty-six 90-minute interviews that yielded 39 hours of conversation (see Table 3). All sessions were conducted in Hebrew and transcribed. All transcriptions save from the focus group discussions were translated into English to allow my supervisor to access the data. Table 2. specifies the background information of the six families, the participants' self-selected pseudonyms, place of birth, level of education, previous emigrations, and status at time of study.

In order to give readers a better sense of who the parents and the teenagers are, the following points need to be highlighted: all the teenagers were born in Israel, the parents of two of the six families were born in Russia. Overall, the parents represent members of the professional class as it includes an engineer, a pharmacologist, computer technologists, an electrician, and a seamstress. That the parents are all professionals is not surprising given that Israel is ranked fourth by the OECD in the percentage of people with tertiary education. This speaks to the context of Israel as a country that is fully respectful of learning and education.

All the teenagers were still in high school at the time of the study. In terms of learning English, while all the teenagers except Monica were assigned to levels D and E—the highest out of five available courses in English for newcomers in high school—not all the parents took English as a second language. Those who did, took a test at a local college that provided courses in English as a Second Language (ESL) for adults and were assigned to one of eight available levels—level eight being the highest.

Of the six mothers, three—the pharmacologist, the social worker, and the human resources manager—stayed at home because their credentials were not recognized and they could not work in their respective fields; one (a computer technologist) went back to school to study to become a nurse while at the same time being a mother of four young children two of whom were teenagers at the time of transition; one (the fashion designer) went down to square one in her once flourishing career in fashion design; and one worked in a local university as a part-time professor teaching a course in Business Management. All six mothers felt frustrated that they could not find jobs in their respective fields in spite of their extensive experience and academic credentials.

Of the six fathers, the credentials and experience of five fathers were not recognized, which meant that only one worked in his previous field as an agent of medical supply; one (an engineer with a Master's degree) went back to school to become a real-estate agent; three worked in lower-paying positions in their fields; and one became an electrical apprentice, which meant five years and 9,000 hours of work before he could apply to become a licensed electrician.

Table 2: The Participants

	Self-selected pseudonym	Place of birth	Education/ Profession	Grade level	Previous emigration	Status at time of study	ESL course
Family 1	Idan						
Parents	Naama	Israel	Pharmacologist		None	Stay-at-home mom	No
	Yehonatan	Israel	Entrepreneur		None	Employee	No
Teenager	Noa	Israel		10	None	HS student	D-E
Family 2	Goldman						
Parents	Ruth	Russia	Computer technologist		Russia→ Israel	Studying nursing	L-6
	Dan	Russia	Computer technologist		Russia→ Israel	Employee	No
Teenagers	Natasha	Israel		11	None	HS student	D-E
	Tal	Israel		11	None	HS student	D-E
Family 3	Altar						
Parents	Aviva	Russia	Seamstress		Russia→ Israel	Seamstress	L-4
	Isaac	Russia	Electrician		Russia→ Israel	Electrical Apprentice	No
Teenager	Monica	Israel		10	None	HS student	Applied Eng.
Family 4	Lapid						
Parents	Lilach	Israel	PhD Business Management		None	Professor	No
	David	Israel	Medical Supply		None	Medical Supply	No
Teenager	Nitsan	Israel		9	None	HS student	D-E
Family 5	Port-Noy						
Parents	Anat	Israel	M.A. Social Worker		None	Stay-at-home mom	No
	Furie	Israel	M.A. Engineer		None	Real-Estate Agent	L-7
Teenagers	Loki	Israel		12	None	HS student	D-E
	Peter	Israel		11	None	HS student	D-E
Family 6	Shemer						
Parents	Adva	Israel	Human Resources Manager		None	Stay-at-home mom	L-7
	Ofer	Israel	Computer Technologist		None	Employee	No
Teenager	Bar	Israel		11	None	HS student	D-E

Table 3. details the types of interviews and sessions conducted, and their length. To adhere to Kvale's (1996) warnings in regard to choosing pseudonyms, I asked the participants to choose their own research names that would represent their research persona. Note that there were six families—coded F1 to F6—that participated in the research in two big cities in Ontario. One-to-one interviews were coded indicating the number of the family (for example, F1), and whether it was an interview with the teenager (for example, F1T) or the parent (for example,

F1P). Families that had two teenagers or two parents that were interviewed were coded appropriately (for example, F5T1, F5T2, F5P1, F5P2).

Table 3: Interview Sessions: Types and Lengths

	Big City #1			Big City #2				
Family #	Family 1	Family 2	Family 3	Family 4	Family 5	Family 6	Total Interviews	Total Hours
Family Focus Group	F1 Idan	F2 Goldman	F3 Altar	F4 Lapid	F5 Port-Noy	F6 Shemer	6	9
One-to-one Interview	F1T Noa	F2T1 Natasha	F3T Monica	F4T Nitsan	F5T1 Loki	F6T Bar	8T	12
		F2T2 Tal			F5T2 Peter			
	F1P1 Naama	F2P Ruth	F3P Aviva	F4P Lilach	F5P1 Anat	F6P Adva	8P	12
	F1P2 Yehonatan				F5P2 Furie			
Other Parent		Dan	Isaac	David		Ofer		
Focus Group Teenagers	FGT1			FGT2			2	3
Focus Group Parents	FGP1			FGP2			2	3
Total							26	39

All six family interviews were conducted at a time and location the participants chose. Five of the six family interviews took place in their respective homes. One family interview took place in the local public library in a quiet room that was reserved specifically for that purpose. Most one-to-one interviews took place in the homes of the participants; two, took place in a local coffee shop. Looking back, I would highly recommend not to conduct interviews in coffee shops. That is, even though the two interviews that took place in a coffee shop took place during late evening hours, the traffic of customers and the surrounding noise sometimes made it difficult not to be distracted. I was worried that the interview would be difficult to decipher and transcribe with all the background noise. Luckily, the two teenagers who chose to be interviewed at the coffee shop spoke loud enough for the digital recorder to capture their voices. Nevertheless, I would not take the risk of potentially interviewing someone whose voice is not loud enough in a public space where there are people coming and going or sitting around and talking. The focus group discussions took place in two local community centres where rooms were reserved for two hours specifically for the purpose of the focus group meeting. Because it was summer time, I decided to buy bottled water for the participants. To minimize noise that might interfere with the

audio recordings, I made sure to buy water bottles that do not make noise when squeezed. That turned out to be a good idea especially during the all-teenage focus group.

Coming into the homes of the participants, I was embraced with the familiar Israeli nature of openness, friendliness, straight talk, and soul talk. It was not only the hospitality that made me feel I was on familiar grounds but also the authentic dialogue that ensued as soon as we met. This should not surprise the reader as it was less about my friendliness or theirs and more about what Tamar Katriel—a cultural anthropologist who has extensively researched the Israeli culture—calls, the “ongoing ideological concern with encounters, direct address, and interpersonal openness as loci of [the Israeli] cultural authenticity” (Katriel, 2004, p. 26).

This socioculturally embedded way of dialogue and authenticity were compatible with the questions and prompts designed for the three meetings. The idea of using prompts was aimed at leaving enough space for the participants to take a lead in where the conversations go. There was no particular response I expected, no particular direction I wanted them to maneuver their responses to. This meant that my follow-up questions were focused on asking for examples or further elaboration. As a result, the interviews were conversational in nature while keeping the object of talking about their experience of integration and of learning EAL and mathematics. In practical terms, in order to invite participants to elaborate on their stories, I would echo the last words said, express confirmation and attentiveness with interjections such as “Uh-huh” and “yes.” In the all-teenage and all-parent focus groups, I would ask provocative questions to invite participants to express their opinion and take a stance.

My role as the researcher. In preparing for the interviews, I would go over the interview guidelines (Appendix 6) to ensure I keep with the plan by using the guidelines as anchors to redirect the conversation back if needed. I would also review my notes and make new ones of some of the points that were raised in the previous interview and needed some further elaboration. This was not done linearly. In fact, nothing in this research—and I believe in any research for that matter—happens linearly. Even compiling the research literature that may seem an activity that can—or should—be done linearly involved dynamic, rhizome-like search for emerging issues and ideas. Similarly, writing down notes involved going back to the recorded interviews, to the not-yet-finished or to the already-finished transcribed interviews and listening to the voices again and again. Specifically, on the way to the

agreed-upon locations to conduct the interviews, I would drive (or take the plane) during which time, I would listen to the audio recordings of the interviews already conducted or listen to the interviews done with the respective family I was about to meet again. These were opportunities for me to get immersed into the data, to reimagine the participants' gestures, facial expressions, and tone of voice to relive the interview, and to press it more deeply into my mind so that ideas, categories, and themes that were grounded in the data could unfold before my mental eyes.

Unlike Kharchenko's (2014) criticism of Norton's being a member of the authoritative group because she was her participants' former EAL teacher thus not truly being able to overcome the "invisible binary of 'I versus they'" (Kharchenko, 2014, p. 31), the power relations with my participants—parents and teenagers alike—were egalitarian. We shared not only the same cultural, linguistic, social background, but also the very experience of transition. This shared cultural and linguistic background and experience of transition into a new country and a new sociocultural context played an important role in the conversations I had with my research participants. With each and every family interview and during each and every one-to-one interview I felt as if part of my own story and experience of transition was echoed in what my participants shared with me. These made the experience of conducting the research far more intense than I expected. There were many common aspects that were brought up and I could not stop thinking how in spite of the fact that I had never before met these people, their stories were, in many respects, similar to mine. In a sense, it felt like the process that Ochs and Capps (1996) refer to by which, "one may return to a known account, rereading or relistening to it utilizing a different facet of one's self. This self may construe new narrative readings, which in turn alter one's sense of being-in-the-world" (p. 23). The very notion that there may be different narrative readings every time I listen to the interviews made me wonder about how the readings could have changed my own and my participants' "sense of being-in-the-world" to echo Ochs and Capps (1996).

Listening to my research participants' stories of transition, learning about their struggles in learning EAL, and, many a times, seeing a reflection of my own and my children's experiences in their accounts, was an emotional experience for me. I not only relived the experience of transition through the teenagers' and the parents' stories, but also, in a sense, was shaken when I realized that many of the details shared were close reflections of my own. I not only relived my

own experience of transition and integration through the families' accounts but also my children's—three of whom were teenagers at the time of transition. While I was somewhat aware of the hardships the transition imposed on my then-teenage children, listening to the accounts of the teenage newcomers who participated in the research sharpened my perception of what the experience of the transition and the integration into a new, socioculturally different educational system might have been like for my own children.

Another aspect that I became acutely aware of pertains to perceiving the notion of identity as something malleable. That is, perceiving my identity as dynamic and in constant flux raised my awareness to my own identity-related dimensions. For one, if I consider autobiographical identity as interpretations one ascribes to lived experiences, it may mean that these interpretations may be different than those applied to my autobiographical self by someone else. Consider, for example, an autobiographical identity shared with me by an acquaintance who lives in South Africa and was born and raised there. It happened over dinner. She and I were talking about, among other things, the political changes that took place in South Africa. It was then when she suddenly exclaimed: "I had no real brick-and-mortar school! My school was actually in the open air! We had no chairs! No desks! Or anything that resembles the looks of a Westernized school! I had to sit under a tree with other kids and a teacher!" I remember thinking to myself that her story was about a story of success, or to use McAdams and Bowman's (2001) analytical framework, a redemption-oriented narrative of self. However, in actual fact, she took me by surprise when she said that all of her suffering was caused by white people who stole from her what was rightfully hers. That is, while I interpreted her story as a success story, she interpreted her story as a trigger for her anger, blame, and judgment. Both interpretations may be redemption oriented. Each, however, puts the focus of redemption elsewhere. Mine was seeing her narrative as a success story of her becoming a teacher; hers was framing her experience as a journey of gaining political power.

That experience sharpened my awareness to issues that pertain to the potential limiting and limited, lopsided perceptions of one's identity by others. Note that I intentionally did not use the word *representations* to reference understanding of identity work because, etymologically, the word *representation* carries the action of *placing before* (Klein, 1967, p. 1330), which, in turn, implies that there is an entity that has some static, solidified existence before which a reflection—however partial—of that entity

stands. When I think of identity-related references—including race, class, and gender that are seemingly static and one-dimensional—I remind myself that the observer’s subjective and context-dependent interpretation must be surfaced. That observer may be anyone looking and that includes self-observation. Thus, as researchers, it is important to be aware of the interpretations of what we see, their origins, and their alternatives (O’Sullivan, 2015; Walshaw, 2010).

Ethical Considerations

In order to ensure that research participants are fully protected against any harm or discomfort, each research project that involves human beings requires the approval of the Research Ethics Board (REB) in the respective institution. This regulation was put in place, across universities and research institutions, worldwide, following, among other things, Milgram’s (1963) work that was set out to understand the phenomenon of human obedience (Van den Hoonaard, 2011, p. 30). Following the publication of Milgram’s (1963) work, debates over ethics in research were ablaze. What triggered this heated debate was Milgram’s description of the extreme discomfort experienced by the participants in his study. In the abstract of Milgram’s (1963) paper, we read: “The procedure created extreme levels of nervous tension in some Ss. Profuse sweating, trembling, and stuttering were typical expressions of this emotional disturbance” (Milgram, 1963, p. 371). Indeed, any research institution has an REB that stands in guard to make sure that any research takes every precaution to avoid causing discomfort of any sort to its participants as research participants have “the right to assume that [their] security and self-esteem will be protected” (Baumrind, 1964, p. 421). My acute awareness to minimizing discomfort of any sort was translated into my efforts to ensure my participants’ wellbeing throughout the sessions. Even though some of the experiences some of the participants shared evoked painful memories of past experiences, overall, these carried therapeutic impact as I will explain later.

These concerns for participants’ wellbeing surfaced throughout the research. Following the approval of the University of Ottawa REB, I disseminated a Call for Participants both in Hebrew and in English (Appendix A) to minimize potential discomfort in having to read something in English only. Nine families reached out and expressed interest in participating in the research. Two of the families, while moving to Canada with their teenagers, did not meet the first criterion; another family, while meeting all inclusion criteria, was about to return to Israel. I thanked them all saying that I appreciate their reaching me but that the research focuses on very recent experience.

Altogether, six families fully met the criteria and participated in the research. The six families, who initiated contact via phone or email, were briefed about the purpose of this study and its research design that would entail meeting three times for about an hour and a half to talk about their experience of transition and of learning mathematics and EAL in Canada and in Israel. In most cases, it was the mother in the family who initiated contact except in one family who had the father contact me. During the first phone conversation, I explained that they can withdraw from the research at any time if they wished to and that if they change their mind between the phone conversation to the first meeting, that would be fine (Baumrind, 1964). At the end of the phone conversation, I asked permission to call back and see whether the teenagers in the family were interested in participating. During the second phone conversation that took place within a few days to give families time to discuss and decide on their participation in the research, a time and place for the first meeting that was convenient for the family was set up. Although it was not anticipated that participants in this research would experience any harm to their wellbeing, the following steps were taken to ensure participants' wellbeing:

Participation. Following verbal expression to participate in the research, a time and place that was convenient to the participants was set up. Five families chose to set the first meeting in their respective homes; one family chose to meet at the local public library. At the beginning of the first meeting, I introduced myself as an education doctoral candidate, interested in hearing their accounts of their transition and their experiences learning mathematics and EAL. I then presented two copies of the consent letter to each participant—one in Hebrew and one in English. I went over the content of the consent letter with the participants and invited them to ask questions or clarifications to make sure they know what to expect at every stage of the research. I explained that they are invited to participate in the research study that I am conducting and that the study was not related to the community centre through which they might have heard about the study. The purpose of the study was then explained with a focus on learning about their experiences of their transition and of their integration into the Canadian educational system and their learning mathematics and EAL. I also explained that in order to give them as much opportunity as possible to share their experiences of the transition and about their experiences, opinions, and beliefs learning mathematics and EAL, we would have three kinds of conversation that would last 90 minutes each.

I noted that the three meetings would be audio recorded and that the first conversation would take place after signing the consent forms and would take the form of a conversation between the teenager, one or both of his/her parents, and me. I also explained that the second meeting would consist of a one-to-one interview and the third will be an all-parent and an all-teenage focus group. Throughout this part, participants—both the parent/s and teenager/s—asked clarifying questions. Answering their questions, I noted that the next two meetings would take place at a time and place that is most convenient for them. Finally, I reminded them that they were under no obligation to participate in the interviews or to answer any of the questions and that they can withdraw at any time.

Informed consent. Two copies of the consent form were presented, one in Hebrew and one in English. Both versions were identical in form and content. Following the overview of the consent form (Appendix 3) and, if needed, the explanation of the difference between an assent form and a consent form (Appendix 4), the parent, their teenage child, and I signed their copies of the consent/assent form as well as mine. Depending on the number of family members participating in the research, the same number of copies were signed so that each would have his/her original copy of the consent/assent form. This took place only after we carefully went over the different items in the consent form making sure that they understand the steps taken to protect their privacy and anonymity as well as the potential benefits and risks in participating in the research. Following this discussion, which mostly took about twenty minutes, I circulated the copies for signage and we all signed. I inserted the signed consent forms into separate folders—one for the parent/s and one for each teenager.

Confidentiality and anonymity. In order to ascertain that the confidentiality and anonymity of the participants are secured, a few steps were taken. I made sure that all printed forms that included the participants' names would be kept in a locked filing cabinet in my office at home. My supervisor also kept copies of the transcribed interviews in a locked filing cabinet in her office on campus. The participants were reassured that the transcripts and audio recordings would be kept for the duration of writing the thesis. The participants were asked to choose a pseudonym of their liking (see Tables 2 & 3). In the process of transcribing the interviews, any identifying details were changed.

I also made sure that my computer, all audio files, transcripts, and notes are password protected and accessible only to myself and my supervisor. Participants were reassured at the time of signing the consent/assent forms that any information that they share would remain strictly confidential. I explained that the contents of the research would be used only for the doctoral dissertation and related publications and that their anonymity will be strictly protected to ensure no information that can identify them will be published or made public. They were reminded that participation in the focus-group discussion entailed their agreement to respect confidentiality and anonymity of their fellow participants.

Risks. During the review over the consent form, participants were told that there were no foreseeable risks to participating in this study. However, they were reminded that because their participation would require that they volunteer personal information in regard to their experiences of the transition to Canada and their experience learning mathematics and EAL in Canada and in Israel, this may cause them to feel emotional discomfort. Nonetheless, I reassured them that they can withdraw at any time and that they can refuse to answer questions. I also reassured them that if they decide to withdraw, all their interviews and files will be destroyed.

Benefits. Going over the consent form, I highlighted the potential benefits of participating in the research in the form of expressing their beliefs, and opinions about their transition and about mathematics and learning English. Indeed, at the conclusion of the first interview, one of the mothers said: “It was great to finally hear them talk about how they feel and what they think without us breaking into tears and accusations. This meant a lot to me” (Ruth Goldman, Family Interview). Similar comments were made by two other mothers who spoke of the opportunity to converse with their teenager/s and giving them enough “air-time” to share their thoughts and experiences.

Validity and Reliability

Whereas reliability and validity are identified as essential in quantifiable data, they seem to be inappropriate in investigations such as the current study where the very dynamic, ever changing, ephemeral nature of the construct of learner’s identity is the focus of the research study. Alternative forms of validity and reliability were then sought.

Within qualitative research, Carolyn Ellis (2004) suggests that instead of talking about reliability—that, more often than not, precludes or makes it impossible to explain phenomena that do not neatly line up with reproducing the same results—in human sciences, it is more conducive to talk about a text that resonates with readers for the text to crown itself as reliable. Given that “the phenomena we study are messy, complicated, uncertain, and soft,” Bochner (2000, p. 267) explains, we need to turn attention to the question “How can [what we write] be true?” In qualitative research, then, it can be more conducive to the process of making sense of phenomena if we ask “What if [what we write] were true? What then?” (Bochner, 2000, p. 267).

Doing qualitative research, then, according to Ellis (2004) and Bochner (2000, 2002) has more to do with communication than representation. This is precisely what I aim at in this research. My suggestion of a unified network framework of identity is dictated by an epistemology that informs knowledge of identity as dynamic, inter-animated, and multi-dimensional. Rather than asking myself how my work represents or is represented in a particular setting, I focus my attention on how to argue for the need for a shift from treating identity as uni-dimensional and separate from other ways of becoming to treating identity as multi-dimensional, inter-animated, and networked.

In regard to validity, Ellis (2004) convincingly argues, “all validity is interpretive and dependent on context and the understandings we bring to the observation” (Ellis, 2004, p. 123). This perception of validity in qualitative research underscores the multiple perspectives that continually contribute to a collective understanding of a phenomenon. Bringing to a collective understanding of a phenomenon is alluded to in Margaret Canovan’s introduction to Hannah Arendt’s *The Human Condition* (Arendt, 1958/1998) where she uses the analogy of people gathered together around a table to understand human condition. I find this insight useful for the purpose of understanding what validity is in qualitative research. Canovan writes,

Only the experience of sharing a common human world with others who look at it from different perspectives can enable us to see reality in the round and to develop a shared common sense. Without it, we are each driven back on our own subjective experience, in which only our feelings, wants, and desires have reality (Arendt, 1958/1998, p. xiii).

In a similar vein, situating validity within postpositivism, Lather (1993) aims at disrupting the “master code of positivism that continues to so shape even postpositivism” (Lather,

1993, p. 674). She argues that validity in its positivistic sense that is framed as the “regime of truth” (Lather, 1993, p. 674) needs to be replaced by four alternative constructs, which she suggests to be: simulacra/ironic validity, paralogical validity, rhizomatic validity, and voluptuous validity, that refer to problems of representation, differences and uncertainties, multiplicities, and practices of self-reflexivity, respectively. In light of the “insufficiencies of language via prose,” (Lather, 1993, p. 678), Lather argues, one can never reach a full representation of a phenomenon.

Simulacra/ironic validity. Simulacra/ironic validity speaks to the impossibility of reaching a true representation of an issue thus precluding a substantive reference to methodological strategies as carrying validity or not. In this particular research, there were instances during the phase of listening and relistening to the recorded interviews, reading and rereading the typed transcripts and translations, and writing and rewriting the report where I had a strong nudging concern that my choice of words in the writing of the report, my interpretations of the data, and the final product of reference to the identity of my participants might not be what they would write, interpret, or say themselves. On the other hand, I was also aware of the nudging concern about allowing readers to pry into the lives of my participants in the name of science (Lather, 1993). I was swept by the need to protect my participants and so I found myself deliberating long and hard on whether to include details of my participants’ pre-transition and post-transition life experiences even in the face of adding substance to my interpretation. For me, this tension was like moving between two ends of a continuum where one end would yield a product that portrays my participants in flat terms of *either/or*, and the other end portrays detailed relationships between specific, very personal, past events and how these impact their experience of the transition and integration. This is why I find Patti Lather’s (1993) suggestion of a simulacra validity highly relevant in my role of making sense of the data I collected and in deciding what goes in the report and what does not.

Paralogical validity. Paralogical validity refers to being cognizant of the fact that there will always be differences and uncertainties that cannot be resolved. Indeed, in carrying out qualitative research, we need to acknowledge our uncertainties and leave space for other means of interpretation. In the context of this research, in order to not create a frozen, lopsided representation of the participants’ identity in a way that may risk seeing them through one-dimensional qualifiers, I chose not to craft profiles or overarching narratives. While this may deny the reader a sense of a tangible sense of a particular teenager, I believe that it allows readers

to focus on the simultaneity of the different identity-related dimensions rather than on one identity in particular. In other words, the very crafting of a profile is about presenting *one side* among many possible others. Indeed, etymologically speaking, the word *profile* references a *side view* (Klein, 1967, p. 1248). In order to create adequate conditions to allow the view from multiple sides, I did not produce profiles for my participants.

Rhizomatic validity. Rhizomatic validity, according to Lather (1993), can be seen in the very representation of identity work as simultaneously multi-directional and multi-dimensional. This kind of validity is compatible with the theoretical framework of this research as well as with the methodological approach that this study employs. Making sense of one's identity through the perspective of one dimension only may pull us back to treating identity as a category of practice and thus crowd out any prospects of comprehensively treating identity as a category of analysis. Using rhizomatic validity to understanding the phenomenon of identity work is part and parcel of the theoretical framework this study offers to understanding teenage newcomers' identity as learners of EAL and of mathematics.

Voluptuous validity. Voluptuous validity, Lather (1993) explains, opens space for self-reflexivity and careful examination of the different interpretations and the consequences they might entail. Through my descriptions of the processes of organizing and reorganizing the data, clustering and re-clustering them in ways that at times were confusing rather than yielding clear and sensible meanings, and through my description of the challenges involved in transcribing interviews and the agonies associated with translating them so that they more accurately reflect the meanings that can never be captured even if the interviews are transcribed in the language that they were spoken, I hope I have attributed this validity to my work.

Chapter Summary

Understanding identity as simultaneously multi-dimensional entails using a methodological approach that is compatible with the theoretical framework. This conviction of the need for compatibility between the theoretical framework and the methodology and method employed has been picked up by Brubaker and Cooper (2000) and framed as the conflation between treating identity as a category of practice and treating it as a category of analysis. This study was formulated to answer Brubaker and Cooper's call for the need to address this conflation and to work toward operationalizing identity as a construct of analysis. As discussed in the literature review chapter, the theoretical framework in this study builds on Ivanič's (1998) four identity-

related dimensions that include autobiographical identity, authorial identity, discorsal identity, and socioculturally available identities. To allow for all four identity-related dimensions to surface, participants took part in a three-part research design where they engaged in three types of interviews/conversations that included a family focus-group, a one-to-one interview, and an all-parent or an all-teenager focus group.

Following approval of the ERB, a dissemination of the Call for Participants was expected to be an effective method to recruit participants. However, recruitment was eventually made possible only through the use of the snowball technique. Some insights in regard to using this technique to recruit participants were drawn from Atkinson and Flint (2001) and Noy (2008) who point to the reasons, possibilities, and limitations of using the snowball technique in recruiting research participants. In addition to the recruitment processes, there was also consideration in regard to issues of reliability and validity. To address the need for validity and reliability concerns, I bring Lather's (1993) suggestion to work with simulacra/ironic validity, paralogical validity, rhizomatic validity, and voluptuous validity.

Six families participated in the research. While the family interviews and the one-to-one interviews spanned over one school year, the focus group discussions in each city took place in each of the two big cities over one afternoon in the summer of that year. Altogether, there were six family-unit interviews that comprised at least one dyad of a parent and a teenager; eight one-to-one interviews with parents; eight one-to-one interviews with teenagers; and four focus group discussions were conducted where participants engaged in conversations about learning mathematics and EAL.

Chapter 4 – Data Analysis and Findings

Following a first round of data analysis using a deductive approach, the segments in the four identity-related dimensions were analyzed inductively both vertically and horizontally to capture the experience of transition and how teenage newcomers' identity work in mathematics and EAL looks like. The next four subsections turn to the research questions that were formulated at the outset of this study.

Collectively, all teenage participants took Academic-level mathematics within their first two years in Canada. Interestingly, all teenage participants and their parents have noted some underlying differences between the Israeli curriculum in mathematics and the Canadian one indicating that when they came to Canada, the material they were working on in their respective mathematics classes was already covered two years before in Israel. This was identified as an advantage among all participants where the familiarity with the material made it so much easier for them to do well in school mathematics in spite of difficulties in using English. Knowing the material contributed to their identity as users and doers of high school mathematics in Canada.

As well, among the participating families, all teenage participants and four of the parents took ESL classes—those who did not, explained they could not take ESL classes out of necessity having to care for the children or make a living. The teenagers were assigned to one of the five school-bound ESL courses (A to E) and had to successfully pass level E in ESL to be allowed into regular English classes. The parents, however, either opted in or out of their ESL classes depending on their availability in light of the dire economic struggles some of them experienced. As I will show in the following sections, the very transition at the age of high school poses age-specific challenges that all the teenagers and their parents brought up. In regard to high school experience in Canada, all teenagers attended public high schools in the two respective cities they lived in with their families. Of the eight parents, one had a PhD, and seven were professionals from diverse fields that included high-tech, pharmacology, fashion design, engineering, human resources, and social work.

Reading the transcripts and the notes I have been compiling, I relived the moments of laughter, healthy debates, and shared understandings experienced in the meetings with the families, the parents, and the teenagers. Every time I read the transcripts I experience a rerun of the conversation, the surroundings, and the words shared. This, in itself, is an incredibly invigorating experience as it takes me back to the sense of strong affinity I shared with the

parents and some of the teenagers that made the interviews feel much more than formal data-gathering sessions as they allowed for unforgettable moments of connectivity. Another researcher may understand this experience of sharing differently but I recognized our shared experiences, and listened very carefully to the differences in experiences and their interpretations. This shared background made it possible for me to more readily empathize with what the parents and the teenagers were talking about. For me, it was not just an interview. It was a mutual experience of the disruption of the notion of stability in identity.

The Three Approaches Used for Data Analysis

Engaging in an iterative and a cyclical approach to data analysis entailed analyzing data during and after data collection, organizing and reorganizing data to reflect different ways they could be clustered together in a meaningful way, and all this while writing notes and memos even though they did not, at the time, compile into a coherent and cohesive text. This constant iteration was nonlinear, and involved the use of different approaches, which took the form of three types of analysis. The first kind of analysis was done deductively, i.e., top-down analysis using Ivanič's (1998) four dimensions to describe identity work. At this stage, Ivanič's (1998) definition for each of the categories was used as the overarching framework for the respective dimension. Together with Ivanič's (1998) somewhat theoretical definition, I formulated an operative definition for each by drawing on the research literature to be able to reliably analyze the data.

How the teenagers story their autobiographical, authorial, discoursal, and sociocultural identities was the focus of this analysis. Through the analysis of the data, I was able, for example, to identify statements as authorial identity by way of the teenagers taking a stance in regard to learning EAL or mathematics. Autobiographical identities were structured by the teenagers by their storied experiences of learning mathematics and EAL. Discoursal identities were constructed by the teenagers' talking about and to by others and themselves. And socioculturally available selfhoods were identified through references to and affiliation and alignment with prototypical possibilities of identities. Table 4 presents a sample of the process of categorization of identity-related excerpts articulated by the teenagers. Such an organization of data according to Ivanič's (1998) four-part model turned my attention to how these bring to light the connection lines between and amongst the different dimensions and

how these can be used to explain the teenagers' decisions, aspirations, and determination about who they wanted to, and could, become.

Table 4: Examples of Participants' four Identity-Related Dimensions in EAL and Mathematics

Research Question	Teenagers' Authorial Identity	Teenagers' Autobiographical Identity	Teenagers' Discoursal Identity	Teenagers' Socioculturally Available Selfhoods
Learning EAL	"In English, you simply need to know loads of words" (Monica Altar, Personal Interview, F3T) "You know you need to study! There is no magic here! You need to study! If you want to get somewhere, you need to sit and study and understand and study" (Aviva Altar, Personal Interview, F3P)	"I remember a secretary who was not really making sense and she simply looked at me and said like, "You need to go!" and she spoke to me as if I was retarded, and I said to her "I'm not stupid" (Bar Shemer, Personal Interview, F6T)	"I still don't like the way I sound in English. I understand lots of English...I can speak it, I'd rather not to because sometimes I lose a word and it's very difficult for me to finish a sentence...I'm simply not comfortable when people see me as such a person" (Loki Port-Noy, Family Interview, F5) (A^{AC})	"I come in and I hear them speak in English and I'm in shock! Like, "What is this? Everybody is speaking English as if it's their mother tongue!"...I didn't feel like moving to a regular English class where everybody speaks English as a mother tongue" (Natasha Goldman, Personal Interview, F2T1)
Learning Mathematics	"Clearly, in order to explain how music works, you talk about it but when you really know music, you don't even need to think with words. You hear the melody, you hear the notes that are on the page and that's why I don't like it when they mix the English with math" (Noa Idan, Family Interview, F1)	"One of the earliest memories I have is when my father and I went to the pool and then we had a break, we ate, and he brought some sort of a big black notebook—the one you use in business—and he would write exercise like adding four-digit numbers. I was only five" (Nitsan Lapid, FG2T)	"I loved it! Like, I was taught to love mathematics. But then I went back to my class because the schedules no longer worked and there were two classes a week so I didn't really manage to understand the material so I got lower marks but I still have this quick understanding in mathematics" (Nitsan Lapid, FG2T) (A^{AC})	"[My father] is what I aspire to become like...He went to the Technion in Israel. [He always says], "if you go to school and study especially mathematics and physics, you have a chance to succeed in life!" (Natasha Goldman, Personal Interview, F2T1)

Following the process of a deductive categorization of the data into Ivanič's (1998) four dimensions, I used an inductive approach to analyze the data bottom-up (vertical analysis) in order to identify additional themes (Corbin & Strauss, 2008). A third analysis was conducted by reading all the identified segments by dimension or by case (LeCompte, 2000) to capture patterns across participants (horizontal analysis). The inductive vertical and horizontal analyses generated the following twelve transition-related codes: excruciating financial hardships; parents supporting

the children; saying goodbye; keeping in touch; you are on your own; what makes an Israeli; “What have we done?”; the new culture; making sacrifices; importance of education; and hope for a better future. These were further reorganized and clustered into six categories, which were then further condensed into three overarching themes through an examination of the similarities and differences between and among the quotes, the categories, and the themes.

Collapsing the twelve categories that were generated through the vertical and horizontal inductive analyses into three overarching themes entailed recurring rounds of going back and forth between the raw data, the codes, the categories, and the themes looking for latent or more evident manifestations by clustering and re-clustering the data. I draw on the work of Ritchie and Spencer (1994) to differentiate between codes (instances of emerging notions and concepts from the data), categories (collapsing notions and concepts into categories by identifying implicit connections), and themes (sorting the categories into overarching themes.)

These entailed a constant triangulation of my insights with my notes and observations that I compiled during data collection and analysis. Answering the four research questions made it possible for me to identify additional categories and themes that essentially add depth and breadth to the answers for the research questions. In other words, understanding teenage newcomers’ evolving identities as learners and doers of mathematics and as learners of EAL could not—and should not—be detached from the experience of transition as it was unfolded throughout the three meetings of data collection and taken form through the identification of the additional codes, categories, and themes.

Under the theme *At a Crossroad*, I grouped the codes that were further condensed into the categories of Making decisions: Looking back, planning forward; and What makes an Israeli? What makes a Canadian? Under *At the Nadir of Transition*, I grouped the codes that related to Financial Hardships: The need to reinvent oneself; and You are on your own: “What have you done?” Under *Making it Against All Odds*, I listed codes that showcased parents’ support and the importance of education; and Hope for a better future. I will discuss these emerging themes in the next chapter where I present my reflections and a synthesis of the findings.

The iterative readings of the rich data allowed me to turn attention to seminal transition-related experiences the participants were sharing with me. Consider, for example, the notion of the need to reinvent one’s professional identity. I noticed that it not only came up in the teenagers’ accounts but also in their parents’. That this notion and other emerging themes are

strongly associated with the notion of identity was solidified the deeper I delved into the data and the more instances I found.

The purpose of the three analyses was to generate a cohesive description of the experience of transition into a new country and the integration into a new educational system through the lens of identity work of teenage newcomers and their families. In addition, through the formulation of the three-part research design, the decision in regard to the types and cycles of analyses, and the engagement in the process of identifying salient issues that were important to the teenage newcomers and their families, I wanted to reach a saturation point where enough information has been gathered to allow for a replication of the study; no new information was generated from the data, and no new codes or themes were surfacing (Fusch & Ness, 2015, p. 1409). This point in data analysis was reached at the conclusion of the third cycle of analysis where I found that many of the data were repeatedly and concurrently reflecting back on the identified categories and codes. At the conclusion of the three cycles of analysis, I turned to the assignment of pulling it all together to capture the multidimensional aspects of the teenage newcomers' identity as learners of EAL and of mathematics.

Table 5. represents the three cyclical data analyses. It provides definitions for each dimension together with a complementary operational definition and its source and an example from the data.

Table 5: Conceptual and Operational Definitions

	Category	Conceptual and Operational Definitions	Example
Deductive Analysis	Authorial Identity	➤ Stating positions, ideas, and beliefs (Ivanič, 1998) ➤ Appropriation of words, beliefs, and ideas (Bakhtin, 1981, 1999)	I think this is the most determining factor, the one thing that is the main cause that prevents girls from being accepted to programs such as chemistry and physics is because they need to work harder in mathematics (Noa Idan—teenager—Family Interview, F1).
	Autobiographical Identity	➤ An account of past experiences to constitute current way of being (Ivanič, 1998) ➤ Reconstruction of past events that impact the present and shape the future as “positive” or “negative” (McAdams & Bowman, 2001)	My grandfather would make me solve so many math problems when I was a child. For every wrong answer, I would get five additional problems. But I am so grateful to him now for doing this. And I’m doing the same with Nicky because it’s really helpful. My parents also always said to me when I was already in eighth grades, they would say, “you see? Now that it’s hard for everybody else and simple for you, you need to be grateful to what your grandfather did.” And truthfully, I’m so glad he did this. (Natasha Goldman—teenager—Personal Interview, F2T1)

Inductive Analyses	Vertical and Horizontal Analyses of Data	Discoursal Identity	➤ address (how individuals are talked <i>to</i> by others), attribution (how individuals are talked <i>about</i> by others), and affiliation (how individuals sound <i>like</i> others) (Ivanič, 2006) ➤ Stories that “are reifying, endorsable, and significant” (Sfard & Prusak, 2005, p. 16): 1st person→A^{AC}, 2nd person→B^{AA}, 3rd person→B^{AC} (Sfard & Prusak, 2005)	1st person attribution (A^{AC}): I do not need to sit and think for long about a problem and such. I’m, like, get what they want from me and I do it. I don’t need loads of time to find out what they want from me in the problem, what they want me to do, like, what they want me to understand (Monica Altar—teenager—Personal Interview, F3T). 3rd person attribution (B^{AC}): She was always very good in mathematics and this year, it was the first time that she really went down, because she said, “I can’t study, I don’t understand him, he does not understand me!” And we are really having problems because she cannot understand, she really went down from 95, 98, to 72, 74 and no one can help, we even asked to switch classes but they didn’t let us (Aviva Altar—Monica’s mother—Individual Interview, F3P).
		Socioculturally Available Identities	➤ Prototypical possibilities for self-hood available in the social context (Ivanič, 1998) ➤ Socioculturally prescribed beliefs (Mendick, 2005)	I came here like an average Israeli who only knows “yes,” “no” and has no idea of English whatsoever. <i>Laughter at work</i> has an episode on Israelis abroad, so one of the stand-up artists says, like, “I want meat but not pigs because I can’t eat pigs because it’s not kosher, you know.” So, yes Israelis are really like that when they are abroad and it really made me laugh and I think we were like that! (Loki Port-Noy—teenager—Family Interview)
	Vertical and Horizontal Analyses of Data	At a Crossroad	➤ Making decisions, making plans for future careers or further education ➤ Socioculturally prescribed beliefs (Mendick, 2005)	I want to study architecture. I [want] to build homes and change the way buildings look like and the way a city looks like because all the buildings are, like, the same (Monica Altar—teenager—Personal Interview). I know there is mathematics in nursing. It was my dream to become a doctor before I began studying computer sciences. And I knew that in order to be accepted to medical school, I need to invest in mathematics because doctors and nurses use mathematics (Natasha Goldman—teenager—Personal Interview).
		At the Nadir of Transition	Substantial transition-related difficulties, stresses, agonies, and hardships	I just want to know, like, if I need something, I’ll have the resources and I won’t have to think about it too much, that I won’t need to come and ask, “this toilet paper or that?” so that I have one extra dollar to spend for that month. I don’t want this. It is mostly because not both my parents have a job but only one of them does (Bar Shemer—teenager—Family Interview)
		Making it Against All Odds	Sources and expressions of optimism, dependability, resilience, perseverance, and hope	I remember that moment of standing in front of everybody, and this poem on perseverance was based on my own experience, that is, this whole experience [spreads her arms] takes perseverance. So I wasn’t looking at them. I said, “I made it! I wrote this poem all by myself!” And I was looking at them and said, “Now you will see, you’ll see what I can do!” (Nitsan Lapid—teenager—personal interview)

Research Question 1 – Teenagers’ Authorial Identity

How do teenage newcomers construct their authorial identity in regard to learning mathematics and EAL? While Norton’s (2000) idea of ownership—that is closely related to the notion of authorship as I use it in this study on authorial identity—has been around for almost two decades, the notion of authorial identity was also explored as an act of creating a new story line of who one becomes (see Vitanova, 2005 in her discussion of a new comer from Russia who could no longer practice as a journalist and changed her story line of self to become a chef by appropriating culinary vocabulary and aligning herself with the way chefs behave and talk), the notion of authorial identity was only recently framed as such in mathematics education (Langer-Osuna, 2017). This is important to note because, in spite of long-time attention to students’ sense making and appropriation of mathematical ideas (see for example, Zack & Graves, 2002), more often than not, students in mathematics classes are expected to engage with mathematics through endless exercises and less through acts of authorship (Boaler & Selling, 2017).

This is particularly relevant in contexts of education and schooling and especially in the context of transition into a new country as learners take ownership of learning and using a new language and of re-solidifying their identities as learners and users of mathematics. In spite of the crucial role authorial identity plays in learning, empirical research that sheds light on this important dimension in learners’ authorial identity is dearth. In the context of mathematics education, of particular relevance is Jones’ (2008) work with students who were deemed mathematically weak. Jones (2008) used a pre- and post-test research design to show that asking her students to keep a journal asking them to reflect on their learning experience and on their sense making in their mathematics class, have substantially improved their confidence in their understanding of the relationship between mathematical concepts.

Analyzing all segments that were categorized under authorial identity yielded a clear picture where teenagers and parents take positions, and express opinions and beliefs learning English as an additional language and learning mathematics are important to learn and use, and how to learn these best.

Authorial identity in EAL: Expressing opinions and beliefs about EAL. Instances of voicing positions, ideas, and beliefs that demonstrate the appropriations of these by teenagers are represented in the conversations that took place in the family interviews, the individual interviews, and the all-teenage and all-parent focus group meetings. In developing authorial

identity, teenagers seemed to appropriate their parents' beliefs about learning EAL. For instance, knowledge of English is believed to be essential in order to participate in the larger world community. I now bring Monica's authorial identity to illustrate how teenagers' opinions echo previously articulated ideas expressed by their parents. Similar examples surface by a close examination of the other teenagers' expression of personal opinions and stances. In her conversation with other newcomer teenagers in the all-teenage focus group, Monica Altar compares mathematics to English saying that both are international languages and explains her perspective about English being essential for communication,

Mathematics is an international language and everyone needs to know it. It's pretty much like English that now begins to become important [for us]. Everyone needs to know it otherwise they won't be able speak or they might even, like, if you take out those who do not know mathematics, like, if you teach it only to those who want to, you will create people who are so intellectually underdeveloped that they [won't know what to do in simple situations] (Monica Altar, teenager, All-Teenage Focus Group, FGT1).

The very research design in this study acted as a safeguard against taking Monica's words in the all-teenage focus group at face value. Coming to Canada as a teenager, she knew only very basic-level English, which was the reason why the system strongly encouraged her to take applied-level English. Realizing that the Applied-level English wasn't a place for her, she was adamant about becoming the best in class so that she can move to the Academic-level English. Knowing Monica's story made it impossible to take her words at face value as she was speaking in the all-teenage focus group (FT3 in FGT1). Her assertion about Applied-level and Academic-level courses describing these courses as ways to perpetuating inequality is revealing,

[The system makes you think] that it's okay not to understand and that you don't even need to, like, get good grades. That it is, like, they say it's okay to be homeless. Like, it's fine to live like this. If you are fine like this, accept it, like, if it is too hard for you, don't work (Monica Altar, teenager, All-Teenage Focus Group, FGT1).

For Monica, the difference in expectations from her as a learner between her parents and her teachers is telling as she takes a stance by appropriating her parents' ideas about learning and schooling and constructs an authorial identity that helps her take on the responsibility for learning in the face of her school and teachers discursively labeling her as incapable. She later explains

what it means to be good in English. She asserts, “In English, you simply need to know loads of words” (Monica Altar—teenager—Personal Interview, F3T). This belief may have been the catalyst for her succeeding in having the school system move her to Academic-level English. Monica’s assertion is a reflection of her parents’ belief that with the right support, children can learn and become anything they want. In the all-parent focus group, where the parents discuss, among other things, schooling and education, Monica’s mother, Aviva Altar, for example, argues,

You can’t say to a child who is ten years old or thirteen years old, ‘I’m sorry, you will never go to a university because now you do not understand!’ [They don’t get that] maybe you are not concentrated. Maybe you need to teach the child in a completely other way (Aviva Altar, Monica’s mother, All-Parent Focus Group, FGP1).

And Monica’s father, Isaac Altar, echoes his wife’s words and complements the assertion that deciding, at an early age, what a child can or cannot learn shuts down possibilities and actually sets the child to a very particular, limiting and limited, life trajectory. He aptly asks, “What if you can prove to them that you can actually become what you want?” (Isaac Altar—Monica’s father—All-Parent Focus Group). In addition to belief that using streaming in the form of telling the child at the age of eleven or thirteen what he can or cannot learn, Aviva—Monica’s mother—also believes that when learning a language, one should not be afraid of making mistakes, of taking risks in communication, and of simply never giving up. What it takes to learn a language or anything else for that matter is commitment. When telling about a computer program her friend graduated from, Monica’s mother recounts how she asked her friend for the secret for her success who said to her “you simply sit on your bottom!” Indeed, Aviva’s belief about how one learns anything involves this unrelenting commitment to study. She says,

You know, you need to study! There’s no magic here! You need to study! If you want to get somewhere, you need to sit and study and understand and study. And if kids start doing this at a very young age, it’s helpful as well (Aviva Altar—Monica’s mother—Personal Interview, F3P).

Interestingly, in her developing identity as a learner of English, Aviva—Monica’s mother—identifies the English grammar as something she cannot get through her head no matter how many times she studies the rules:

I simply don’t understand the mess in my head about the progressive and everything, and nothing gets through to my head! And as much as I try to

organize everything I can't to get it. To this day, it is all disorganized in my head. If I organize everything in a table, I get it (Aviva Altar—Monica's mother—Personal Interview, F3P).

This, however, did not preclude her communicating in English by employing her beliefs about using a language through making mistakes, taking risks in communication, and never giving up. In order to make a living and support her family, Monica's mother found a job as a seamstress. She was very successful to begin with because her professional experience, creativity, and knowledge immediately stood out so when she was unexpectedly left alone in the store for a period of a few weeks, she could no longer "come sit quietly and sew" as she did before. She had to use little English she did know and communicate with clients. Her authorial identity in learning EAL surfaced:

I stayed there all by myself! Not speaking English! New place! That I don't like! And I didn't have a choice and I opened my mouth and started speaking English! There are women who speak English more than I do and who know many more words than I do and who understand more in verb tenses but they are afraid to open their mouths and speak in English because they don't have anyone to speak to in English. But I'm not afraid to open my mouth and speak in English! I sometimes look at myself and say, "What did I just say?" And I talk and talk like rushing like Russian like English. If I'm looking for a word I start pantomiming it (Aviva Altar—Monica's mother—Personal Interview, F3P).

These points of view that were articulated in the interviews reflect the *miniature-culture* (Bruner, 2004, p. 700) of the Altar family where in the face of Monica's dire difficulties to learn English in a very short time so that she can be transferred to an Academic-level English, the parents—together with teenage daughter Monica—join forces to invest resources, energy, and time to bring Monica's level of English on par with what is required in Academic-level English. That is, Monica's authorial identity does not develop in a vacuum. Her articulation of how things should be, her perspective about learning English, and her commitment to learning a language so quickly do not only reflect her beliefs but also the appropriation of her parents' beliefs about what it means to learn and what it means to be the one who authors their own trajectory in life.

Authorial identity in regard to learning mathematics. Similar manifestations of appropriations of beliefs, stances, and perspectives were also evident in conversations about mathematics. In this

section, I bring some examples that represent authorial identity in mathematics as it was expressed across the data. To begin, I would like to bring Loki Port-Noy's (one of the teenagers) idea of what mathematics is. To him, mathematics is something "that you do subconsciously, and it's something so deeply ingrained in our lives that we are not even aware of it" (Loki Port-Noy, teenager, All-Teenage Focus Group, FG2T). His brother, Peter Port-Noy holds a similar opinion about what mathematics is "You need mathematics to build new gadgets and more beautiful buildings and all this stuff" (Peter Port-Noy, Peter, All-Teenage Focus Group, FG2T).

When Noa talks about the differences between Israel and Canada in learning mathematics, she uses her mother's ideas and perceptions about the differences between the two ways of teaching and learning mathematics. She notes,

In Israel, when I take tests in mathematics, they give you the full score as long as you have the correct answer, but here they don't so I learned how to explain what I'm thinking and I got improved a lot and quite fast. Instead of writing only the equation or the result, I simply had to explain why I wrote that particular equation and how I'm using all the numbers and given information, and how these led to the solution (Noa Idan, teenager, Family Interview, F1T).

However, at the same time, Noa also reproduces her father's stance about the place of words or "English" as Noa frames it in mathematic. Noa thus says,

Clearly, in order to explain how music works, you talk about it but when you really know music, you don't even need to think with words. You hear the melody, you hear the notes that are on the page and that's why I don't like it when they mix the English with the math. You can't explain mathematics with so much English. You need to have much more mathematics than English (Noa Idan, teenager, Family Interview, F1).

Noa ventriloquizes her father's perspective about girls and mathematics and says, "I think this is the most determining factor, the one thing that is the main cause that prevents girls from being accepted to programs such as chemistry and physics is because they need to work harder in mathematics" (Noa Idan, teenager, Family Interview). Noa's authorial identity is nurtured by her parents' perceptions of what learning mathematics means. This ventriloquizing and appropriation of ideas is more clearly situated when we turn to the parents' authorial identity, i.e., expression of opinions and stances about what learning mathematics means. In reacting to his daughter's explanation about the

differences she saw between Israel and Canada in teaching mathematics, Yehonatan Idan—Noa's father—says,

What is important here is the rationalization aspect, less the result. What is more valued here is that you need to explain more, to be more communicative, to explain what you did. I don't think it's a good approach. The emphasis in school here is less on the bottom line, knowing that you got to the right answer, and more on things that are not related to mathematics such as wording, explanations, showing that you listen to the teacher. These are things that are important in other areas but not in an area that, after all, is all about finding the right answer or realizing that you have the wrong answer. In English, in literature, and in other subjects, it's different. I understand why there is a need to be verbal in English. I don't really understand why it's so important to them that the student is verbal in mathematics. I heard an explanation on the radio that said it is for the purpose of helping those who are weak in mathematics, those who do not do well in mathematics, and girls. Whether it is true or not, I am not sure it was an expert opinion of the individual responsible of the curriculum. Whatever the case, I am convinced it's not a good thing (Yehonatan Idan—Noa's father—Family Interview, F1P2).

The father's perspective and beliefs about mathematics are not corroborated by the mother's idea of how things should be in mathematics classes. She responds to what is being said talking about one of her other younger children and bringing in the difference in what children learn in the Israeli system versus the Canadian system. She says,

Nadav is bored in mathematics and since Grade 7, I compare what they did in mathematics in Israel and suddenly in Grade 7 while, in Israel, they go ahead with the material, here, they go over everything again. Here, they very much develop the kids' thinking skills. When in Israel, they still say, do 100 practice problems in addition and subtraction, here, they already have mathematical thinking processes. I would be very glad if Israel would adopt the Canadian textbook (Naama Idan—parent—Family Interview, F1P1).

In this context, Noa takes an authoritative stance in response to her father's attributing talkativeness to girls. When her father says,

I think that on average, girls are more verbal. My sister studied mathematics and she has a second degree in mathematics, and she is better in mathematics than many boys that I know. I understand we are talking about averages. Nonetheless, I think that generally, girls do better in subjects that are more discourse oriented (Yehonatan Idan—Noa's father—Family Interview, F1P2), she responds with,

Maybe on average, but it depends because, I think, if mathematics is made more verbal, it makes it much easier for everybody. Because if you show some knowledge in mathematics when you are taking a test, you won't fail it. And in actual fact there were some tests in mathematics where I made really stupid mistakes that show I did not remember something. Once, I did not remember something in trigonometry what $\sin 30$ and $\sin 60$ were and this sort of thing but because I wrote something, I still got 70, I think, and I got to the conclusion that you need to do really bad in order to fail mathematics here (Noa Idan, teenager, Family Interview, F1T).

Noa's perceptions, beliefs, and ideas about what it means to learn mathematics are not developed in a vacuum. The miniature culture, to echo Bruner's (2004) term again, of her family has cultivated a deep commitment to taking school mathematics very seriously. She understands that in order to become a neuroscientist—an area she wanted to study after high school—she needs to get high marks in mathematics. While the learning of school mathematics seems to be utilitarian in Noa's family as well as in the other families who participated in the research, the miniature culture (Bruner, 2004) of each family functions as landscape of the orientation of and orientation for the cultivation of curiosity about the centrality of mathematics in understanding how things work. Specifically, when the conversation turns to the Game Theory, Noa interjects and says, "We have that book on the Prisoner's Dilemma" and then begins to recount the movie *The Dark Knight Rises* analyzing it through the lens of the theory of the Prisoner's Dilemma. At the end of her lengthy description of how the theory applies to the movie, Noa concludes her vision of the relationship between the theory and the movie and says, "It was beautiful to see. So when I saw the book *The Prisoner's Dilemma* I asked my dad what the Prisoner's Dilemma is, and then I read the explanation for the Prisoner's Dilemma in the book" (Noa Idan, teenager, Family Interview, F1T).

How teenagers' authorial identity becomes a terrain of manifestations of processes of appropriation is evident in examining other teenagers' articulation of mathematics-related opinions and beliefs. Looking into Adva's (Bar's mother) perception of mathematics is helpful to later use it as the backdrop against which we examine her daughter's, Bar, mathematics-related beliefs. Looking into Adva Shemer's account of the kind of mathematics education she received growing up in a big city in Israel—one that encouraged students to verbalize their thinking and take ownership of their sense making of mathematics, is later articulated in Bar's stance in relation to learning mathematics. Adva's description is revealing and I bring it here in full:

I had a-m-a-z-i-n-g teachers! And I was so fortunate to have an amazing teacher in high school. She was beyond amazing. She was a one-of-a-kind teacher. She was very open-minded, not at all closed-minded. It was not about "there is only one way to get there and that's it!" which is the case in many schools in Israel. I don't know how it is like here, to tell you the truth. "There is only one way to get there and that's it!" She encouraged creativity. She encouraged, "Think! I taught you one way! I want you now to teach me the other ways. We'll get to the same place, but teach me other ways." And she has so much enriched the thinking in class that it was a great fun. It was like someone allows me, a student, to think on my own. But very few are lucky enough to get this kind of teaching. Very few are fortunate enough to get this! (Adva Shemer, Bar's mother, Personal Interview, F6P).

For Bar's mother, learning mathematics was more about developing an authorial identity and less about finding the right solution fast. This continual verbalizing that was pushed forward as the preferred pedagogical approach of her mathematics teacher is what developed Adva's positions and beliefs about mathematics—that she has been trying very hard to pass on to her own children. Her description of her mathematics teacher solidifies what she took away from those classes:

In her class, there was emphasis not on the grade but on your ability to analyze and get to a solution like that [raising her left upper arm to her left ear and reaching her hand over her head to the right ear]. There was a lot of interaction, lot of interaction in a mathematics class, which is amazing, in my opinion, because it was about explaining how you got to where you were. It was about explaining your thinking so that another student can, you know,

break out the barriers of self-confidence and self-belief that you can “think for yourself!” (Adva Shemer, Bar’s mother, Personal Interview, F6P).

Adva Shemer’s beliefs about what mathematics means percolate into Bar’s shaping stances and beliefs about mathematics. In the all-teenage focus group discussion, Bar ventriloquizes her mother’s beliefs about what mathematics should be about and how mathematics should be taught. Doing so, she exercises her authorial identity and receives supporting reactions from the other teenagers in the focus group. As a response to a prompt of how they like a mathematics teacher to teach like, the teenagers start talking all at once. When Bar takes the floor, the following interaction among the teenagers takes place:

Bar: May I say something about it? When you teach mathematics, there is always a few ways to solve a problem. There is never just one way to solve a problem. So, I would say, first teach the way that is most universal, that you yourself were taught, that you already know, and then try to ask students to provide other ways they can use to solve the problem (Bar Shemer, teenager, All-Teenage Focus Group, FGT2).

Peter: Yes!

Bar: You need to teach many ways to solving a problem. Don’t just come and say, ‘This is the right way!’

Peter: That’s the right way!

Bar: Like, combine the two ways. Teach but also ask what the kids think and then you give more students the chance to choose which way to use, which way they understand better.

Loki: That’s right. Be open to diversity. Don’t be stone blind and say, like, “Guys, it is what it is! This is how you do mathematics! This is how you will do mathematics!” (Bar Shemer, Loki Port-Noy, Peter Port-Noy, teenagers, All-Teenage Focus Group, FG2).

The use of a different context such as the focus group discussion provided a glimpse into how the teenagers’ authorial identity receives an opportunity of ventriloquizing. The teenagers in the focus group discussion have a clear stance in regard to teaching/learning mathematics. Bar’s opinion was taken on by the other teenagers in the focus group thus, conferring her an authorial stance. Drawing on Bakhtin, we can better understand how ventriloquation takes place. Indeed, taking ownership over the notion of the importance of discussing alternative ways to getting to a

solution in mathematics may most probably have become Bar's strong belief as it has been for Adva, her mother—a belief the mother alluded to throughout the three meetings. This is a belief she also shares with her children as she provides them the support and guidance when they do their schoolwork or make any decision for that matter. Interestingly, while all participants indicated that they had positive attitudes about mathematics, what stood out across the voices in the research was that love for mathematics is not associated with an inexplicable attraction to it but with fascination that was translated into many hours of committed work and perseverance in understanding how it works.

Research Question 2 – Teenagers' Autobiographical Identity

How do teenage newcomers craft their mathematics-related and EAL autobiographical identities? Using McAdams and Bowman's (2001) work on contaminating and redemption autobiographical stories—where negative past experiences are interpreted as either causing negative (contaminating) or positive (redemption) after effects—was used to make sense of the participants' autobiographical identity in mathematics and EAL. This operational definition was helpful in making sense of the data that was categorized as autobiographical identity. The next sections showcase some of these autobiographical identities that have shaped the way the teenagers develop their identities as users and speakers of English and as users and doers of mathematics.

Autobiographical identity in EAL. In relation to learning EAL, all participants were acutely aware of the fact that regardless of their mastery of vocabulary, and of their appreciation of English as a language they know to some degree or another, they still felt like outsiders, marginalized by their accent. Bar, for example, who has just finished Grade 11, which was her first year in a Canadian high school, noted:

In Canada, my English is considered good for an immigrant, but I still have difficulties in speaking because I cannot speak without an accent. That is, the others make me feel lack of confidence because they do not have an accent at all and I have a heavy Israeli accent, I don't feel comfortable with this. My accent makes me feel as if I do not belong at all because they do not have an accent and I do (Bar Shemer—teenager—Personal Interview, F6T).

Nevertheless, in spite of this experience evoking negative feelings about the way she speaks English, Bar constructs a redemption story as her autobiographical identity. The following

example represents her redemption-oriented autobiographical identity as a learner of EAL. In this story, Bar describes how she overcame what she calls her “stage fright” when she had to go to the guidance office in order to find out what to do in regard to a school-related issue:

Like, when I went to the office to talk to the secretaries, they would always make faces of like, “how, how did you know that you need to come here at all?” And I was very proud of myself actually because I knew where to go and I knew who to ask, and I knew what to ask and they would explain everything to me and even when I did not understand, I would press on, until they would make a face of “just go away!” I would still press on. And I remember a secretary who was not really making sense and she simply looked at me and said like, “You need to go!” and she spoke to me as if I was retarded, and I said to her “I’m not stupid, I understand what you are saying” and I, like, imitated her, and she, like, looked at me and, like, said, “so you do understand English?” and I said “Yes” and then she spoke to me in the most regular way, I don’t know, it was like a turning point, people looked at me differently so I had to show everybody that I can and so I continued going to the secretary to ask questions (Bar Shemer—teenager—Personal Interview, F6T).

Whereas Bar’s EAL-related autobiography was painted in negative colours, she turned it to be a redemption story as she felt she gained the confidence in her ability to advocate for herself and to go to the school administration to get answers to questions she had. This ties back to the conversation Bar and her mother had in regard to optimizing the last two years of high school, which happen to take place in a new educational system she needs to learn about.

In a similar token, Monica’s EAL autobiography is telling as well in how a negative experience turned into a redemption story. The first school year was excruciatingly and emotionally taxing for her and her parents. It was perceived as such especially in light of the fact that they perceived her knowledge of English to be sealing her fate as a learner. By admission, Monica who went to Grade 8 in her first year in Canada, spoke no English at all save from a few words. In her first year in Canada, her teacher’s approach to her framed her within a deficit framework. This then coloured Monica’s autobiographical experience learning EAL in very dark colours as she was deemed weak academically. Because she was perceived as someone who

does not know English, she was given easy, belittling things to do. Monica's reaction to this positioning is a telling example of how a story that is first coloured in bleak colours is turned to a redemption autobiographical story:

We used to read stories, you know, do the same story, like, tell the story and simply sit and feel, like, a little dyslexic, I didn't like it, which is why I bought a book and read it by myself. And then, I, like, come in with a huge book, like this (indicating thickness with her thumb and index finger), and begin to read, and everybody is looking at me in a weird way because I suddenly, like, began reading out of nowhere...it wasn't very pleasant that everybody was looking at me, like looking at me like I am some sort of an elephant who suddenly learned how to speak, it was like, something that was impossible...I knew I wanted to go to academic English and my mom would always say to me, "Try! Try! Try! Try!" so I tried and I realized that, like, I can do it! (Monica Altar—teenager—Personal Interview, F3T).

Understanding Monica's EAL autobiography in terms of a redemption autobiography helps us appreciate how—within one year—she switched from a "Can't do!" mindset in regard to learning English to a "Can do!" attitude. Not knowing much English upon arrival to Canada and being deemed academically weak by her teachers and classmates, she turned the tables and managed to be accepted into a prestigious high school program that had highly demanding admission processes in place. Monica's imagined future as an architect is painted by her experience learning English almost from square one and being known by her classmates and parents as good in mathematics. These stories demonstrate how autobiographical identities frame past experiences in a way that helps make sense of present actions and future aspirations.

Analyzing the teenagers' autobiographical identities using McAdams and Bowman's (2001) redemption and contamination framework did not always yield a straightforward distinction in negatively framed life events that led to positively or negatively-coloured life events. To begin with, there were instances where an EAL-related autobiographical identity simply reflected the kind of relationship the EAL learner had with English. The EAL autobiographies the teenagers' parents shared were framed as positive experiences that framed the kind of relationship their teenagers developed with learning EAL. Consider the

experience of one of the mothers, Adva Shemer—Bar’s mother—of the ESL classes she took upon arrival to Canada:

I can tell you that I have greatly enjoyed the ESL classes here. I really really enjoyed them. It was amazing to me. It was also from the perspective of the human experience going to class with other people who were, more or less, going through the same experience of transition like me. It was also being in the same class with physicians who supposedly have a high level of English and if I was put there, it means that, in a way, I too am in a high-level. It was also about not being shy. When we got to Canada, I decided that I was a newcomer and that I am allowed to make mistakes, so I spoke English all the time and I asked people to correct me whenever [I made a mistake]. I wasn’t shy or afraid to make mistakes. So when I sensed I made a mistake, I always asked “Am I saying it right? How do you say it?” In contrast to those who remain silent, I did not remain silent. I always spoke, wherever I could. That’s it, I really enjoyed English (Adva Shemer, Bar’s mother, Personal Interview, F6P).

For Bar’s mother, knowing that she was not the only one going through the hardships of transition, integration, and learning EAL, contributed to her feeling confident in her ESL classes and to foregrounding her experience to her children as such. Her autobiographical identity as a learner of EAL was framed as a positive experience where she felt welcomed by others who were going through the same experience. This relationship with English as something you put effort in is manifested through Bar’s EAL-related autobiography where she shares her passion to learning English through multiple modes including reading, watching movies, listening to songs in English, and playing computer games. Bar’s autobiographical identity describing herself as “a book worm” (Bar Shemer—teenager—Personal Interview, F6T) and her realization that she needs to put time and effort in learning English are evident in her description of her hard work:

I simply put a lot into it. And I, like, knew that if I can speak [English] and write [English], it, like, would help me a lot. So I watched movies as much as I possibly could without subtitles...because I knew it’s like exercise where you don’t necessarily speak [English], you simply absorb English as much as possible. It simply exposes you to as much English as

possible...It's like an equation, if you speak English with people who speak only Russian with you, which is something my friend does, you will not improve your English because all you'll do is use the English you already know. But, if you practice your English with people who use it on a day-to-day basis, which is essentially also watching a movie, I learn more...One of the things I wanted to tell you about (Bar Shemer—teenager—Personal Interview, F6T).

Both teenager and mother shared a similar mindset in regard to their relationship with English as an additional language. Understanding the mother's EAL autobiography can enhance our understanding of Bar's EAL autobiographical identity as both were committed to learning the language, both were committed to improving mastery of it, both were aware that it would take time for them to completely master it but at the same time, that it was possible for them to get there. In other words, both teenager and parent crafted EAL autobiographies that presented past evens as the background against which they formulated their present actions.

Redemption and contamination autobiographies in mathematics. As I discussed in the theoretical overview, there have been several recent research studies (see for example, Di Martino & Zan, 2010; Graven et al., 2013) that have put forth and pushed forward the association between students' mathematics-related autobiographies and their developing identities as learners and doers of school mathematics. This association has also been seen in the data collected for the purposes of this research. For example, in the teenage focus group discussion, Tal and Natasha recount how fearful they were of their elementary school mathematics teacher but how they appreciate the teacher as a teacher-for-life thus turning this mathematics-oriented autobiographical identity to a redemption autobiography:

Tal: I loved it how we had that teacher, if you still remember, we had a Russian teacher, remember? Natasha?

Natasha: Yes

Tal: And she was very strict, she, like didn't. We were always jealous of all the other classes because they had such cool teachers, such nice teachers, and ours was like, "No! You study! Study! study!"

Natasha: In Grade 1!

- Tal: Yes, she simply killed us with so much work. It's like teaching for life!
- Natasha: In Grade 1, I already knew to add up to more than twenty, I don't know how much we did!
- Tal: Yes, you knew it all! And what I liked was that she would simply, like, stand in class, going around the desks, we were like sitting in groups.
- Natasha: Oh, I remember, so terrifying. She would come to me, just like that, a class! 40 people! "Natasha! Fourteen minus seven!" And I'm like "Seven?" "Good Job! Take a sticker!" But it was terrifying! Seriously! I was afraid to make a mistake!
- Tal: Everybody was afraid that she would test them but everybody wanted that sticker! It was something that I really liked in her teaching! (Natasha Goldman, Tal Goldman, teenagers, All-Teenage Focus Group, FGT1).

Here, even though, both Tal and Natasha frame their experiences with their Grade 1 mathematics teacher as "terrifying," they use it as a redemption story associating it with positive after-effects such as "teaching for life!" and "I already knew how to add up to more than twenty" (Natasha Goldman, teenager, All-teenage Focus Group, FGT1). For both, now teenagers, Natasha and Tal, the stickers the mathematics teacher gave out constructed their autobiographical identity as someone who was knowledgeable mathematically, a good student deserving a token of appreciation in the form of a sticker: "Everybody was afraid that she would test them but everybody wanted that sticker! It was something that I really liked in her teaching!" (Tal Goldman, All-teenage Focus Group, FGT1). It is worth noting that while this autobiographical narrative is framed as a redemption story, it is not detached from discoursal identity by attribution because receiving the sticker from the strict teacher was, in effect, an act of identification, of acknowledging that a particular student was a certain kind of a student—a student who knows how to add and subtract—thus demonstrating the interwoven nature of the autobiographical and discoursal identity-related dimensions.

This sense of an autobiographical mathematics-related identity was common across teenagers' stories. Like the other teenage participants, Noa also formulated an autobiographical mathematics-related identity that carried redemption connotations. Noa

was 14 when she came to Canada with her family. Noa felt highly comfortable with her school mathematics but this level of comfort in mathematics did not happen in a vacuum. As reflected from the one-to-one interviews with her parents, it was clear that her parents—both academics—put much emphasis on the importance of education in general and of learning mathematics in particular. They would not save time, energy, and effort in working with their children on school mathematics by methodically going through mathematics textbooks and workbooks. There was a history of work in mathematics running through the generations in her father's family. Her father's mathematics-related autobiographical identity is especially revealing. Growing up in Israel, her father took part in a mathematically gifted program. Being recognized as mathematically gifted granted him permission to work on his own in mathematics getting ahead in the textbook. This was perceived as a natural extension of the fact that his father, Noa's grandfather, was a mathematics and physics teacher.

This practice of getting ahead with the material was reproduced in Noa's own mathematics-related autobiographical identity thus pointing to the relationship between parents' autobiographical identity and their children's. It is not surprising then, that Noa was also encouraged to take on learning mathematics on her own by systematically going over her respective mathematics textbooks as she was going through elementary and junior high school thus framing her autobiographical mathematics-related identity with positively coloured stories of success and a can-do mindset.

As I have shown, these positively oriented stories about mathematics do not develop in a vacuum. The parents' autobiographical identities directly and indirectly inform and shape the teenagers' mathematics-related autobiographies. Although there were numerous manifestations of how the parents' autobiographical identities were impactful on their teenagers' autobiographical mathematics-related identities as learners, I used as examples those that are detailed and bring together ideas that were common across all parents. For Bar's mother, for example, mathematics was always a source of joy and of intellectual growth. This attitude toward mathematics was cultivated by her interpretation of the experience she had with her high school mathematics teacher who never accepted the notion that there is only one way to getting to a solution. By Adva Shemer's description of her mathematics-related autobiographical identity, then, it was her love for what mathematics stands for, the hidden patterns that are simply waiting to be uncovered or discovered, that

made her feel that “Mathematics was something that carried a lofty value for [her].” In one of her accounts about her mathematics-related autobiography, she says,

Throughout my childhood, I loved mathematics very much. I loved the absolute feeling of success. I found it difficult because I had no help at home. I always had help in Bible, mostly from my dad, by the way, because my dad loved studying. I had help in Bible. I had help in Arabic. I had help maybe in literature. My mom was a kindergarten teacher and there was no way she could help me with homework. The solution was in the figure of a neighbour who was a good friend of my parents’ and who used to live one floor below us. She was a neighbour who was basically a housewife but she was very intelligent and we had very good relationships, and I felt very comfortable with her because she had the patience to sit with me and to explain things to me, and I remember myself sitting and crying “I don’t understand!” but I didn’t want to give up, I didn’t want to give up! And I would sit for hours on end and try this way and try that way, and an exercise from here and an exercise from there, and a book from here, until I understood. I remember a crazy stubbornness to understand, to understand in order to succeed (Adva Shemer, Bar’s mother, Personal Interview, F6P).

As a parent to three school-age children—Bar being one who was to take two more years of high school when she moved to Canada—Bar’s mother used her autobiographical identity in working with Bar and her younger children. She shared her experience with her high school mathematics teacher who was “something quite scary” and how “Every time [the teacher] raised her voice, you would become paralyzed, she was scary.” Adva Shemer’s mathematics teacher may have been terribly strict but at the same time she was someone who inspired Bar’s mother to think creatively, to do something that is not widely practiced in mathematics classes—to take down the blinders that are metaphorically attached to one’s temples to restrict the field of vision and to open up a visual field that allows the identification of other ways to getting to a solution. Bar’s mother further explains,

On the one hand, it was very easy to disconnect from mathematics in her class. On the other hand, there was some kind of a way of speech that she always used and that I myself say to this day to my kids. She always used to say, “Don’t think like that!” [putting her two palms against her temples to demonstrate horse

blindness] “I want you to think like this!” [moving her palms away from each other keeping her wrists against her temples]. That is, “I explain to you one way, but it is only one way and I don’t want you to memorize it because if you memorize what I taught you, I didn’t do my job teaching you anything!” (Adva Shemer, Bar’s mother, Personal Interview, F6P).

This linking of thinking creatively in mathematics to not wearing blinders was a repeated theme in Adva’s communication about mathematics with Bar and her younger children. Her love for mathematics was associated with the redemption stories that she tried to pass on to Bar:

I got lots of help from my neighbour friend who many times sat with me for hours on end until I understood. There was lots of stubbornness to reach an understanding or a solution and never give up, never give up! Never give up! I will never forget, there was a game like Scrabble in mathematics, now, as long as you don’t solve one problem, you cannot move on to the next. These are things that I have experienced and I see them as significant in a person’s development (Adva Shemer, Bar’s mother, Personal Interview, F6P).

In spite of Bar’s experience of challenges in learning Grade-11 Academic-level mathematics, her mathematics-related autobiographical identity carries a sense of this positive-autobiographical identity:

The beginning of school here was the easiest term for me. Again, it was because I have already learned the material the year before [in Israel]...and then the other students began talking to me and they would ask me “So wait! How do you do this and that?” because they realized that I was good in it because I had already learned it, so they would ask me for help a lot and it was all in English (Bar Shemer, Personal Interview, F6T).

Similar mathematics-related autobiographies emerged from the data of the other participating teenage newcomers. Natasha, Tal, Monica, Nitsan, Loki, Peter, and Bar (pseudonyms) have all shared autobiographical identities of being good in mathematics, working with their grandfathers or parents on mathematics in after-school hours. What stands out through the examination of the participants’ autobiographical identity is that in spite of some of the events being represented, at face value, as negative, they mostly end up being interpreted as redemption stories that direct the teenagers’ actions in regard to learning mathematics. The teenage

newcomers' autobiographies in mathematics directed them to choosing Academic-level mathematics courses in high school. All but one who came at the beginning of Grade 12 successfully completed Academic-level mathematics. All but one continued their education in post-secondary institutions.

Research Question 3 – Teenage newcomers' discorsal identity

How are teenage newcomers' discorsal identities constructed as learners of EAL and of mathematics? In extending Bourdieu's (1977) notion of using and exploring language as "an instrument of action" rather than a mere "object of understanding" (p. 645), it will be useful if we conceptualize language in this context as an *instrument of identity-construction*. Conceptualizing language as an instrument of identity construction reflects Bourdieu's (1977) notion that "in place of specifically linguistic competence, [the sociological critique of linguistics] puts *symbolic capital*, which is inseparable from the speaker's position in the social structure" (Bourdieu, 1977, p. 646). This perception of language as a manifestation of a "speaker's position in the social structure" is used here as the framework for discorsal identity.

Exploring discorsal identity in the data that were collected through the three-part research design, I use Gee's (2001) notion of identifying someone as *a certain kind of person*, and Ivanič's (2006) operationalization of discorsal identity through address (i.e., how individuals are talked to by others), attribution (i.e., how individuals are talked about by others), and affiliation (i.e., how individuals sound like others). I also use Sfard and Prusak's (2005) triple model of identifying stories because it provides a sharper set of tools to identifying discorsal identity. Specifically, Sfard and Prusak (2005) suggest using the following categorization for identifying stories through discourse as they "are reifying, endorsable, and significant" (Sfard & Prusak, 2005, p. 16):

- 1st person identifying stories for instances where a speaker (A) talks about himself (A) to another individual (C) to yield a triple model of A^AC.
- 2nd person identifying stories for instances where a speaker (B) talks about a person (A) to that person thus yielding the triple model of B^AA.

- 3rd person identifying stories for instances where a speaker (B) talks about a person (A) to a third person (C) to yield the triple model of B^AC

To wit, the data were combed through to identify discorsal identities of the teenage newcomers. I use Gee's (2001) notion as an overarching theme in discorsal identity that frames people's identity as a *certain kind of person*. In order to explore the notion of directionality in discorsal identity, I use both Ivanič's (2006) and Sfard and Prusak's (2005) operationalization of how people speak of themselves and others because they complement each other. While Ivanič's (2006) model provides a nomenclature to capture the kinds of discorsal identity by differentiating address, attribution, and affiliation in discorsal identity, Sfard and Prusak (2005) provide a more specific tool of identification by easily identifying who are the speaker, the receiver, and the subject. The three-part research design employed in this study allowed for the identification of a plethora of examples of discorsal identity.

Discorsal identity through 1st, 2nd, and 3rd address and attribution in EAL. Being identified as a certain kind of person (Gee, 2001) can be framed as the overarching theme in the experience of transition into a new country. Bar's comment in this regard is a particularly illustrative example,

I don't like it when people say to me, "Are you from Israel?" because I don't like to be categorized to a certain place, be it Israel or even Spain, it doesn't matter. I don't like to be categorized because at that moment, I'm simply not! At that moment, I can't help thinking about the fact that any race of people experienced some sort of racism and I don't like it. So I simply want to not be affiliated to anything, that people will see me as a clean slate, not a red page, yellow, white, black. Like, I want people to look at me as a clean page that has no smudge of anything, not a dot, no ink that will cause people to judge me. And accent is one of those things that are most revealing of who you are because you hear an accent and you say, "wait a minute, this is from this language, so she must be from there." So I don't like to have an accent and when people say I have an accent, like, me, "Bar has an accent!" I immediately try to change it as much as I can because as I said, I don't like it (Bar Shemer, Personal Interview, F6T).

Bar's perspective on *accent* is reminiscent of Brubaker and Cooper's (2000) warning against using identity as a category of practice, that is, using identity for the purposes of dividing people. For them, identity should not constitute social worlds. It is worthwhile to bring their quote again here to show how Bar's insight points to the potential detrimental consequences of using identity as a category of practice. For Brubaker and Cooper (2000) this kind of treatment of identity "implies or asserts that 'nations,' 'races,' and 'identities' 'exist' and that people 'have' a 'nationality,' a 'race,' an 'identity' (Brubaker & Cooper, 2000, p. 6). The detrimental effects of using identity as a divisive tool were also put forth by Bauman (2004/2012) who convincingly describes the phenomenon of the "effacement or denial of individuality" (Bauman, 2004/2012, p. 39). This deprivation of individuality is experienced by those

whose access to identity choice has been barred, people who are given no say in deciding their preferences and who in the end are burdened with identities enforced and imposed *by others* (original emphasis); identities which they themselves resent but are not allowed to shed and cannot manage to get rid of. Stereotyping, humiliating, dehumanizing, stigmatizing identities... (Bauman, 2004/2012, p. 38).

Here, in reifying her identity as a newcomer through her accent, Bar does not want to be identified by others as someone who does not belong. For Bar, the accent she has deprives her of the identity she wants to adopt. Her use of colours as instruments for judgement is particularly revealing as she does not specifically refer to any particular stereotype or stigma. The use of colours leaves it to the discretion of the beholder to assign whatever identities that they stigmatizing identities. This sense of *accent* as a manifestation of identity cuts across the interviews, thus attributing significance to the positioning of self in relation to the larger community. Bar's refusal to being seen as a certain kind of person resonates with Marx's (2002) account of not wanting to be identified as Canadian. Marx (2002) explains, "This was especially evident in my delight at not being 'caught' as a foreigner when speaking with strangers; brief conversations with strangers were considered successful when people were surprised I was not German and had begun to learn the language only at the relatively late age of 15" (Marx, 2002, p. 272).

The teenagers' parents also perceived accent as a discursal marker of identifying. In speaking about her daughter's mastery of English, Bar's mother identifies Bar as a fluent English speaker. She shares the story about Bar receiving an excellence award in her first year in Canada

and by an act of discorsal attribution uses the third person discorsal identity to describe her daughter as fluent in English.

There were things that I did remember that I know were very significant for Bar, but she did not remember to tell you. I told her, and she said it's okay for me to tell you. It's about her receiving an excellence award at the end of her first semester here in Canada. It is very very significant. It's not only about mathematics and English. It is about coping with language, coping with the material, coping with a new social context, with school, and with many things (Adva Shemer, Bar's mother, Personal Interview, F6P).

The story is revealing in that it not only highlights the affordances of using the specific three-part research design that allowed participants to "fill in" missing parts in the story of the experience of transition but also provides an opportunity for participants to engage in discorsal identity by attribution or address. Specifically, Adva, Bar's mother, realized that Bar did not share with me an important event in school that highlighted Bar's academic achievements and that took place in her very first year in Canada. Between the family interview and the individual interview, Bar's mother discussed this with Bar and asked her whether she could share the story with me when she and I get together for her personal interview. Bar agreed. The very discussion between mother and daughter of the excellence award as something that needed to be shared with me, may be seen as an example of second-person discorsal identity ($B^A A$), where the mother (B) addresses Bar (A) and identifies her (A) as a successful student. Her sharing the story with me was done by way of third-person discorsal attribution of success ($B^A C$) and, consequently, discursively identifying Bar as a successful learner.

Being discursively identified as knowing English or not knowing English was a crucial part in the teenagers' perception of self as a speaker and user of English. Loki, a teenager, for example, did not say a word in English for the first few months fearing that he will lose face by making a mistake or being stuck looking for a word. In the one-to-one interview, he uses the first person discorsal identity ($A^A C$) in reifying his identity as a learner of EAL:

I still don't like the way I sound in English. I understand lots of English. When we got here, I simply did not understand anything at all including what the Americans were saying. Like, I watched many, many series in English, and English is, like, three-hundred-and-eighty degrees around me, the whole time, so I understand it. I can speak it, I'd rather not because sometimes I lose

a word and it's very difficult for me to finish a sentence, and I'm not comfortable with such things. I'm simply not comfortable when people see me as such a person (Loki Port-Noy, teenager, Family Interview, F5).

Loki's experience is representative of what Marx (2002) describes in her own experience of transition from Canada to Germany. For her, the first phase in transition is characterized by linguistic and semantic vacuum, which precedes a process of appropriation of others' voices (Marx, 2002, p. 270). Marx's (2002) distinction between the phases of being at a loss and appropriation helps in understanding Loki's and the other teenagers' experiences using EAL. Discursively identifying the EAL self in terms of belonging or not belonging is exemplified in Natasha's (A^{AC}) account of her EAL classes,

When you go to ESL classes, there are people who basically do not speak English. And I come in and I hear them speak English and I am in shock! Like, "What is this? Everybody is speaking English as if it's their mother tongue!" This is what crossed my mind at the time but later, as I began to know them, I realized that wasn't the case. But in the beginning I thought, "How can I become one of them if I can't even say one word in English?" The teacher asked me a question and I don't know how I succeeded in answering her. I said something to her and I was surprised by the fact that I said something in English. [Being in the ESL class] gave me confidence because we are all in the same boat, if I can put it this way. No one has perfect English so no one judges us! Each one of us says whatever we have to say in whatever way, in whatever accent. And as an Israeli, I don't have an accent like the one the Chinese, for example, have so it's much easier to understand what I'm saying, so I felt I had an advantage over others in class (Natasha Goldman, teenager, Personal Interview, F2T1).

Natasha's discursive identification (A^{AC}) reveals that when she was in the ESL class her identity as an EAL learner was framed in terms of positive experience. This reifies her identity as a successful learner of EAL as she later says,

When I moved to the next level, I had a far stricter teacher who did expect us to do a lot of work. She was really strict and she said, "No one in my classes passes the course with more than sixty!"...When I got more than eighty, she was shocked!...The fact that I got eighty-six and eighty-four surprised

her...When I got the highest mark, she was surprised....I didn't feel like moving to a regular English class where everybody speaks English as a mother tongue and where I will lose my advantage over everybody else, which means that rather than receiving the highest grades in class I'll start getting the lowest marks and I will become the one everyone thinks does not belong...When my Grade 11 English course began in the beginning of my Grade 12 year, I was much quieter. I didn't talk much like before, as there were only three other students who were in ESL with me in that class who were in the same situation as mine. It's not that I had a problem working, sharing my ideas, or reading out loud but I was keeping a low profile in that class (Natasha Goldman, teenager, Personal Interview, F2T1).

Natasha's discursively identifies herself as belonging to the ESL group. This did not preclude her participation in the regular English class but she did feel more comfortable not talking "much like before" and "keeping a low profile" indicating that at the time she may did not feel as a full member of the target-language community (Piller, 2002). This, of course, may have changed with her going to university as she was planning on doing and appropriating others' voices (Marx, 2002, p. 270).

But it was not only the teenage newcomers who used discoursal identities to construct their identities as users and learners of EAL. Loki and Peter's mother, Anat Port-Noy, uses discoursal attribution when she notes that the level of English of her younger children is far better than that of the older children (Anat Port-Noy, Loki and Peter's mother, All-parent Focus Group). In the all-parent focus group, Isaac tells of his wife's efforts learning English noting, "She is more concerned about her accent than about whether she is saying it correctly." He then uses 3rd person identity (B^AC) by way of attribution when he talks about his daughter saying who was not present at the all-parent focus group, "She is ashamed of us when we speak English" (Isaac Altar, All-parent Focus Group). Raising this issue in the focus group, it generated conversation among the parents and, consequently, a collective meaning making of the parents' experiences speaking English. Indeed, Naama Idan—Noa's mother—responds by providing another 1st person identity (A^AC) saying of her children, "My kids too are ashamed when I speak English. They laugh at us too." This is corroborated by many of the other parents' 1st person discoursal identity (A^AC) identifying themselves as users of English whose accent will always disclose the fact that they do not really belong.

Discoursal identity through 1st, 2nd, and 3rd address and attribution in mathematics. In trying to provide guidance and support to her daughter who was to choose the courses for the last year in high school after spending only one year in a Canadian high school, Adva Shemer, Bar's mother, is cognizant of the pressing issue of planning and deciding about further education after high school. Specifically, she tells of a conversation she had with Bar about choosing these courses. I bring Adva's account of this conversation in full to put Bar's 3rd person discoursal identity by address in context:

When we sat and talked—because she doesn't know yet what she wants to do after she graduates—we sat at the end of the last school year and I said to her, “Because you don't know what you want to study after high school, let's open the hand fan for you and take one or two courses in almost every area that we think might be of interest to you. We took two courses in technology, in computers, two courses in psychology and sociology. She really wanted to do languages, so we took Spanish. I said to her, “This will be your fun course.” We took two courses in accounting (Adva Shemer, Bar's mother, Personal Interview, F6P).

In choosing the courses in accounting, Adva, Bar's mother, uses 3rd person discoursal identity by address to provide her guidance and support when she says,

I said to her, “Try it! To me, looking from the side, it seems to me that you are a numbers person. Try it! To me it doesn't look hard. Try it! If you decide that it's not working for you, nothing happened but you have the opportunity to see for yourself!” So we plugged in these courses (Adva Shemer, Bar's mother, Personal Interview, F6P).

She then uses 3rd person attribution talking about Bar through verbalizing the different potential thoughts that may cross Bar's mind as she is trying the courses in accounting:

She took all these courses. So she has the opportunity to sit on the chair and think: “Do I feel comfortable here or do I feel uncomfortable here? Indeed, I need to invest in all of them but here, it frustrates me and depresses me and it's not relevant to me, okay? And here, yes, I do want to get there and it challenges me.” You see? (Adva Shemer, Bar's mother, Personal Interview, F6P).

Using discorsal identity by means of address in order to guide her daughter's decisions in regard to courses that she can take in her last year in high school, Adva co-constructs Bar's identity as a learner of mathematics. Similarly, in sharing a conversation she had with her father about whether she should opt for a five-point level mathematics, which is considered to be the highest level of mathematics available in Israel, or opt for the four-point level of mathematics, Natasha—teenager—demonstrates her father's use of the second person discorsal identity (B^AA) to try and convince her to take the most advanced-level mathematics class, "There is no way this is happening to you!" He said to me, "You are an excellent student! You have been doing mathematics all your life! You are not a four-point kind of person!" (Natasha Goldman—teenager—Personal Interview, F2T1).

As well, it was revealing to see how the teenagers use 1st person identity (A^AC) in relation to themselves as learners of mathematics. In the all-teenage focus group, for example the following exchange took place:

Nitsan: I understand [mathematics], I do it, like, I like what I'm...

Loki: I think what I liked the most in mathematics was to be at the head of the classroom because I would always see to it that I would be two meters ahead of everybody especially in elementary school. In high school I went down a bit mostly because I moved to English, which was hard for me

Peter: Oy, it was hard

Loki: Incredibly hard, but in elementary school I was always, I was always two subjects ahead of everyone. They were all in the beginning and I would be in the end of the book

Peter: That's right. He and I were always, like, relatively good in mathematics (Nitsan Lapid, Loki Port-Noy, Peter Port-Noy, teenagers, All-Teenage Focus Group, FGT2).

This short excerpt demonstrates the teenagers' self-identifying themselves as good in mathematics. Nitsan uses 1st person identity (A^AC) to tell everybody in the focus group she always loved doing mathematics. Loki too uses 1st person identity (A^AC) to talk about himself as someone who was always ahead of the rest of the students in mathematics. He then tells everybody that this has changed when he moved to Canada and had to use English when working in mathematics. Peter acknowledges the difficulties Loki is referring to and by doing so he talks to Loki and employs the 2nd person identity (B^AA) as he addresses both Loki and the other

members of the focus group. In the all-parent focus group, Peter's mother uses the 3rd person identity (B^AC) by attribution to identify Peter who is not present in the room as someone who has difficulty in geometry, which is corroborated with Peter admitting it in 1st person attribution (A^AC) during the all-teenage focus group, "I do not understand geometry. I understand area, I understand circumference, that's it, that is all, of squares, like there is more in the circumference of a square" (Peter Port-Noy, teenager, All-Teenage Focus Group, FGT2). How these acts of attribution through discursal identity inform each other reflects the interconnectivity and mutual co-constructive processes between the dimensions.

Similarly, not using pocket calculators is considered to hold the speaker at a mathematical advantage. It is thus revealing when Bar uses the 1st person identity (A^AC) when she says, "I do not usually use the calculator. I just started because we are working on geometry. So, like, this is all this work with π and everything, but in principle, I do not use a calculator." This discursal identity positions her as someone who is confident doing and learning mathematics. In the one-to-one interview, Bar constructs a future-oriented identity when she says, "As for a career, I know that I will go toward something related to mathematics, and I know I will do well in it, because mathematics is logic and logic is me" (Bar Shemer, Individual Interview).

Noa, also self-identifies herself discursively as mathematically able, "I know how to multiply in my head far better than Canadians" (Noa Idan, teenager, All-teenage Focus Group). Constructing an identity as mathematically gifted learners and doers of mathematics, Tal, Natasha, Monica, and Noa use 1st person (A^AC) identity construction when they talk in their all-teenage focus group about their being in a class of mathematically gifted children in Israel:

Tal: I wasn't allowed to go to a gifted class here and they put me in a regular classroom, after a month, I had nothing to do, I died of boredom. In Israel, I was in a gifted class as soon as I began high school so I found it a bit...

Natasha: I don't understand why this thing with English caused so much trouble, like, what? Because I'm not a speaker of this language, does it mean I'm less gifted than you are? As far as I'm concerned, I'm far more...

Tal: Mathematically, as soon as I came here, I could not go to gifted.

Noa: I got marks, the year I got here, I think I got the highest marks in class in mathematics, and I got average marks in everything else.

Monica: It's not only in mathematics, it's also other subjects. For example, when I came I was told, "you can't take Academic-level English!" Why?

“Because you don’t know English!” But I’m, like, I understand, I think, I’m, like, capable. I can go to academic. They put me in Applied English.

Noa: You died of boredom, right?

Monica: Yes, I got the highest mark (Noa Idan, Natasha Goldman, Tal

Goldman, Monica Altar, teenagers, All-Teenage Focus Group, FGT1).

In this exchange, the participants use 1st person discursal identity (A^AC) to talk about themselves being in a gifted class in mathematics in Israel and about having to lose this identity upon arrival to Canada because of English being the language of instruction. Monica, whose knowledge of mathematics gained her a high social status among her Canadian friends, could not use this high status in her EAL classes. In fact, Monica’s struggle to go to an Academic-level English class had met with refusal and she was put in an Applied-level English class. Elsewhere, Monica tells how she was eventually moved to an Academic-level English class because she did exceptionally well in the Applied-level English class. When Monica speaks of herself as a learner of mathematics, she identifies herself through first person discourse (A^AC) as mathematically able,

I do not need to sit and think for long about a problem and such. I’m, like, get what they want from me and I do it. I don’t need loads of time to find out what they want from me in the problem, what they want me to do, like, what they want me to understand (Monica Altar—teenager—Personal Interview, F3T).

However, in the all-parent focus group, Monica’s mother uses a 3rd person attribution (B^AC) to describe the difficulties her daughter had working with one of her mathematics teachers,

She was always very good in mathematics and this year, it was the first time that she really went down, because she said, “I can’t study, I don’t understand him, he does not understand me!” And we are really having problems because she cannot understand, she really went down from 95, 98, to 72, 74 and no one can help, we even asked to switch classes but... (Aviva Altar—Monica’s mother—Individual Interview, F3P).

Here, again, the teenagers discursively construct their identity as learners and doers of mathematics demonstrating its complex nature as it is shaped not only by one’s past but also by how others perceive one’s mathematics- and EAL-related identity.

Research Question 4 – Teenage newcomers’ socioculturally available selfhoods

How are socioculturally available selfhoods scripted into the learning of mathematics and EAL among teenage newcomers? While the role socioculturally available identities play in the co-construction of a learner’s identity has been recognized in the research literature, this study pushes them forward to front stage position. In my overview of the theoretical and empirical research on socioculturally available identities, I also pointed to relevant research in EAL and in mathematics education. Analyzing the data that were collected for the purposes of this research, participants repeatedly talked about their awareness of their English not sounding like a native speaker. They also alluded to socioculturally available identities within mathematics. These will be discussed in the next sections.

Learning to sound like native speakers. While research in socioculturally available identities in the context of learning EAL has been limited, there are important insights from the little research that is available. As discussed earlier, learners of EAL, more often than not, wish to sound like native speakers (Fang, 2016; Piller, 2002; Timmis, 2002). Specifically, passing for a native speaker (Piller, 2002) in order to be considered as a full member of the target-language community has surfaced across interviews and across teenagers and their parents.

In his personal interview, for example, Yehonatan Idan—Noa’s father—shares his thoughts about how his English should sound like,

At a very young age, I have already accepted the fact that my English will never be really good. After I finished my service in the army and after going a few times to the United States and feeling that I have a heavy tongue when speaking in English, where was a time when I thought that maybe I need to work on my own on my pronunciation. In regard to vocabulary and understanding English, I have no problem. After a few visits to the United States, I noticed a very irritating phenomenon, and even though I understand English perfectly, when I speak with sales for people in a store and when they hear my accent, they start speaking to me slowly, slowly as if I am a two-year-old child and it kills me and I thought that maybe I need to start working on it on my accent, and I did a few exercises but I did not improve (Yehonatan Idan—Noa’s father—Personal Interview, F1P).

Noa's father's account illustrates his concern about the difference between the way he speaks and the way the speech should sound like. This constant awareness depicts the identity of a native speaker that is socioculturally available to him. To him, his youngest child, Yael,

[will have] no problem. She speaks English. Also, in regard to vocabulary and in regard to syntax, no accent, like a child who was born here. She spends most of her time with girls who are native speakers, so she simply speaks a lot (Yehonatan Idan—Noa's father—Personal Interview, F1P).

Putting Noa's father's words in the context of research in and about socioculturally available identities, we can understand that by graduating high school in Canada, the younger children who were in elementary school and kindergarten at the time of the research will not need to cope with this constant comparison of their speech with the one of a native speaker's because they will have already mastered a native-speaker-like English.

Teenagers, like their parents, learn about socioculturally available identities through their connections with adults other than their parents. Identities that are socioculturally available in learning EAL can also be found among people who had successfully gone through the process of learning EAL themselves. For example, Monica's mother shares the story of Irena, a friend from work where she worked as a seamstress. At a point where she wanted to give up and resign from the job that she had to commute for a good chunk of the day and that was paying her less than minimum wages, her friend offered her own success story to encourage Aviva, and by extension her daughter—Monica, to stay on the job. Monica's mother's account reveals her using Irena's story to construct her own identity as someone who will learn English with time,

I had to take two buses to get to work and twelve dollars is not much and Isaac said to me "If it makes you feel bad don't go there! Don't worry, we will find something closer and better. So three days later, I came to Irena and I said to her "I can't continue like this!" and she said, "But you can get clients!" and I said, "But I don't speak English! I just want to come sit quietly and sew!" And she said, "No, no! Don't worry! I was also in the same situation twenty years ago! I also did not know English! You will listen! You'll get the words you need! 'cut here' 'add there'

yada yada yada. Don't worry! Everything will be just fine! I'm here and I'll help you!" That's what Irena said (Aviva Altar—Monica's mother—Personal Interview, F3P).

I bring this here to contextualize Monica's work on her own identity as a learner of English. Aviva's use of Irena's story as an available identity is an example of Norton's (2006) call to understand identity work as a sociocultural construct. Irena was the one who convinced Monica's mother not to resign, to stay on the job, and to continue working on her English as she herself did twenty years before that. Monica's mother agreed to stay and found herself using English in spite of the fact that she still found the grammar confusing. All this can be used as the backdrop against which we can now present Monica's work on her developing identity as a speaker of English through socioculturally available selfhoods. When Monica and her parents moved to Canada, she spoke very little English. In fact, the very little English she thought she knew was not really helpful as she was afraid to speak and disclose the fact that she is not like everybody else. However, during Grade 8, which was her first year in a Canadian school, with the very little English she had, she also had to prepare for high school.

Things looked really bleak as she was told that without English, her chances of being accepted to an arts school were very slim. It took the mentorship of one teacher in Grade 8 that walked Monica through all the stages of preparing for the auditions and instilling in her the belief that she can—and will—be accepted like others before her did and many others after her would do. Examining the data gathered from the different contexts, it seems to me that this available selfhood was the drive behind Monica's perseverance and hard work in investing time, effort, and energy in reading books, writing extensively, and doing extra work in her school projects. She passed the audition with flying colours. Her mother was beside herself seeing her dream for her daughter come true. Monica did so well academically that she not only took Academic level mathematics as was expected of her with her strong background in mathematics but also Academic level English as she insisted that the school would allow her to move to. If it were not for that one teacher who consistently showed her what she can become, Monica and her mother admitted that she would never have ended up in that prestigious art school she applied to only one year after she arrived to Canada.

In regard to available selfhoods that the teenagers have brought forward, there too, one can see how wishing to be like somebody else that you know has driven the teenagers to action.

Nitsan's story, for example, is telling. Nitsan was assigned to Applied-level English something she said she was not happy about. Her wish was "to transfer to Academic and be in the same level as kids who, you know, grew up here" (Nitsan Lapid, teenager, Personal Interview), thus using socioculturally available identities to determine where she wants to see herself with respect to her learning English. This notion of wanting to be like the native speakers of English was articulated by Nitsan's mother when she said, "I will be happy if she speaks English at the level of a native speaker and I think she understand it and wants it herself" (Lilach Lapid, Nitsan's mother, Personal Interview). Similarly, movies too are used as a source of available ways of being. Loki, for example, explains,

I always pay attention to how to say things. I know how the mouth should look watching movies and stuff like that. I also checked it a few times, so I know it and I repeat it to myself many times, I'm saying the word and then I'm saying it the right way (Loki Port-Noy—teenager—Personal Interview, F5T1).

Taking together these examples sheds light onto socioculturally available selfhoods that co-construct one's identity as a learner and user of EAL. While these accounts can also reflect other identity-related dimensions such as discorsal identity, autobiographical identity, and authorial identity, zooming in on the dimension of socioculturally available identities can add depth in our understanding of what drives people to take specific actions and not others in their process of learning EAL.

Scripted identities in socioculturally available selfhoods in mathematics. In their recent work on gender gap in mathematics, Nollenberger et al. (2016) merged the four sets of PISA data collected in 2003, 2006, 2009, and 2012 with the World Economic Forum's gender gap index and found that socioculturally embedded expectations indeed play a dominant and determining role in shaping students' identity as learners of mathematics. Specifically, they found that second-generation female immigrants whose parents emigrated from countries of more gender-equal cultures were performing as well as boys.

But such available identities are not only generated through meta-narratives about what one can become. Learning from one's parents' stories and mathematics-related autobiographical identities that run in the family also play a determining role in shaping one's identity as a learner of mathematics. That is, socioculturally available identities can

also be generated in one's immediate environment (see Norton, 2006 on the definition of identity as a sociocultural construct). These may include, *inter alia*, classmates, a neighbour, a parent, and even a teacher.

In the Idan family, for example, sharing his experiences learning mathematics, Yehonatan Idan—Noa's father—talked about how his father, a teacher of mathematics, used to talk to him about mathematical problems. His description of his childhood home's *miniature culture*, to cite Bruner (2004), depicts a picture where family members were continually engaged in mathematics-related activities. He recounts,

[M]y dad would write programs that he did not have to but he did simply because it interested him like other things that interested him...If we got something new, like a coloured monitor, I suddenly had a library, which I could use to draw coloured pictures so I did it then. That was what made me work on the fractal program...It was my dad who worked on it a lot and he also bought books and studied fractals, but it was my dad and it interested me. He would do fractals on the computers and he would show us, and we would talk about it, and he would explain to us what this is and what that is. My sister worked on a different program, which was X-Mix-Drix in in three dimension where the computer played against you and would win many times. That is, instead of being three-by three, it was three-by three. So she would do it and I would watch. So she would do it and I would watch what she was doing, and I would be interested because it looked interesting...these were things she did and it made me too think about things of this sort (Yehonatan Idan—Noa's father—Personal Interview, F1P).

This has shaped the sociocultural identities available to teenager Noa and her siblings as learners of mathematics. Knowing that mathematics was something everybody, everywhere did in their extended families meant that they too were expected to do it and succeed in it. Indeed, not only Noa was expected to do well in mathematics but her younger siblings too. This success in mathematics meant that the family invested time, energy, and effort in working on mathematics at home. The children were expected to do their mathematics workbooks that were shipped from Israel by the grandparents. It was an everyday activity that became an integral part of their familial *miniature-culture* (Bruner, 2004, p. 700).

This set of socioculturally available identities as doers and learners of mathematics in the Idan family was cultivated long before the parents—Yehonatan and Naama—introduced it into their home working with their children on mathematics on an everyday basis. Noa's father's socioculturally available identities were nurtured in his childhood home. He later went to study mathematics at a university and now has a career in high tech. His sister has a Master's degree in mathematics and works in a mathematics-related field. Now, as a father of four children one of whom is a teenager, it was clear that he has recreated these very specific scripted selfhoods in mathematics in his own family.

Besides socioculturally available selfhoods that were used from the immediate family, available identities from pop culture was also made available. During his one-to-one interview, Yehonatan—Noa's father—discussed the story of Srinivasa Ramanujan—the renowned Indian mathematician—as an example of a socioculturally available selfhood one can strive to become,

The problem is there are many people who have exceptional talent and never get anywhere. There is the famous story of Ramanujan who was an Indian boy in the beginning of the twentieth century, who grew up in a remote village in India in an impoverished family, and he really had an exceptional talent and somehow because of his talent he somehow got to a mathematician by the name of Hardy who met him when he was 16, 17 and Ramanujan really had an exceptional brains, and it did not come to him from anywhere else. His parents were not, did not teach him mathematics at home. In the short period from the moment Hardy discovered him until the moment he died of tuberculosis, he did, at the age of 22, 23, these six years, without any background in mathematics, without really finishing a first degree in anything, he got to such achievement that are awe striking. And it is all the nature versus nurture [says the last three words in English]. He was born with it...The talent to do mathematics is innate. And the ability to significantly change what you get from your parents or at birth is pretty much limited. Yes, I can take a person weak or strong in mathematics, and through big efforts have him pass five-point mathematics, but it will end there. And in order to get to the high achievements in mathematics, you need to have it, to have it from birth (Yehonatan Idan—Noa's father—Personal Interview, F1P).

This quote from Noa's father is revealing in many levels. It not only reflects her father's own beliefs about who can be really good in mathematics, but he also draws on socioculturally available selfhoods by the very fact he brings in the story of Ramanujan. Indeed, towards the very end of the interview, he admits,

In mathematics, I know Noa has that talent, that is, it will be easy for her in whatever she chooses to do...But, she is not good enough, and she too thinks she is not good enough, she is not brilliant in mathematics in the sense of a prodigy, you know, one out of a thousand....If she studies medicine, mathematics will never be a problem for her. Mathematics for medicine will be easy for her. It will be easy. She will get very high marks...I would not recommend her to study mathematics (Yehonatan Idan, Noa's father, Personal Interview, F1P).

Disregarding the third person discursal identity (B^{AC}) by attribution that some readers may detect here, we see here how socioculturally available selfhoods work when her father compares her with someone who is "brilliant in mathematics in the sense of a prodigy." For Noa's father, a socioculturally available selfhood in mathematics is a mathematics prodigy one can either be like or not. Because teenagers appropriate and ventriloquize their parents' and other adults' beliefs and opinions in regard to learning mathematics, identifying such beliefs that are situated within sociocultural contexts is important to better understand where and how teenagers adapt available selfhoods as learners and doers of mathematics.

Socioculturally available identities can also emerge in other environments such as schools and classrooms. Speaking of a classmate, Adva Shemer recounts,

Throughout the years, I always had at least one or two classmates in class, who were extraordinary, kind of, you know, there was a classmate in high school who was Russian. I don't know whether he was a newcomer or not but socially speaking he was completely disconnected. He was kind of very strange. He also looked strange. He used to conduct chemical experiments at his house and he blew his finger in one of them. He used to read science fiction books in English this thick [gesturing two inches with her thumb and index finger], he never had his books or notebooks, nothing! In the psychometric test he got something close to eight hundred. He used to always get a hundred on every test. Something unreal. And there was

always someone who paved the way for others to follow in class! That is, there was always a role model in class and if you had a sense of competitiveness and if you aspired to excellence, you had someone to look up to (Adva Shemer, Bar's mother, Personal Interview, F6P).

What stood out in Adva's account of who she looked up to is that she admits, "[T]here was always someone who paved the way for others to follow in class!" For Bar's mother, that classmate who was exceptionally good at everything he did, was a role model from whom she could learn and improve.

This notion of associating social disconnectedness and weirdness to mathematicians is also supported by a story David, Nitsan's father, shares with the other parents in the all-parent focus group about his mathematics professor who would walk into the lecture hall, turn to the blackboard, soar into disconnected lecture speaking somewhat to himself, and leave the students dumbfounded. He then notes, "Everywhere you read about mathematics, they talk about the fact that many children are terrified of mathematics" (David Lapid, Nitsan's father, All-parent Focus Group), thus solidifying the widespread belief that mathematics is only good for the gifted few and that mathematicians are mostly socially awkward.

Similarly, Bar's father, Ofer Shemer, notes in the all-parent focus group about culture-specific mathematics that there are two kinds of people "algorithmic people" that comprise ten per cent of the population and all the rest (Ofer Shemer, Bar's father, All-parent Focus Group, FGP2). Nitsan's father, seems to agree with Bar's father as he responds with sharing the plot of the movie *A beautiful mind* to argue that only very few get to academic positions in mathematics and that mathematicians' careers are limited and short lived. Nitsan's mother, Lilach Lapid, then raises the point that a possible reason for having so few people in positions related to mathematics is that sociocultural discourse creates a strong aversion against anything related to mathematics by "creating this image of mathematics as something that is unattainable like nuclear engineering" (Lilach Lapid, Nitsan's mother, All-parent Focus Group, FGP2).

Socioculturally available selfhoods in mathematics are also shaped by popular beliefs such as the division between science-oriented and mathematics-oriented people. The former are believed to work better with words, the latter, with numbers. Ofer, Bar's father, reminds the other parents in the all-parent focus group that "Those who do not have a mathematical inclination and would like to be artists, do not necessarily need to learn advanced-level mathematics" (Ofer Shemer, Bar's father, All-parent Focus Group, FGP2). Lilach, Nitsan's mother, agrees with him,

“He does not need to be a mathematician in order to become an artist” (Lilach Lapid, Nitsan’s mother, All-parent Focus Group, FGP2).

Adva, Bar’s mother, notes how the skill of writing for mathematically oriented students can be as impassable a task as crossing the red sea on foot (Anat Port-Noy, Loki and Peter’s mother, All-parent Focus Group, FGP2). In light of this division between those who are mathematically inclined and those who are not mathematically inclined, Lilach, Nitsan’s mother, laments her decision of not pursuing a scientific-oriented career saying that at the class reunion everybody told her they were sure she would turn out to be an accountant (Lilach Lapid, Nitsan’s mother, Personal Interview, FGP2). Similarly, speaking of her daughter having to make a decision about what courses to take, Adva recounts,

For many years, we thought that she was Humanities oriented because she loves literature and because she loves reading and mathematics was not easy for her...So I said to her, let’s talk about the school subjects that are considered to be humanities oriented, those that are based on words (Adva Shemer, Bar’s mother, Personal Interview, F6P).

These excerpts illustrate how socioculturally available selfhoods in mathematics shape the identities of the newcomer teenagers’ identities as learners of mathematics. These sociocultural identities are propagated by popular media such as movies, by individuals such as university instructors and classmates, and by widespread beliefs about the separation between mathematics and humanities-oriented fields, and about the division between those who are mathematically able and those who are not.

Immersing myself in the data not only allowed me to answer the four research questions this study was designed to answer but also to identify experience-dependent codes that are part and parcel of the teenage newcomers’ developing identities as learners of EAL and of mathematics. Table 6 presents the codes, the categories, and the themes that were identified through the multiple analyses of the data.

Table 6: Experience-Related Codes, Categories, and Themes

Theme	At a Crossroad		At the Nadir of Transition		Making it Against All Odds	
Category	Making Decisions: Looking Back, Planning Forward		Financial Hardships: The Need to Reinvent Oneself		Parents' Supporting Their Children: The Importance of Education	
Code	Planning for a Future Career	Keeping in Touch	What Makes an Israeli?	New Culture	Starting from Square One	Professionally Void
					No Extended Family or Friends	Severed Ties
					High Expectations	"You Can Do It!"
					Jewish History	Hakol Yihey Be'Seder

The emerging themes, while standing on their own merit, complement—rather than contradict—the four identity-related dimensions that this research offers. In other words, the teenagers' developing identities as learners of EAL and mathematics at a time of transition was formed and informed by their experience of being at a crossroad. Through this experience of transition, teenagers were immersed in planning for the future, having a clear sense of what they wanted to become and what further education they would require in order to get there. But this was not divorced from the teenagers' Israeli identity, as they perceived it, was strongly related to their perceptions of the new culture they moved into, their strong need to keep in touch with significant members of their respective families and friends, and their experiences of their parents' financial hardships that were imposed on them as a result of the transition. The excruciating feelings of isolation and of being alone stand in stark contrast to the close knit fabric of the Israeli society where solidarity, supportiveness, and interpersonal relationships are "explicitly valued even in their absence" (Katriel, 2004, p. 207).

As I was going back and forth between reading the data, listening to the recorded sessions, and making sense of identity-related experiences, I realized that the participants' experience was not only exacerbated by the excruciating experiences associated with transition but was also mitigated by historically and socioculturally informed ways of being and coping

with difficulties and believing in a better future. In turn, these shaped the teenagers' identities as learners of EAL and of mathematics.

Teenage newcomers and their families at a crossroad

Much of the reason for conducting this research was the entry point of seeing teenagers as a special group that needs to be looked into in the context of transition. That is, moving to another country and experiencing difficulties and challenges associated with adaptation and adjustment to new ways of life is coupled with the age-specific challenges of adolescence, which, in turn create a context where learners' identity (read the four-dimensional understanding of identity work) as users and doers of school mathematics and as learners of EAL plays an important role in the teenagers' integration into the new educational system. Marx (2002) explains this as a context where newcomers acquire a second culture because "the frame of reference used for understanding the world is no longer valid in the new culture" (Marx, 2002, p. 269). Clearly, the teenagers' perception of their identity does not form in a vacuum. What the parents say, for example, plays an important role in this multidimensional, multidirectional identity work.

Making decisions: Looking back and planning forward. Planning for future career paths and for further education while attending the last years of formal schooling is a theme that cuts across the voices of the teenagers. Mathematics was not identified as a first-choice option for the teenage newcomers. This may be because, for most of them, their identities as mathematically abled was mostly eroded as a consequence of the challenges they experienced in having to learn mathematics in a language they did not yet master. However, in relation to learning and using EAL, the teenagers' figured worlds and imagined communities of becoming full members of the target language community (Piller, 2002) by improving their accent and mastery of English was something the teenagers were willing to commit to, work on, and invest in. For example, Loki, who moved to Canada in Grade 11, and who was hoping to become a professional actor says:

I didn't know at all [I had to prepare for auditions]. This is something, like, I have to know if I want to be an actor so what did all the Drama Course [in high school] help me in life, if I get to the real world and I have no clue about what to do. So I really pressed my teacher about this and she said it wasn't something that she is told to do so she can't do it, she is allowed to do all sorts of small games but she is not allowed to do this really because

it's not something they tell her to do. It's really a problem, because, what am I getting from school then if not what I need to do in real life? (Loki Port-Noy, teenager, Personal Interview, F5T1).

For Loki, the fact that the only course that could actually provide him with the skills, however nascent, he knew he needed to become a member of his imagined community of actors, did not teach him what he needed for real life after school. His engagement in school was such that he sometimes got marks as high as 90 and other times as low as failing mark. Loki did not see how the last year of high school that happened to be in Canada because of his family's transition can help him in any way become a member in the community he envisioned for himself.

Similarly, Bar Shemer (teenager), who arrived in Canada in Grade 11 as well, knew that the two years she would have in the Canadian high school would need to be optimized so that she can continue her education. Her mother talked about the understanding she reached with Bar to work together in order "to see how we can maximize whatever is left of the time [Bar] needs to spend in high school so that she can really get to where she wants to get to" (Adva Shemer, Bar's mother, Personal Interview, F6P).

Being cognizant of the fact that the transition to Canada has imposed a shift in understanding how things work through a change of language plays an important role in the process of integration. This realization is also corroborated by Anat's (Loki and Peter's mother) observation that, "A language is a language is a language. Changing it is everything! The whole world changes!" (Anat Port-Noy, Loki and Peter's mother, Family Interview, F5). Even though both Loki and Peter discursively and autobiographically identified themselves as mathematically able when talking about themselves as students in Israel, this was no longer an identity they could take on upon transitioning to Canada. For them too, like for their parents, as the language changed, everything changed. The whole world changed. The very transition to a new country entails not only change in linguistic references and socioculturally embedded ways of understanding the world, it also entails a complete change of identity as a user of EAL as the next excerpts illustrate.

Anat: A language is a language is a language. Changing it is everything!
The whole world changes!

Peter: You know that English is a less civilized language. They don't have
beteavon, they don't have *bruchim hanimtsaim*

Anat: Yes, that's true

Loki: *Bruchim hashavim, bruchim hanimitsaim, hanimitsaim*, we found it last week, I think. They don't have *bruchim hanimitsaim* in their language. They are missing this expression. How do you say *beteavon? Bon Appetit*

Anat: But it's in French

Loki: People understand it though, but there is no equivalent in English

Anat: They may say "enjoy your meal"

Loki: It's not in the culture

Peter: I think they also don't have *lirvaya*

Anat: That for sure they don't have "*enjoy your drink*" [everybody is laughing] (Port-Noy, teenager, Family Interview, F5).

This short excerpt demonstrates Loki's and Peter's sense-making of the change of language echoing their mother's comment "A language is a language is a language. Changing it is everything! The whole world changes!" (Anat Port-Noy, Loki and Peter's mother, Family Interview, F5). For them the cultural voids between Hebrew and English created situations that prevented them from directly transferring what they know in Hebrew into English thus creating the need for them to develop *multimemberships* (Marx, 2002) as they were developing their identity as users of EAL.

These teenagers' stances in regard to the differences between Hebrew and English and in regard to the cultural ways of being are corroborated with Loki's refusal to communicate in English to the extent that he refused even ask for ketchup when the family went to McDonald's asking his siblings to do it in his stead. Nevertheless, during the one-to-one interview, he admitted that he can now see the bigger picture and that the turmoil he experienced having to suddenly remain silent and not being able to freely communicate with his peers caused him much disturbance: "You can see the bigger picture when the water is calm, when there is high tide, it's far more difficult to see" (Loki Port-Noy, teenager, Personal Interview, F5T1). In relation to his unsuccessful attempts to passing the mathematics courses even though he was considered mathematically gifted in Israel, Loki states:

In all languages, the numbers remain the same but the moment everything is in words so 'two' is not *shtayim* and 'two plus two' is not *arba* because it is 'four' and what I need is 'four' not *arba*, and you can do nothing about it (Loki Port-Noy, teenager, Personal Interview, F5T1).

Loki's stance as to having to learn a whole new language in order to be able to assert his identity as mathematically able that he previously had in Israel explains why he has in actual fact failed mathematics as he transitioned to Canada:

It takes learning another language in addition to the one I am trying to preserve and to the other that I am trying to learn. I, again, go into learning a completely different language, and it's a new language even though I know it already, and *kaful* and *lechalek* that I don't even remember how you say it in English, it will come to me in a second, are like things that suddenly, suddenly you need to learn them anew.

It does not mean that I need to memorize again the multiplication table but basically, yes, I do, I don't know how to say this number, how to do this problem, how to explain Pi. As I said before, I suddenly realize, like take for example geometry, it's even harder than mathematics because it's all about shapes and go and show that you know how to name different shapes in English, because it is not something basic that you learn in order to integrate into the country.

They don't teach you how to name shapes, they teach you courtesy words like "hello" and "please" you learn verbs, stuff like that, you don't learn shapes, kindergarten kids learn shapes, you won't teach an adult shapes. So geometry is also like opening a new page and I need to learn everything from the beginning. And I failed. I tried to run with it, I tried to learn everything in a month in that one-month summer course, it's very intensive and it's very difficult to concentrate especially in the summer and learn a new language with all the distractions of the summer, the fact that you sit three or four hours in class and you try to shove in as much material as possible to your head especially when you don't understand the language, so it really tripped me, it swept the carpet under my feet and I failed that course (Loki Port-Noy, teenager, Personal Interview, F5T1).

Loki's description of the loss of his frame of reference paints a clear picture of the crossroad newcomer teenagers find themselves at. His insightful sense-making of the experience contributes to our understanding of what transitioning to a new country may mean for one's identity as a learner.

Being at a crossroad and having to plan for future careers and further education was also expressed by teenagers Noa who spoke of becoming a neuroscientist, Natasha who talked about studying computer sciences, Tal who planned on studying child development, Monica who said she wanted to become an architect, Nitsan who wanted to become a psychologist, Peter who said he wanted to go into hotel management, and Bar who spoke of becoming an accountant. These findings illustrate that in spite of the fact that many of these teenagers saw themselves as learners of EAL and not yet full members of the target-language community, they still had clear ideas of who they wanted to become thus solidifying the association between high school years and planning for future education and career trajectories (see for example, Bardick, Bernes, & Magnusson, 2006; Davis, 2008; Gati & Saka, 2001; Lopez, 2001; Negru-Subtirica, Pop, & Crocetti, 2017).

Natasha's concern about how the courses that she was allowed to take would affect her future career plans is revealing. She recounts the stress she was under when she found out she could not take the science courses she was planning on taking thus worrying about not being able to take the courses that she needed to study science in university:

The day I came for registration was terrible. Because I heard that in Canada, you choose your own subjects. And we came to register late and I knew there would be no available spots in the classes I wanted to take. And my father says, "Don't worry! How many people want to take sciences?" And I wanted to take the sciences. And I said to him, "I don't want to be made to take other courses. What will I do with history and such? So I come to the guidance officer and he asks me, "What do you want to take?" So I tell him, "Chemistry, Physics, Biology, and Mathematics!" So he looks at the lists and says, "Chemistry, full! Biology, full! Physics, full! Mathematics, not full!" So I say, "Okay, so what can I take then?" "There is Physical Activity, Sociology, History." I was in shock. I'm like, "No! This is not what I want to do when I graduate!" So, like, so, like, I was sad. "What shall I do?" "This is not what I want to study!" So I registered to sociology, physical activity, and mathematics. And then after the school year began, a spot became available in chemistry, so I changed from sociology to chemistry...The fact that what happened was so different than what I expected and wanted. And I said to myself, "What can I do now? What shall I do?" and my father was saying

“Relax! Relax! Everything will be okay.” and I tried to explain to him, “It won’t be alright! All the classes are full!” But that’s okay. It turned out well in the end (Natasha Goldman, teenager, Personal Interview, F2T1).

Natasha’s realization that she was at a crossroad and that she had to make decisions that would affect her future prospects in further education caused her deep concern about the possibility of not being able to take the courses she wanted. This concern is representative of similar concerns experienced by the other teenagers about being able to take certain courses in their respective high schools so that these would be compatible with what they wanted to do after graduation. Being aware of the notion of future career plans (see discussion on imagined communities in Cohen, 2012; Norton, 2001) was given added value in the process of making sense of their dynamic multi-dimensional mathematics- and EAL-related identities.

What makes an Israeli? What makes a Canadian? An integral part of the experience of transition was the growing awareness of the differences between the Israeli way of being and the Canadian way of being. Specifically, teenagers spoke about how their very identity as Israelis informed the way they approached things. For example, parent-teacher relationships and parent involvement in school were identified to be completely different between the two contexts. If in Israel, the access to teachers was unmediated and parents could contact the teacher by phone or a visit in school, in Canada, they had to set up an appointment to meet only during school hours or at parent-teacher nights. That is, with the transition to Canada, parents could no longer simply call teachers’ phone numbers in the afternoon or evening hours or show up in school. Nevertheless, the teenagers were aware of the differences between the two sociocultural contexts that impacted their experience of integration.

The following conversation about the effectiveness of teachers of mathematics that ensues between the teenagers in one of the all-teenage focus group discussions is revealing:

Peter: I know that teachers do not teach well, but, at the same time, I don’t know how they should teach instead. It’s just like all Israelis. What’s their greatest pleasure? To complain!

Loki: But Canadians bite their tongue. We always complain!

Bar: Yes, fine. The fact that they are hiding it doesn’t mean it doesn’t exist!

Loki: Of course it exists! Of course it exists! But we do it the best!
[laughing] Everybody here, especially the adults but also the kids know pretty well how to hide their emotions, but adults especially, it's all about smiling, and it's all about "good day!" and how wonderful everything is. Everything here is like a huge marshmallow that has petrol inside that contaminates the whole world but nobody knows nothing about it because everything is so like a pink puppy.

Nitsan: You even see it in the news. You watch the news channel in Israel, you see a boy was stabbed, the cottage-cheese revolt, whatever it is, here you see...

Loki: Hockey [laughing]

Nitsan: Because if they would report on each and every case of death or stabbing here, in comparison to Israel, which is a small country, people would say "why! I can't live here!" and then all sorts of things of racism and such would come out.

Bar: From the moment I came to Canada, I noticed that people are hypocrite here, they are detached, not nice to you. They don't tell you what they really think. No one comes and tells you to your face what they think. This, in principle, means that people are very closed off and everyone is to themselves, and you can understand that because people come from different cultures and different ways...because, after all, Canada is a country that has lots of immigrants and everyone keeps to themselves. But in Israel, it's more of a feeling of, like, everybody is open to each other, everyone, is, like, you had people come to Israel as far back as when Israel was established. You had people come and say, "This is our country. We are all Jews. We are all together. We are all in the Jewish State. And then, everybody, like, it was something of a different sort. Here, it's different.

Nitsan: We are all brothers.

Bar: Exactly! Here, it's more like, more closed off, more of everyone to themselves...It's, in my opinion, simply about differences between cultures. (Loki Port Noy, Peter Port Noy, Bar Shemer, and Nitsan Lapid, teenagers, All-Teenage Focus Group, FG2T).

This conversation not only provides a fascinating manifestation of “how people engage in collective sense making” (Wibeck et al., 2007, p. 250) in the context of focus group discussions but also speaks to specific sociocultural ways of being an Israeli that expect people to speak *dugri* (straight talk) (Katriel, 2015) and be ritually engaged in griping (Katriel, 1985). Similar references to these culturally embedded ways of being were made across teenagers and parents in the throughout the three-part data collection. These socioculturally embedded ways of being were already known by the teenagers because they were immersed in the Israeli culture until not long before they participated in the research. Their familiarity and strong sense of the difference between the Israeli way of being and the Canadian way of being may be further explicated by Katriel's (2004) insight in regard to what she calls “An accent of sincerity” (Katriel, 2004, p. 160), “the commitment toward self-making through the enactment of some version of authentic dialogue was socially embedded in a wider social matrix coloured by the social injunction to be true to oneself” (Katriel, 2004, p. 160). This sense of authenticity was sorely missed by the teenagers as they were experiencing the transition into Canada as newcomers.

At the nadir of transition

Moving into a new country that operates in and through unfamiliar sociocultural rules of behaviour (Marx, 2002; Schwartz, Montgomery, & Briones, 2006) and that creates a situation where “the frame of reference used for understanding the world is no longer valid in the new culture” (Marx, 2002, p. 269) can potentially create trying times for newcomer adolescents and their families. This, in and of itself positions the families and their children in situations where they continuously need to adapt and readjust to the way things are done in the new country.

The two categories that were embedded in the data were the financial hardships associated with the transition and the feeling of loneliness and of being at a loss. These notions of having to start from square one and experiencing loneliness and feeling at a loss were poignantly expressed not only by the teenagers but by the parents as well. However, together with the emotionally and mentally taxing experiences of transition, there was also a

spirit of resilience, and of hope and optimism that has engulfed and cultivated a spirit of making it against all odds, which I will discuss later.

Financial hardships. The teenagers' identity as learners of EAL and of mathematics was couched within their parents' efforts in finding ways of providing for the family as their professional credentials, more often than not, were not recognized at the time of data collection for this study. Furie's (Loki and Peter's father) account of the transition-related hardships he had experienced is revealing. As an engineer by profession and being the only breadwinner, he made great efforts in finding a job in his field, for no avail. All his efforts were completely futile in spite of his substantive experience in the field. As time went by and he could not find a job in his field, he turned to becoming a real-estate agent. At the time of the interview, he was working diligently on building his portfolio as a real-estate agent. Furie's description of his experience fully discloses the taxing experience of having to what I call here *reinvent yourself* to be able to support your family,

It's a very difficult time that is still going on and that entails change in occupation, and my expectation is that this time, it will work out. It's a gruesome experience, kind of an army boot camp. This is what made me change my occupation. I realized that whatever I'm doing is just not working, that I had to do something different...All in all, it's a really very hard time. Nothing is working. I go to meetings and go here and go there, it's very hard time...It's not that I did not look for a job. I did! With all my heart!...But I didn't succeed...It was excruciatingly difficult to send tens of resumes and not get anything. Not get anything! No interviews, and endless phone calls (Furie Port-Noy, Loki and Peter's father, Personal Interview, F5P2).

Without being able to work, Furie, like the other parent participants, found himself in dire straits. The other parents also experienced the need to reinvent themselves like Furie did. They too had to look into new career paths even in the face of financial constraints and familial obligations and responsibilities. The need of having to reinvent oneself was associated with excruciating feelings of stress. Furie, like Anat—his wife—also likened his experience to the plot of Sallah Shabati (Kishon & Golan, 1964), "Sallah Shabati became a well-digger [laughing]. A well-digger! Whatever! I'll do whatever it takes!" (Furie Port-Noy, Loki and Peter's father, Personal Interview, F5P2).

Aviva's (Monica's mother) experience of her relentless, almost impossible, quest to rebuild her career as a sought-after, high-end fashion-designer; Naama's (Noa's mother) realization that her career as a pharmacologist may have reached to its end; Ruth's (Natasha and Tal's mother) decision to abandon her career as a high-tech professional and to go into nursing; Anat's (Loki and Peter's mother) realization that there were no prospects of finding a job as a social worker; and Adva's (Bar's mother) decision to go back to square one in learning—*anew*—human resources management at a local college; and Furie's (Loki and Peter's father) futile efforts in finding a job in his field of engineering—has made it impossible for them to integrate into the job market doing the job they did in Israel. This need to start all over again stripped them from their respective professional identities thus, in a sense, positioning them on par with their teenage children who were also struggling to find their place in the new environment.

You are on your own: “What have we done?” A representative example for the feelings of loss and disorientation that Marx (2002) also writes about in her work can be seen in the way Loki and Peter's parents—Anat and Furie Port Noy—described the difficulties they were going through. To convey their experience of feeling at a loss and their being cognizant of the need to adapt and readjust to a new frame of reference in the new country, Anat Port-Noy (Personal Interview) and Furie Port-Noy (Personal Interview) liken their experiences of transition to the movie *Sallah Shabati* (Kishon & Golan, 1964) that tells the story of a newcomer to Israel.

As I showed in the discussion on socioculturally available selfhoods, movies and literature do not only provide identities that one wants to imitate but also provide storylines that can be actively adopted (Bruner, 1986; Goffman, 1959; Ricoeur, 1992) to craft one's autobiographical identity through socioculturally available selfhoods. Indeed, the findings described in this section illustrate how movies can also provide figures that viewers can identify with when, for example, as they realize that the character on the screen is going through the same experience as they do.

The movie *Sallah Shabati* (Kishon & Golan, 1964) is based on a series of short plays about a Jewish family who moved to Israel from an Islamic country. The series was written by Efraim Kishon for *Lahakat HaNahal* (a music troupe in the Israeli Defence Force) and has been produced as a feature film, which was nominated for Oscar for best foreign language film in 1964. *Sallah Shabati* has since become a classic in the Israeli culture. The movie depicts the

pain, confusion, and disorientation and the processes of adaptation and readjustment to new ways of being—all associated with the experience of transition—in a comical and satirical way, which may explain why it has become a cultural asset of the Israeli society.

When Loki and Peter's mother, Anat Port-Noy (Personal Interview) talks about the movie *Sallah Shabati*, she identifies with the story of the protagonists in the movie who not only had to learn the Hebrew language and the new ways of being and living in a new sociocultural setting but also had to adapt and readjust to the new setting. Talking about her experiences of the transition to Canada, Anat equates her experiences of transition with those depicted in *Sallah Shabati*, "To me, this process makes the movie *Sallah Shabati* much more real. An immigration is an immigration is an immigration! You feel that you don't belong and you are lost" (Anat Port-Noy, Loki and Peter's mother, Personal Interview, F5P1).

The excruciating feeling of loneliness that is associated with the experience of transition was described by many of the parents and the teenagers. Ruth Goldman's (Natasha and Tal's mother) framing this as the rhetorical question "what have we done?" (Ruth Goldman, Personal Interview, F2P) packages the feelings associated with the hardships of transition. For example, Aviva Altar—Monica's mother—describes how, at the end-of-the-year school celebrations, it was difficult for her to see the extended family of all the other children while there was no one there accompanying her own three-member family that included her daughter, her husband, and herself. She says, "Everybody came with the families, with the grandmothers, and the aunts but we came by ourselves [tearing up]. We sat in the back!" (Aviva Altar, Family Interview, F3P). This acute sense of loneliness was exacerbated by having to deal with the teenagers' need to quickly acquire a language at a level that will allow them to successfully graduate high school in the very little time they had left before graduation.

The theme of feeling that you are on your own was experienced by the Goldmans as well. Leaving the extended family behind and coming to a new country without being able to get the support of the other family members was excruciatingly difficult. Ruth Goldman as well as her teenage daughters, Tal and Natasha, sounded their own feelings of being on their own by speaking about how close they felt to their extended family of which the mother's comment is representative, "It was really hard for all of us. You have neighbours, friends, but it's not the same as having your parents here with you" (Ruth Goldman—Natasha and Tal's parent—Family Interview).

The category of being on your own with no one from the extended family or long-time friends was a recurring theme. Indeed, Noa Idan—a teenager—states, “I would set up some kind of a club for ESL students because I noticed that I was pretty lonesome in the first year. Because everybody is kind of lonely, maybe together they would have felt better because they had something in common” (Noa Idan—a teenager—Family Interview, F1T).

The notion of loneliness emerged as part and parcel of the experience of transition, which impacted not only the teenagers but their extended family as well. Yehonatan—Noa’s father—talked about his sons’ preference to stay home on their own and not to socialize with children their age. While he wanted to give them the space to gradually get accustomed to the new way of doing things socially, he was also concerned about them not socializing enough with other kids and about this affecting their progress mastering English.

Loki’s mother, Anat Port Noy, for example, talked about her son becoming very quiet, not interacting with anyone so much so that she feared for his wellbeing. His silence and refusal to communicate at all with anyone in the family caused his parents substantial concern. Their lifeline came in the form of an acting part in a theater play and in the form of painting. When I came in for the family interview, a mural on the dining room wall amazed me. It was a beautiful painting of stars in dark blue sky. Seeing me admiring the mural, Anat readily explained that Loki was the one who painted it. For him, painting and acting were the only activities he could engage with and experience success without fearing for his identity as a newcomer and a learner of EAL.

Making it Against All Odds

In the face of the experiences of transition the teenagers and their families were going through, and in spite of some dire difficulties that they had gone through, optimism and feelings that things will turn out fine prevailed. Under the theme of *Making it against all odds*, I discuss next the categories of *parents’ support of their teenagers* and *hope for a better future*.

Parents’ supporting their children: The importance of education. Parental expectations of their teenagers’ and of their younger children’s successful integration into school was translated into support at home in the form of discussions and conversations about schoolwork and helping the teenagers and the younger children understand the material taught at school. This was not void of challenges in their own right. For example, Furie—Loki and Peter’s father—an engineer

by profession, shared his experiences working with his teenage children and his younger children on word problems only to admit,

First of all, I can say that mathematics in the first semester in Canada with Loki, Peter, Itsik, and Israel—all four of them—was mission impossible. It was simply mission impossible. It doesn't just upload. You need to do the impossible. It's very difficult. Today, for example, I sat with Itsik. So I speak to him in Hebrew and I give him the exercises in Hebrew and I do it on purpose, right? Because it's easier! So he says to me, "What is this?" [laughing] "We are learning Hebrew now, aren't we?" So, when you talk about mathematics, even though it is mathematics, you have to have the language. With both of them, like, I'm talking about the older ones, after all, they started school here at a more advanced stage in mathematics, it was mission impossible...It turns out that to be able to do mathematics, you need the language. Not knowing the language is a barrier. It was a very tangible difficulty. I didn't understand then, and I'm not understanding today why there is such a difficulty (Furie Port-Noy, Loki and Peter's father, Personal Interview, F5P2).

Indeed, the category of the value attributed to education that has been quantitatively reported in the official documents of the OECD (2016) and of the Israeli Central Bureau of Statistics (2016a) takes a qualitative nature in exploring this construct within this study. The deep appreciation for education has repeatedly surfaced throughout the data. Natasha, for example, who was concerned that she would not be able to go straight to university because she thought she might not be accepted was thrilled when she got the acceptance letter to a program she applied for,

I began with [ESL] one below the highest and then moved to the highest level. There are five levels, and when I came here, I did an assessment test and was assigned to level D so after the first half year I moved to E, which was in the second half of Grade 11. Then I took Academic Grade 10 English. Then in the first half year in Grade 12, I took Academic Grade 11 English. And in the second half year in Grade 12, I took Academic Grade 12 English. Like, within two years, I finished quite many courses in English. The teachers were shocked. Like, my Grade 12 English teacher spoke to my

Grade 10 English teacher and he told her about me and my sister so she said, “Good for you for being able to do all this within a year-and-a-half and not fail in anything!”

The last half-year of doing mathematics, I did vectors and calculus and the teacher would speak for half an hour or an hour depending on what he had to teach and then he would give us math problems to do, not in groups, and the moment he stopped talking and gave us the assignment, everybody got up and left. I never did. I would stay and do the problems and if I had a question, I would ask him... Writing was my biggest challenge. Like, I don’t know how to write! Like, I know how to put sentences together, but I have never in my life written a ten-page essay, not even in Hebrew! So it was something I had to work on a lot! That was a challenge. I am better now. I wanted to be accepted to the University.

This too, is not something that I thought I would succeed in. I was sure I would spend another year in high school. It wasn’t something I expected. I thought my English would be a problem. My English was not at a high-level so I said, “Fine, I don’t mind staying for another six months or another year. I’m not taking a gap year. I’m not in a hurry!” but when I was accepted, I was thrilled. In my English course at the University, we were asked to write an essay in class and they gave us three hours, I got a hundred! I don’t know how but I did! I didn’t expect it. When I told my grandmother I was accepted to university, she cried. They always wanted us to be the best (Natasha Goldman—a teenager—Personal Interview, F2T1).

Natasha always knew what she wanted to do. This is why she was very worried that in spite of her valiant efforts, her level of English will not be high enough to be accepted to the university. But her stout-hearted efforts in studying hard and her investment of time and energy paid off. She was accepted to university and she made it against all odds in spite of the fact that she could—by her admission—barely write in English when she came to Canada and in spite of the fact that she had only two years of English instruction in Canada before graduating high school.

Tal’s efforts to pick up reading and writing in English were as pressured as her sister’s. Even though coming to Canada in Grade 11 left her only two years of high school to catch up

with English, she too was not afraid to pick up books from the library and read daily newspapers. In regard to mathematics, in spite of the fact that she was familiar with the content of the courses she took, she still found it very confusing to learn from her teachers in Grade 11 and Grade 12 mathematics. Nevertheless, she decided to take another term of high school courses to improve her grades. Her success in graduating high school in the face of the challenges she experienced adds substance to the theme of making it against all odds.

Nitsan's success, much as the other teenagers', stands out as she tells about her efforts to do well in school in spite of the school's recommending her to take Applied-level English. Like Monica, who was also assigned to Applied-level English in the process of her integration into the Canadian education system, Nitsan too has worked hard to improve her English within a very short period of time. Her account of the poem she wrote on perseverance is telling,

We had a project to write poems. Which is the topic of perseverance. Basically, we needed to do it in groups, but again I explained it to you yesterday I wasn't very socially involved and I didn't have a lot of friends... so I said, "Okay, I'll do it on my own." And I wrote the poem on my own and then I read it in front of the class, that is, you could choose to read it out loud in class or sing it, and I chose to read it out loud because let's say I am not so good in singing, and I remember that moment of standing in front of everybody, and this poem on perseverance—you know what perseverance means, yes?—So this poem was based on my own experience, that is, this whole experience [spreads her arms] takes perseverance. So I wasn't looking at them. I said, "I made it! I wrote this poem all by myself! It's a poem that got a better mark than any other poem. And I was looking at them and said, "Now you will see. You will see what I can do!" And I read the poem out loud and I got A minus. And then I saw, like they were kids who got B+ and I was like "Okay, you can do it! You can surpass them!" [The poem] talks about someone who is thinking of giving up and it says to them not to give up and that yes, it is hard and life is-, I remember the chorus, "life is an unending climb and I know this is a hard time, you need to carry on, don't stop, eventually you will make it to the top!" So basically it says,

“Yes that’s true, it’s hard, I need to go on but eventually there is an objective” (Nitsan Lapid—a teenager—Personal Interview, F4T).

This poem that Nitsan wrote and read out loud in front of her classmates speaks volumes about the theme of making it against all odds that cuts across the teenagers’ experience of transition. I turn next to the discussion on the added value of the particular three-part research design used in this study.

Hope for a better future. In the face of the hardships and challenges associated with the transition and with the integration into a new school system at an age that, more often than not, requires making decisions about further education or future careers, it is important to note that the Israeli socioculturally embedded world view of positivism and optimism guides the teenagers’ and their parents’ mindset. Lilach Lapid’s (Nitsan’s mother) comment about the first year they spent in Canada is a representative example: “[W]e have all had a very special year, a year of lots of changes and new challenges at the familial and personal level and at the professional level and now we are facing the future” (Lilach Lapid, Nitsan’s mother, Family Interview, F4). Similarly, Adva Shemer, Bar’s mother, explains:

I’m optimistic, I’m optimistic. I don’t know what the next day will bring, but I believe all will be good. And I don’t aspire for greatness. I only aspire really to peaceful life. It only depends on how you perceive life and how you define happiness. Happiness and wealth. And we have gone through enough to understand what this means a bit differently (Adva Shemer, Bar’s mother, Family Interview, F6).

Among the teenage newcomers, this optimistic future took the form of the professions the teenagers wanted to acquire in spite of all the language- or mathematics-related challenges. These imagined communities were the designated identities the teenagers set as targets for themselves. Their hope of becoming who they wanted to become drove them forward.

This mindset of a positive perception of the future is also perceived as part of the Israeli “semantic of identity” (Katriel, 2004, p. 164) and is colloquially expressed by *Hakol Yihey Be’Seder* meaning “all will be alright.” As a researcher who was conferred with the status of an insider, the experiences the teenagers and their parents have shared with me could not be taken at face value. That is, my position as an insider allowed me to see how what the teenagers and their

parents were sharing with me had strong connections to socioculturally and historically embedded ways of seeing and understanding how the world works. Hence, when the notion of a brighter future and better prospects came up, I could not help but think how this mindset is in fact an integral part of the history of Israel. Israeli culture, in fact, is suffused with the belief that in the face of all difficulties, wars, terror attacks, financial hardships, and other life tragedies that may feel like impassable, things will—eventually—get better. Indeed, looking as far back as 1987, a children’s song called *Yihey Be’Seder* (Pestigal, the Official Channel, 2014) was sung in a festival of songs for children organized yearly in Chanukah, a holiday that commemorates the Maccabean Revolt against the empire of Ancient Greece.

In a more recent children’s show (Friedman & Yanay, 2017), *Yihey Be’Seder* is sung as a lullaby that celebrates self-reliance, resilience, positive thinking, solidarity, support, and hope. This socioculturally embedded mindset of hope and optimism was also picked up in 1992 by Yitzhak Rabin (Ministry of Defence, 2014), the then Prime Minister of Israel, who chose to speak of the negative implications of *Yihey Be’Seder* calling Israelis to heed to the potential danger this collocation imposes on how Israelis do things. Having a positive mindset—that is, always thinking about better times—remains integral to what it means to be Israeli so much so that it has been put front and centre in spoken word poetry (S. Cohen, 2017), popular songs (Artzi, 2018; Avidan & Sharon, 2016; Café Shahor Hazak, 2014; G. Cohen, 2017; Daniel, 2009; Farber, 2009; Gamerman, 2016; HaDor HaAharon, 2015), and even a popular radio show called *Yihey Be’Seder* (GLZradio, 2015) that receives calls and complaints from the public and assists in resolving issues.

It is the very themes that emerged through an inductive analysis of the data that I could identify the contextual elements of the transition to a new country. What it means to be an Israeli coloured the teenagers’ experiences of the transition and of building their identities as learners of school mathematics and of EAL. It was through these contextual transition-related themes that the teenagers’ struggle, sense of self, and determination came to life.

Chapter Summary

In exploring teenage newcomers’ authorial identity, I have shown how the participating teenagers develop their authorial identity in regard to learning EAL and mathematics by stating positions, ideas, and beliefs (Ivanič, 1998) that they appropriate (Bakhtin, 1981, 1999) from their parents and from the way ideas are used around them. We cannot understand how

identity work unfolds without considering whose voices, ideas, words, beliefs, and ways of seeing the world the learners make their own by way of ventriloquation. Not turning attention to authorial identity may leave in the shadows an important aspect that sheds light on how people learn and how they close the gap between their actual identities and their designated identities (to echo Sfard and Prusak, 2005).

The second identity-related dimension that is inseparable from the others is the autobiographical identity. Although Ivanič (1998) identifies this dimension in understanding the developing identity of students in the context of academic writing, I needed to operationalize it in a manner which will be more fine tuned to the kind of experiences teenage newcomers have in relation to learning EAL and mathematics. To address this need, I drew on McAdams and Bowman's (2001) work on contaminating and redemption stories that shape present decisions and future plans. Using these fine-tuned terms in understanding autobiographical identities, I could identify how it is the interpretation of EAL- and mathematics-related experiences as redemption or contaminating stories that helped maneuver a teenager's actions and reactions in the face of context-dependent challenges.

The third identity-related dimension explored among the newcomer teenagers was discursal identity. Here, again, I demonstrated that while this dimension may be temporally and spatially linked to the other three dimensions, it carries its unique impact on constructing one's identity in ways that "are reifying, endorsable, and significant" (Sfard & Prusak, 2005, p. 16). Understanding how discursal identity works is essential to understanding how these Israeli teenage newcomers succeeded in closing the gaps between their actual identities and their designated identities. That is, considering the very little time these teenagers had to catch up with their mastery of EAL and mathematics in a language that carried completely different "frames of reference" (Marx, 2002) than those they were familiar with, we can better understand how it was possible if we look into how their identity as learners of EAL and of mathematics is "built on other people's responses and attitude toward [them] and is subject to change as these responses, inherently variable and inconsistent, change in their character" (Polkinghorne, 1988, p. 145).

Finally, I showed how socioculturally available selfhoods in relation to learning EAL and mathematics were most probably recruited by the teenagers from the stories and the role models their parents provided, directly and indirectly. While the story of Ramanujan was shared with me in the personal interview that I had with Noa's father, it is safe to assume that

Ramanujan's story was used as a potential available identity in the Idan's family. Conversations about mathematics-related topics were imbued in the *miniature-culture* (Bruner, 2004, p. 700) of the Idan family and in the other families. Indeed, Noa's reference to the game theory has potentially generated discussion around the individuals who contributed to the configuration of this theory and its extension thus making their identities socioculturally available.

In this chapter, I showed how the four identity-related dimensions take on distinct roles in shaping teenage newcomers' identities as doers and learners of mathematics and as learners of EAL. Even though these were discussed linearly, they should in no way be understood as linear processes. However, while they might be understood linearly as they are presented as such because of the limited ways available for presentation of complex ideas such as identity work, every effort should be made to understand them as distinct but inseparable, multidirectional, and interanimated. This chapter presents instances of teenage newcomers' authorial identity, autobiographical identity, discorsal identity, and socioculturally available identities. While each deserves to be treated on its own, it cannot be understood without turning our attention to how, simultaneously, each of the identity-related dimensions comes into play when understanding one's developing identity.

The answers to the research questions and the experience-dependent themes that emerged from the data illustrate the complex nature of identity work among teenage newcomers as they make decisions about their future and as they experience the challenges of the transition as learners of EAL and of mathematics.

Chapter 5 – Reflections and Conclusions

I began this research by developing an understanding of what identity means based on the existing theoretical and empirical literature on the concept of identity. I then crafted a research design that would reflect the very nature of the dynamic multidimensionality of identity work by using four inter-related identity dimensions. Having collected data through a three-part research design, I conducted interviews of different structures and settings. I embarked on making sense of the data collected using Ivanič's (1998) four-part model for identity work. I then realized that even though the operationalization of each of the four identity-related dimensions that Ivanič (1998) offers may seem straightforward, it was in fact far from simple to identify in the data.

Consequently, in order to be able to make sense of the data, I went back and forth between the data transcripts, my notes, and the literature to see what can be readily grounded in the data and what data entailed further examination of potential subsets of categories and themes. For example, when trying to make sense of the participants' autobiographical identity, I realized, at an early stage, that merely describing autobiographies would not adequately reflect the intricacies of the positive-oriented or negative-oriented narratives and their interpretations. This realization entailed further examination of the data excerpts that were identified as autobiographical as carrying strong negative or positive flavours, which made it possible to see the relationship between these and the participants' decision-making in regard to their learning mathematics or EAL.

While each of the teenagers and the parents had their own story of transition to tell from their own perspective, and while a detailed discussion of each can fill up long chapters, I first focused my attention on finding answers to the overarching research questions about the four identity dimensions. I soon realized that it was not only the answers to the research questions that I was looking for but also the relationship and inter-animation among the different dimensions. This entailed three rounds of data analysis, each focusing on a different query; each uncovering additional layers in the experience of transition and integration; and each offering an additional perspective on identity work.

This process was not divorced from reflections about my role as a researcher in making sense of the data. During and following the first round of analysis, I kept wondering about the association between the researcher's perceived identity and the object of research. I also thought about questions such as: How is my role as a researcher perceived by the teenagers? Their

parents? How do I manage the sense of acute responsibility that I feel in regard to adequately representing the multidimensional nature of the teenage newcomers' developing identities as learners of EAL and of mathematics without creating frozen versions of their identity work? How do I negotiate between my personal perception of my own experience of transition and the experiences of the teenagers who participated in the research and their parents?

During the transcriptions and translation of the interviews, I found myself engaged in multiple rounds of listening to what the teenagers and their parents were saying and, in a sense, mentally reliving the interviews and re-reading their articulated texts. These multiple readings and mental reruns allowed me to more deeply connect with the teenagers and their parents, to understand their aspirations, their struggles, their hopes, and their determination. They also allowed me to re-live the interviews, remembering the surroundings of where the interviews took place, the sounds, the room layout, what was said, the facial expressions, the gestures, the emotions, and the moments of heartfelt empathy, joy, and poignancy. In addition, in spite—and potentially because of—my familiarity with processes of translation between the language pair of Hebrew and English that I acquired in my Master's degree in translation and interpreting, the very process of translating the interviews generated some tensions and thought-provoking issues and dilemmas to which I turn next.

On the Perils of Transcribing and Translating Research Data

As far back as almost a hundred years ago, Edward Sapir, one of the forefathers of the field of linguistics, had extensively described the differences of what seem, only on the face of it, to be words that mean the same thing. You may think that these problems are relevant only in cases of translation from a source language to a target language. This cannot be further from the truth. The activity of interpreting interview data, making sense of them, and deriving conclusions or further research trajectories may be replete with assumptions that are used to colour the data in a certain way rather than another. This realization has generated, among other things, an acute awareness in my word choice in the process of translating the data from Hebrew to English and writing up this report.

Considering the literature on issues of translation, much is left to be explored. Riessman's (2008) work collecting narratives of childless Indian women where she used a translator to interview the women and to translate the stories the women shared is relevant here. Even though Riessman (2008) herself was present at the meetings where the women shared their stories,

she admits that her inability to participate in the conversations—not to mention fully understand what was being said—compromised her control over data collection. It was not her who followed up on the women's stories and responses, it was not her who asked for clarification and elaboration, and it was not her who interpreted and constructed the stories to be analyzed. Working with a translator during data collection and the ensuing narrative construction, Riessman (2008) concludes, "Translators are active in the process of constructing accounts and an examination of their intellectual and personal autobiographies, that is, an analytic engagement with how they come to know what to do, is an important component in understanding the nature and status of the findings" (Riessman, 2008, p. 50). This awareness to the work of the translator in conducting research surfaced because Riessman (2008) was at the receiving end of already-translated texts. Riessman (2008) thus calls for the need to "bring the translator from behind the shadows" (Riessman, 2008, p. 49). In my account here of my experience in translating my participants' interviews into English, being at the producing end of the translated texts, I answer this call.

Translating the interviews from Hebrew to English, and in spite—or maybe because—of the knowledge I garnered in my Master's degree in translation and interpreting, I found myself, at times, debating whether my translation and choice of words does justice to what the interviewee was saying. I deliberated about instances of cultural voids between the two languages that emanated from the difference in the cultural, historical, and social backgrounds between Hebrew and English (see for example, Blum-Kulka, 1987); I lamented the lost nuances in the transition of ideas between Hebrew and English; and I struggled with the constant feeling of not adequately representing the original meaning by the very act of translating (see Danto, 1997; Derrida, 1985; Fellus & Glanfield, 2017). These were real concerns as words have associated meanings that cannot be transferred in translation (see Cole, 2009 on the case of the translation of the Russian word *obucheyne*).

Translating in general—and in research in particular—is not a trivial matter because the meaning of words is socially, culturally, and historically dependent. Sapir (1921) explains,

We all grant, for instance, that storm, tempest, and hurricane, quite aside from their slight differences of actual meaning, have distinct feeling-tones, tones that are felt by all sensitive speakers and readers of English in a roughly equivalent fashion. Storm, we feel, is a more general and a

decidedly less ‘magnificent’ word than the other two; tempest is not only associated with the sea but is likely, in the minds of many, to have obtained a softened glamour from a specific association with Shakespeare’s great play; hurricane has a greater forthrightness, a director [sic] ruthlessness than its synonyms (Sapir, 1921, p. 43).

Thus, word choice—and I am not specifying the mode now as it can apply to the written, spoken, or gestural—carries with it not only the phonological sound or grammatical structure but also the semantic baggage that has been packed into it by previous users. Sapir (1921) has long ago identified the nature of the singularity of meanings that words bring with them. He explains,

English words crave spaces between them, they do not like to huddle in clusters of slightly divergent centers of meaning, each edging a little away from the rest. *Goodness*, a noun of quality, almost a noun of relation, that takes its cue from the concrete idea of “good” without necessarily predicating that quality (e.g., *I do not think much of his goodness*) is sufficiently spaced from *good* itself not to need fear absorption. Similarly, *unable* can hold its own against *able* because it destroys the latter’s sphere of influence; *unable* is psychologically as distinct from *able* as is *blundering* or *stupid* (Sapir, 1921, p. 181).

Choice of words, then, is far more complex than the working of the auditory sense or a mere manifestation of the speech organs working in tandem. Sapir further explains that even if you take a seemingly simple word such as ‘house,’ there are far more meaning-shaping mechanisms in place than the mere sound of the word on its own, its particular way of pronunciation, its associated visual perception, or the movement of the hand writing it and of the tongue speaking it, or the memory of all of these combined. Rather, as Sapir points out, it is “only when these, and possibly still other, associated experiences are automatically associated with the image of a house that they begin to take on the nature of a symbol, a word, an element of language” (Sapir, 1921, p. 10), which “is the most massive and inclusive art we know, a mountainous and anonymous work of unconscious generations” (Sapir, 1921, p. 235).

In the process of translating the interviews, then, I was aware of the cultural, historical, and social nuances between words in Hebrew and their translation into English. Issues of connotations, for example, made me stop and think hard and long about the best choice of words

that would decrease the distance in meaning stretched, by default, by the act of translation. This concern about the difference between the original meaning in the source language and the meaning assigned to the word in translation in the target language resonates with Quine's (1960) warning in regard to translations and their respective original sources that "stand to each other in no plausible sort of equivalence however loose" (Quine, 1960, p. 27).

The process of transcribing entails its own challenges and complex decisions of choice as Lapadat and Lindsay (1999) aptly write, "Transcription necessarily involves selection" thus raising the question: to what extent is what's transcribed really what the interviewee is saying? As much as I worked on mobilizing the message from the spoken word in the interview to the written, reified form in the transcript and the translation, I am aware that in the transition some meanings may have slipped away thus experiencing Derrida's (1985) framing of translation as "both necessary and impossible" (Derrida, 1985, p. 103).

Some of the challenging words and expressions that I struggled with included: *lefargen*, *gibush*, *dugri*, *inal haolam*, *tachles*, *achva*, and *ashkara* (see Katriel, 1988, 1993, 2004, 2015; Katriel & Nesher, 1986 for discussions on the Israeli culturally and historically embedded meaning systems associated with words such as *lefargen*, *gibush*, and *dugri*). To minimize the gap between how things were said and how they sound on paper, I read my transcripts, and later my translation of the transcripts, to myself with the intonation of the teenagers and their parents thus reliving the episode and changing word choice if needed.

Against this backdrop, I hope the reader can appreciate the process involved in transcribing the interviews and translating them into English. In preparing the data for analysis, and in order to easily retrieve sections of data, I organized the transcripts by location, families, and types of interviews used (see Table 3). Following the translation of the interviews, and in order to answer the research questions, I initially employed a deductive analysis by categorizing the data into the four identity-related dimensions that I imported from Ivanič (1998). While the process of categorization was mostly straightforward, at times, I identified statements and chunks of data that could be categorized to more than one identity dimension. This is to say that while I recognize the importance of categorizing data into the different identity-related dimensions, I am also acutely cognizant of their inseparable nature and inter-dependency thus rendering data as representing the complex nature of identity work.

On the added value of the particular order of the research design

The research design was such that the family interview with at least one dyad of a teenager and a parent took place before the one-to-one interviews with the teenager and his/her parent. This preceded the all-teenage focus groups, which preceded the all-parent focus group in each of the two big cities. The three-part research design was conducive to the purpose of the study in at least two ways. One is that this particular order allowed a gradual process of increasing familiarity and rapport particularly with the teenagers. Second, this particular order allowed me to get a better sense of the context of and the relationship between what the teenagers were saying in their one-to-one interviews and in the all-teenage focus groups. That is, interacting with the families as a unit, with the teenagers and their parents in personal interviews, and then with the all-teenage and all-parent focus groups uncovered the role of the family unit as, to echo Bruner's definition, a "miniature culture" (Bruner, 2004, p. 700) in cultivating beliefs and ideas about learning mathematics and EAL and in reifying discursal identities as learners of EAL and mathematics.

The fact that the very first interview was with the presence of at least one parent created a more secure and protected setting for the teenagers to talk about their experiences. I could see how the interaction between the parent and the teenager was something that was received favourably by the parents and, by extension, by the teenagers as well. In fact, the mothers of four of the six families expressed their heartfelt appreciation of the family interview as an opportunity for their teenage children to openly talk about their perspectives of the transition. One of the mothers said, "It was great to finally hear them talk about how they feel and what they think without us breaking into tears and accusations. This meant a lot to me" (Ruth Goldman, Family Interview). Another mother confided with me after the family interview finished telling me that she never spent an hour and a half with her teenage child talking about the experience of transition and that she appreciates the opportunity to doing so through this research.

Whereas a three-part research design spans over longer time in comparison to a one-time interview, and whereas in the beginning of the research I was worried that I would not have enough families who would be interested in participating in the research, and whereas the logistics of organizing the interviews required consideration of the parents' and the teenagers' availability, as well as organization of travel time, meeting places for the focus group discussions, and accommodation when the collection of data required an overnight stay in one of

the big cities, the benefits of this research design for the purpose of this study surpass the challenges it lined up. By creating a platform through which I could capture parents' and teenagers' voices among recent newcomers, and by allowing three different opportunities to interact, in length, with the participants, I could create a rich and thick description of the experience of transition and of teenage newcomers' identities in regard to their learning EAL and mathematics. As one of the mothers commented,

I think that the time passed from meeting to meeting gave us some time to digest our conversations. I remember the thinking process that I went through after you left. So I continued discussing this with Bar. And we were thinking about our responses and you also realize that you don't take a pause in life, and sit, and analyze how you feel, how you think—you don't have time for this! Even if there are really important things that you think are pertinent, you don't have this time-out. And when you answer a question, and you choose a certain response, so you choose a certain way to answer the question, and then you have the time to sit and wait for the next meeting, to sit and analyze it because the next meeting is built upon the previous meeting. And if this all were a one-shot interview, you couldn't have gone through this process that you went through (Adva Shemer, Bar's mother, All-parent Focus Group, FGP2).

From uni-directionality to a network framing of identity

This study shows how the four identity-related dimensions, while closely related, are not subsets of each other but distinct. As such, each necessitates a definition both conceptual and operational. Treating these dimensions separately stands at odds with increasing evidence that indicates these are indeed distinct but inseparable. Through this form of investigation that pulls the four identity-related dimensions together, at once, I widen the lens and increase the pixels of the image of identity work to sharpen what we see when we talk about identity and to unblur the lines of distinction between the different inseparable entities. The process of making sense of the data that were collected for this study involved several cycles of analysis to allow for deeper understanding than a linear reading of the texts alone might suggest.

Zooming in and looking at each dimension at a time behooves us to then zoom out to see how these dimensions are inter-animated. This continual zoom-in, zoom-out perspective helped me in my thinking about the research design, the interview questions, and data analysis. Being

able to distinguish between the different identity-related dimensions and at the same time seeing how they are in a constant state of inter-animation allows researchers as well as practitioners to have a view of the creases, wrinkles, and folds of the landscape we call identity.

I am aware of the need to have continued conversations about the relationship between learners' identity and the decisions they make in regard to their using and doing mathematics and their learning and speaking English as an additional language. I am also cognizant of the possibilities this affords as it makes it possible to investigate identity as a simultaneous multi-dimensional, multi-modal system. Whereas the discussion in this research monograph is presented linearly, by default, as is the nature of written reports, I do not want to make it look like—or read like—a laundry list of identity-related insights. Rather, I hope I had reflected the networked relationship among these dimensions that can explain the simultaneously multidimensional nature of mathematics- and EAL-related identity among teenager newcomers.

Contributions of this research

This research study offers contributions in four levels: theoretical, methodological, empirical, and practical. Each adds to the existing knowledge in the field of identity work in mathematics and EAL. Each suggests an added layer to the already existing possibilities of conducting research on learners' identity. In the context of teenage newcomers and their evolving identities as learners of school mathematics and of EAL, each can be harnessed in order to better understand how the different identity-related dimensions come into play in learners' decisions about who they can become and why. I now turn to a short summary of the contributions of this research.

Theoretical. In regard to informing particular lacunae in research, this study can shed light on at least two meeting points of relevant research areas including mathematics and EAL, and immigration and education. An analysis of the rich data yielded a deeper understanding of identity work that pertains to not only biographies or discourses. Identities were not only constructed and put forth by sporadic reference to past personal experiences or collective events. Rather, they cut across participants' autobiographies, authorial identity, discursal identity, and socioculturally available identities thus buttressing the notion of the simultaneous, networked, and co-constitutive aspects of identity work within mathematics education and learning EAL.

Whereas the teenagers' mathematics-related and EAL-related identities were separate in terms of the research design, they were integrated in terms of their experiences. The teenagers' identity as learners of mathematics was intricately intertwined with their identity as users and learners of EAL. Through their descriptions of mathematics- and EAL-related experiences, each of the teenage newcomers allowed me to explore their identity work as it was co-crafted in and through their autobiographical identity, discursal identity, authorial identity, and socioculturally available identities. Using a unified four-part identity model that I imported from Ivanič (1998) allowed me to explore teenage newcomers' identity work as learners of mathematics and of EAL through complementary multifarious aspects. Employing this framework in future research may not only facilitate gauging and supporting identity work as learners and users of mathematics and EAL but also be conducive to shifting the experience of teaching and learning that is focused on the future rather than on the past. Examining the simultaneous co-animation of the multiple aspects of identity work expands our visual field to include areas that were inconspicuously located in the blind spots of our researcher view. With respect to the newcomers' identity as learners of EAL, echoing Ricoeur's (1992) distinction between *sameness* and *selfhood* that are etymologically embedded in the word *identity*, I show that the newcomer is continuously engaged in closing the gap—to allude to Sfard and Prusak's (2005) work—between the degree of sameness to members belonging to the new community and selfhood.

Metaphorically speaking, Bauman (2009) suggested we think of identity in terms of a ship rather than a tree. However, for those who feel less convinced to do so and who still feel more attuned to understanding identity work in terms of a tree, I suggest they think about identity in terms of a banyan tree that looks like a single tree comprised of multiple root-like trunks. Thinking of the banyan tree as a metaphor for identity helps us see how identity is located in and generated by what seems on the face of it to be a single entity but it is in fact multi-faceted.

Methodological. Methodologically speaking, this study was aimed to address the discrepancy between how identity is conceptualized and how it has been mostly explored (Brubaker & Cooper, 2000). The purpose of working with identity in terms that build on the construct's multidimensional nature does not automatically guarantee methodological and analytical frameworks that are equally reflective of the complex nature of identity work. Operationalizing

identity as a multidimensional construct is key to allow for identity work in mathematics and EAL to reveal itself. The use of identity as operationally dynamic also allows for different questions to be asked. The questions I asked in this study focused on Ivanič's four identity-related dimensions in regard to learning mathematics and EAL and by extension on the co-animation among these dimensions. Specifically, in order to facilitate and elicit detailed descriptions of stances, experiences, beliefs, and perspectives, I used McAdams' (1995) technique of retrieving past experiences in the form of life chapters. Using this technique with teenagers and their parents, I believed, would facilitate the organization of past events and their interpretation in a meaningful way.

To wit, being a teenage newcomer, learning a new language in a new country, and integrating into a new school system unfolds into a new and unfamiliar map of paths, terrains, and points of departure. This study focuses on how identity work among newcomer teenagers is framed as gaining permission of access to a new community (Bauman, 2009; Marx, 2002; Norton, 2000; Wenger, 1998). This study also frames the work of identity as one's developing a sense of belonging in a new unfamiliar society that is operated by unfamiliar ways of interaction in a new language; it is about one's sense of identity as a member of the new society; and it is about one's being accepted as an equal member in the new sociocultural context (Marx, 2002; Norton, 2000; Wenger, 1998). Identity, then, plays an important role in the process of learning EAL and school mathematics. It is especially important in the context of transitioning to a new country in high school.

In order to gain deeper understanding of teenage newcomers' identity work, data in this study were collected in the participants' first language. In light of the fact that most research among newcomers is conducted in their L2 (see for example, Gallucci, 2016; Naraghi, 2013; Norton, 2000), using L1 to collect data carries added value in providing a wider spectrum of dimensions that in turn contribute to a better understanding of identity work (see for example, McKay & Wong, 1996).

Empirical. The empirical contributions of this research relate to several areas. First, this study focused on learners' mathematical identities thus contributing to filling the gap identified in the literature review in regard to K-12 learners' mathematical identity (Towers et al., 2016). That most research on identity within mathematics education focuses on teachers' identity (see Towers et al., 2016) and that most research on identity work within EAL focuses

on adult learners (see Babino & Stewart, 2017) points to a need to flesh out empirical evidence that buttresses our understanding of identity work among the very target of educational systems—K-12 students.

Second, methodologically speaking, this study was focused on garnering a glimpse of identity work that is complex and intricate in nature. I thus designed a research methodology that would be able to bring into light not only the teenagers' perspective about their identity as users and doers of mathematics and as learners of EAL but also their parents' and the historical, social, and cultural context they were brought up in. This research design allowed me to triangulate data that were collected from both teenage newcomers and their parents. In many research studies on identity work, it is only the students' perspective that is brought into light thus pushing the complex and networked nature of identity work that involves parents' and teachers' impact into the shadows. Indeed, Sfard and Prusak's (2005) and Prusak (2003) work is only one example, as far as I know, of research that showcases how parents' and teachers' discourse within a specific sociocultural context contributes to the development of one's identity as a learner of mathematics. Using Sfard and Prusak's (2005) three-part analytical framework for the purposes of this study responds to Graven, Hewana, and Stott's (2013) call to adopt it as an analytical framework thus contributing to it gaining empirical substance.

Finally, in the face of increasing waves of immigration, exploring identity work among high school students who are at the verge of finishing compulsory education can generate better understanding of how and why newcomer teenagers make decisions about who they can become. This study adds empirical support to our understanding of the relationship between newcomer students' socioculturally available selfhoods and their integration into the new school system thus widening the spectrum of understanding newcomers' identity as learners of mathematics and of EAL.

Practical. In thinking about the contribution to practice of this study, I find it helpful to begin by asking the following questions: 1) Why is a teenage newcomer's identity important in mathematics education and in learning an additional language? 2) How might an understanding of a teenage newcomer's identity as a four-aspect storied self-contribute to their integration into the school system of the new county? To answer these questions, I go back to the findings that the data collected for this study generated. For one, teenage

newcomers already have identities as learners and doers of mathematics but it is intricately intertwined with their identities as learners of English as an additional language. Buildings on these identities may make it possible for more teenage newcomers to more successfully integrate into the new system. Consider, for example, Loki Port Noy's (teenager) case who has realized that his knowledge of mathematics can no longer be of service to him because, as he put it, "two plus two is not Arba!" (Loki Port Noy, teenager, Personal Interview). For him, the fact that he needs now to do mathematics in English—a language of instruction he is not feeling comfortable using because he does not see himself as competent in English—precludes him from doing very simple operations in mathematics such as adding two and two, which no longer sum up to "Arba" (four in Hebrew).

In regard to the contribution of the four-aspect storied self, it is here that teachers can intervene and work together with learners on their developing identities as learners and doers of mathematics and as learners and users of EAL. The framework provides refined understanding of one's developing identities and helps explain teenage newcomers' efforts in integration and engagement. This framework suggests that access to each of the components of the framework, not just one, may allow teachers to support teenage newcomers' identities. Learners' identity understood as storied self and as multifarious, opens space for teachers to listen and be sensitive to learners' discursal identity through address and attribution, socioculturally available selfhoods through acts of alignment, interpretation and reinterpretation of past experiences, and the development of authorial self where learners receive the skeptron. This role that teachers play in identity development is corroborated by the work done by Heyd-Metzuyanim and Sfard (2011) where the authors conclude that "teachers' actions, as well intended as they might, can harm the process of learning by prompting and then fuelling counterproductive identifying interactions. Such harmful identifying may be responsible not only for students' failure to learn, but also for some learners' conviction on their 'incapability', either mathematical or social" (Heyd-Metzuyanim & Sfard, 2011, p. 17).

While efforts should be made to experience learning as enjoyable, it is the interpretation of the lived experience that may frame one's autobiography as a learner of EAL or of mathematics as positive (i.e., redemption story) or as negative (i.e., contaminating story) and not so much how these are perceived by others. This awareness to learners' autobiographical identity is a necessary—however, insufficient—condition to understanding a learner's identity.

Educators as well as parents or other caregivers should become cognizant of how they discursively build teenage newcomer learners' identities as users and doers of mathematics or as learners of EAL. Assigning identities that emanate from treating students through the principles of the holy trinity (i.e., race, gender, and class) should only be used as spring boards to diving into vicarious experiences of others who did well. This will most probably shift the focus on newcomers from viewing them using deficit models to viewing them using scaffolding that were already used by successful others in the past.

Finally, in order to develop learners' authorial identity, more opportunities need to specifically target opportunities to making sense of content and structure of EAL and of mathematical ideas; to taking a stance in mathematics or in English and defending one's point of view; to making mistakes as an integral part of learning; and to taking ownership over mathematical ideas or using English. Having said that, how learners discursively construct their and others' identities needs to be closely gauged and modeled (Barron, 2003; Sfard & Kieran, 2001; Takeuchi & Towers, 2016).

Limitations

For all the efforts taken in this research to operationally address the need to treat identity as a category of analysis rather than as a category of practice (Brubaker & Cooper, 2000), a few limitations are identified. First, while this research spanned over a few months during one school year, research on identity that focuses on the multidimensional nature of this construct will benefit from conducting longitudinal research studies that span over a few years to at least include high school years. Collecting data over high school years may yield deeper understanding of the interplay between authorial identity, autobiographical identity, discursive identity, and socioculturally available identities. A longitudinal study may also make it possible to see how imagined communities motivate students to close the gap between actual identity and designated identity and how these are co-constructed through authorial, discursive, autobiographical, and socioculturally available selfhoods.

Second, this study focused on teenage newcomers' developing identities as these are discursively and socioculturally co-constructed by the teenagers and their parents. Exploring identity work as it is co-constructed by other research participants such as teachers, classmates, as well as school policies and programs may add substantial depth in understanding identity work in the context of teenage newcomers' identity as learners of EAL and of mathematics. Such

participants can increase the breadth through which discorsal identity (by address and attribution) are co-constructed.

Third, this research explored teenage newcomers' identity in the context of their families. Collecting data in classrooms and examining the relationship between pedagogical practices, classroom discourse, and learners' identity as it is understood through the four identity-related dimensions. Such exploration was not possible in this study. However, research in the classroom context can shed light on practices that impede or support newcomer students' discorsal and autobiographical identities that are interpreted by students as redemption stories or contaminating stories.

Fourth, this research did not specifically elicit socioculturally available identities that teenager newcomers can recruit identities from. That is while some insights were formulated in regard to socioculturally available selfhoods, a more focused plan on uncovering available identities can shed light onto the vicarious experiences students draw on in constructing their identities as learners of EAL and of mathematics.

Naturally, there are limitations—that I discussed here—to my study that I hope to address or be addressed by other researchers in future research. What this study does make clear is that teenage newcomers' identity as it is understood through the four dimensions discussed here is a first step toward using a unified framework to the investigation of identity as a category of analysis.

Looking forward: Future research trajectories

Whereas the unified framework of the four identity-related dimensions that I have described in this research does suggest a more comprehensive treatment of identity, many questions remain open as to how cultural contexts and socially and historically framed narratives shape and are shaped by identity work and how values, agency, and scripted roles that individuals choose to align with or reject play a role in the identity formation process in EAL and mathematics among teenage newcomers. Further research on these questions and others will shed more light on the very identity-related aspects of teaching and learning that were, inadvertently, pushed into the shadows so that we can focus not on change in attitude but rather on relationship between how attitudes are formulated. This is important so that, to echo Di Martino and Zan (2010), individuals can shift their interpretation of identity-related

expressions of attitude from a “claim of surrender” to learners’ dispositions to a tool “of steering future action” (Di Martino & Zan, 2010, p. 32).

To conclude this study, let me discuss its potential implications. Taking Jones’ (2002) framing the needs of EAL students as “everyone’s responsibility” (p. 4) and given that most probably, all teachers—regardless of their academic subject matter—teach ESL students, I suggest teacher preparation programs open up and include courses on the complex and multidimensional nature of learners’ identity. The following will be some of the focal points in such a teacher preparation program:

- (1) shying away from treating identity as a construct of vision and division that relies mainly on readily observable characteristics;
- (2) allowing for the four identity-related aspects introduced and discussed in this study to take form and shape in teachers’ understanding of identity;
- (3) becoming cognizant about how students are talked to and what attributions are ascribed to them;
- (4) being aware of how autobiographical identities are crafted, how these set down teenage newcomers’ trajectories in learning mathematics and EAL;
- (5) providing pedagogical opportunities for students to develop their authorial identity so that they can effectively appropriate words and make them their own;
- (6) surfacing socioculturally available identities that teenage newcomers recruit to shape their identities as users and doers of school mathematics and as learners of EAL.

Even though this thesis has reached its conclusion, I would like to do further research on learners’ identities using the framework suggested in this thesis. Specifically, I would want to access diverse groups including young learners in order to better understand how the four identity-related dimensions take form and shape learners’ actions and reactions in contexts of transition to a new country. Given the growing attention to identity-related aspects in mathematics education and in EAL, I would be interested in extending the framework suggested in this thesis to parents and teachers who are transitioning to a new country as well because they too have their own developing identities as learners of an additional language and as users and doers of mathematics. When identities that are institutionally assigned come into the picture, other considerations may need to be taken into account. These may include policies and other system-wide mechanisms that learners act in

and through. I would like to find out more about how the four identity-related dimensions interact and how they form and inform learners' future trajectories.

In terms of the different identity-related dimensions, I would like to see the relationship between socioculturally available selfhoods and learners' choices of which identities to recruit for their own and which to reject and resist. In turn, I would like to explore the relationship between discursal identity and authorial identity that informs autobiographical identity. In addition, I would like to explore the relationship between identity-related pedagogical practices in the context of transition and learners' acceptance or resistance of assigned identities. Even though I refer to them in a linear way, the challenge will most probably be to bridge the gap between the inter-dimension complex nonlinear interaction and the intra-dimension developments and perturbations. Finally, I would be interested in exploring how identity-related work is integrated into school systems to bring and push toward an educational change that democratizes academic success and allows all, regardless of readily observable characteristics, to attain academically.

Concluding Notes

In this research, I look into the intersection point of identity among teenage-EAL learners who are also developing their identities as users and doers of mathematics. Bringing together two research areas of EAL and mathematics education creates a synthesis that reflects a real-life context for many teenage newcomers. It is thus not a temporary compound but rather an area of research that is most compelling especially in light of the waves of migration seen throughout the world. Shedding light on identity work among teenage-EAL learners who also learn school mathematics frames this study as an important addition to our understanding of the integration of teenage newcomers in Canada. Given that identity in EAL and mathematics are constructs that have received considerable attention in theoretical and empirical research and given that such research explores, to some degree, how identity is constructed through different dimensions, I showed that research on identity in K-12 and especially among high school students is lacking. In order to reflect a treatment of identity as a category of analysis rather than as a category of practice (Brubaker & Cooper, 2000), I imported Ivanič's (1998) four-part framework that comprises autobiographical identity, authorial identity, discursal identity, and socioculturally available identities to understanding and researching identity. I thus argue that a unified model that brings together

the four dimensions as discussed in the previous sections may provide a fuller picture of how identity works in the context of EAL and mathematics education.

In this study, I positioned the entry point in Brubaker and Cooper's (2000) call to refrain from using identity as a category of practice and instead to use it as a category of analysis. I drew on Norton's (2006) call to treat identity as a sociocultural construct in order to highlight the use of identity as a category of analysis. Norton's (1997) use of the concept *identity* as a way "to refer to how people understand their relationship to the world, how that relationship is constructed across time and space, and how people understand their possibilities for the future" (p. 410) is indispensable in pushing forth the multidimensional nature of identity work. Such a treatment can make it more feasible to understand identity work as an idea that a person constructs rather than as a substance that a person possesses.

Scrutinizing the data that I collected through the four identity-related dimensions, it was instructive to see how identity work is co-constructed through multi-directional and inter-animated processes. These processes involve the construction and reconstruction of teenage learners' identity as they transition into a new educational system. At the same time, given the focus of this research on teenage newcomers, and given the important role of high school years in planning and identifying future educational paths and careers (Bardick, Bernes, & Magnusson, 2006; Gati & Saka, 2001; Lopez, 2001; Negru-Subtirica, Pop, & Crocetti, 2017), it was revealing to see how conversations about the teenage newcomers' future careers unfold. This study showed how the context of being at a crossroad was consequential to the teenage newcomers' developing identities as learners of EAL and mathematics.

This research contributes to the accumulating knowledge about using identity as a category of analysis (read *ipse* identity) rather than as a category of practice (read *idem* identity), to allude to Brubaker & Cooper, 2000. Specifically, it sheds light on the network framework of identity work that allows us to see the inter-animation between the different identity-related dimensions. By framing identity work as multidimensional and multidirectional through the use of the realms of autobiography, authorial, discursal, and sociocultural, I provide not only theoretical underpinning for *ipse* identity but also an empirical support to a much-needed perspective on how identity works. The implications of this study may shed light on the relationship and strong association between identity and how learners' set their learning trajectories. How identity is associated with learning trajectories is not a trivial question. Rather, it is related to the larger question of what schooling is about.

Bibliography

- Albert, R., Jeong, H., & Barabási, A. L. (1999). Internet: Diameter of the worldwide web. *Nature*, 401(6749), 130–131.
- Andersson, A., Valero, P., & Meaney, T. (2015). I am [not always] a maths hater”: Shifting students’ identity narratives in context. *Educational Studies in Mathematics*, 90(2), 143–161.
- Angelil-Carter, S. (1997). Second language acquisition of spoken and written English: Acquiring the skeptron. *TESOL Quarterly*, 31(2), 263–287.
- Archer, L., DeWitt, J., Osborne, J., Dillon, J., Willis, B., & Wong, B. (2010). “Doing” science versus “being” a scientist: Examining 10/11-year-old schoolchildren's constructions of science through the lens of identity. *Science Education*, 94(4), 617–639.
- Arendt, H. (1958/1998). *The human condition*. Chicago, IL: The University of Chicago Press.
- Aronson, J., Lustina, M. J., Good, C., Keough, K., Steele, C. M., & Brown, J. (1999). When white men can't do math: Necessary and sufficient factors in stereotype threat. *Journal of Experimental Social Psychology*, 35(1), 29–46.
- Artzi, B. (2018, January 14). Ben Artzi – *Yihey Be'Seder* (in Hebrew) [Video file]. YouTube. Retrieved from <https://www.youtube.com/watch?v=zmafeXcOKG8>
- Ashforth, B. E., & Schinoff, B. S. (2016). Identity under construction: How individuals come to define themselves in organizations. *Annual Review of Organizational Psychology and Organizational Behavior*, 3, 111–137.
- Atkinson, R., & Flit, J. (2001). Accessing hidden and hard-to-reach populations: Snowball research strategies. *Social Research Update*, 33(1), 1–4.
- Atweh, B., & Cooper, T. (1995). The construction of gender, social class, and mathematics in the classroom. *Educational Studies in Mathematics*, 28(3), 293–310.
- Avidan, A. & Sharon, S. (2016, April 8). Aviva Avidan and Sara'le Sharon – *Yihey Be'Seder* (in Hebrew) [Video file]. YouTube. Retrieved from <https://www.youtube.com/watch?v=FKo1zlwJVVw>
- Ayalon, H. (1995). Math as a gatekeeper: Ethnic and gender inequality in course taking of the sciences in Israel. *American Journal of Education*, 104, 34–56.
- Babino, A., & Stewart, M. A. (2017). “I like English better”: Latino dual language students’ investment in Spanish, English, and Bilingualism. *Journal of Latinos and Education*, 16(1), 18–29.

- Bakhtin, M. (1981). *The dialogic imagination* (C. Emerson & M. Holquist, Trans.). Austin, Texas: University of Texas Press.
- Bakhtin, M. (1999). The problem of speech genres. In A. Jaworski & N. Coupland (Eds.), *The discourse reader* (pp. 121–132). London and New York: Routledge.
- Bardick, A. D., Bernes, K. B., Magnusson, K. C., & Witko, K. D. (2006). Junior high school students' career plans for the future: A Canadian perspective. *Journal of Career Development*, 32(3), 250–271.
- Barron, B. (2003). When smart groups fail. *The Journal of Learning Sciences*, 12(3), 307–359.
- Barwell, R. (2003). Patterns of attention in the interaction of a primary school mathematics student with English as an additional language. *Educational Studies in Mathematics*, 53, 35–59.
- Barwell, R. (2016). Investigating stratification, language diversity, and mathematics classroom interaction. *PNA*, 11(1), 34–52.
- Barwell, R., Moschkovich, J. & Setati-Phakeng, M. (2017) Language diversity and mathematics: second language, bilingual, and multilingual learners. In Cai, J. (Ed.) *Compendium for research in mathematics education*, (pp. 583–606). Reston, VA: National Council of Teachers of Mathematics.
- Bauman, Z. (1996). From pilgrim to tourist – or a short history of identity. In S. Hall & P. Du Gay (Eds.), *Questions of cultural identity* (pp. 18–36). London: Sage.
- Bauman, Z. (2001). Identity in the globalized world. *Social Anthropology*, 9(2), 121–129.
- Bauman, Z. (2004/2012). *Identity: Conversations with Benedetto Vecchi*. Cambridge: Polity Press.
- Bauman, Z. (2009). Education in the liquid-modern setting. *Power and Education*, 1(2), 157–166.
- Baumrind, D. (1964). Some thoughts on ethics of research: After reading Milgram's "Behavioral study of obedience." *American Psychologist*, 19(6), 421–423.
- Bearse, C., & de Jong, E. J. (2008). Cultural and linguistic investment: Adolescents in a secondary two-way immersion program. *Equity & Excellence in Education*, 41(3), 325–340.
- Ben-Yehuda, M., Lavy, I., Linchevski, L., & Sfard, A. (2005). Doing wrong with words: What bars students' access to arithmetical discourses. *Journal for Research in Mathematics Education*, 36(3), 176–247.
- Berry, R. Q., Thunder, K., & McClain, O. L. (2011). Counter narratives: Examining the mathematics and racial identities of black boys who are successful with school mathematics. *Journal of African American Males in Education*, 2(1), 10–23.

- Betz, D. E., & Sekaquaptewa, D. (2012). My fair physicist? Feminine math and science role models demotivate young girls. *Social Psychological and Personality Science*, 3(6), 738–746.
- Bishop, J. P. (2012). “She’s always been the smart one. I’ve always been the dumb one”: Identities in the mathematics classroom. *Journal for Research in Mathematics Education*, 43(1), 34–74.
- Black, L., Mendick, H., & Solomon, Y. (Eds.). (2009). *Mathematical relationships in education: Identities and participation*. New York, NY: Routledge.
- Black, L., Williams, J., Hernandez-Martinez, P., Davis, P., Pampaka, M., & Wake, G. (2010). Developing a ‘leading identity’: The relationship between students’ mathematical identities and their career and higher education aspirations. *Educational Studies in Mathematics*, 73(1), 55–72.
- Blum-Kulka, S. (1987). Indirectness and politeness in requests: Same or different? *Journal of Pragmatics*, 11(2), 131–146.
- Boaler, J. (1997) When even the winners are losers: Evaluating the experiences of ‘top set’ students. *Journal of Curriculum Studies*, 29(2), 165–182.
- Boaler, J. (2002). The development of disciplinary relationships: Knowledge, practice, and identity in mathematics classrooms. *For the Learning of Mathematics*, 22(1), 42–47.
- Boaler, J. (2005). The ‘Psychological Prison’ from which they never escaped: The role of ability grouping in reproducing social class inequalities. *FORUM*, 47(2–3), 135–144.
- Boaler, J. (2013) Ability grouping in mathematics classrooms, In S. Lerman (Ed.) *Encyclopedia of Mathematics Education*, Heidelberg: Springer.
- Boaler, J. Wiliam, D. & Zevenbergen, R. (2000). The construction of identity in secondary mathematics education. In J.F. Matos and M. Santos (Eds.), *Proceedings of the Second International Mathematics Education and Society Conference (MES2)*, (pp. 192–202). Montechorro, Portugal: Centro de Investigação Educação da Faculdade de Ciências Universidade de Lisboa.
- Boaler, J., & Greeno, J. G. (2000). Identity, agency, and knowing in mathematics worlds. In J. Boaler (Ed.), *Multiple perspectives on mathematics teaching and learning* (pp. 171–200). Westport, CT: Ablex.
- Boaler, J., & Selling, S. K. (2017). Psychological imprisonment or intellectual freedom? A longitudinal study of contrasting school mathematics approaches and their impact on adults’ lives. *Journal for Research in Mathematics Education*, 48(1), 78–105.

- Boaler, J., Wiliam, D., & Brown, M. L. (2000). Students' experiences of ability grouping—disaffection, polarisation and the construction of failure. *British Educational Research Journal*, 26(5), 631–648.
- Bochner, A. P. (2000). Criteria against ourselves. *Qualitative Inquiry*, 6(2), 266–272.
- Bochner, A. P. (2002). Perspectives on inquiry III: The moral of stories. In M. L. Knapp & G. R. Miller (Eds.), *Handbook of interpersonal communication* (3rd ed., pp. 73–101). Thousand Oaks, CA: Sage.
- Bourdieu, P. (1977). The economics of linguistic exchanges. *Social Science Information*, 16(6), 645–668.
- British Columbia Ministry of Education. (2016). Building connections to support newcomer students and families. In S. Mercer (Ed.). *Learn: The magazine of BC education*. Issue 13. (pp. 6–9). Vancouver: BC.
https://www.bcteacherregulation.ca/documents/Learn/2016/LearnMagazine_Spring_2016.pdf.
- Brubaker, R., & Cooper, F. (2000). Beyond “identity.” *Theory and Society*, 29(1), 1–47.
- Bruner, J. (1986), *Actual minds, possible worlds* (The Jerusalem-Harvard Lectures), Harvard University Press, Cambridge, Massachusetts.
- Bruner, J. (1990). *Acts of meaning*. Cambridge: MA, Cambridge University Press.
- Bruner, J. (2002). *Making stories: Law, literature, life*. New York, NY: Farrar, Straus and Giroux.
- Bruner, J. (2004). Life as narrative. *Social Research*, 71(3), 691–710.
- Burgess, A., & Ivanič, R. (2010). Writing and being written: Issues of identity across timescales. *Written Communication*, 27(2), 228–255.
- Café Shahor Hazak (2014, September 24). *Cafe Shahor Hazak ft Nechi Nech - ihiye beseder Be'Seder* (in Hebrew) [Video file]. YouTube. Retrieved from https://www.youtube.com/watch?v=PQp2a_yunmM
- Carraher, T. N., Carraher, D. W., & Schliemann, A. D. (1985). Mathematics in the streets and in schools. *British Journal of Developmental Psychology*, 3(1), 21–29.
- Cayley, D. (1992). *Ivan Illich in conversation: The testament of Ivan Illich*. House of Anansi.
- Central Bureau of Statistics. (2016a). *Population* [Data file]. Jerusalem, Israel: Author. Retrieved from <http://www.cbs.gov.il/shnaton67/np2.pdf> (In Hebrew)
- Central Bureau of Statistics. (2016b). *Education and Schooling* [Data file]. Jerusalem, Israel: Author. Retrieved from <http://www.cbs.gov.il/shnaton67/np4.pdf> (In Hebrew)
- Chen, J. F., Warden, C. A., & Chang, H. T. (2005). Motivators that do not motivate: The case of Chinese EFL learners and the influence of culture on motivation. *TESOL Quarterly*, 39(4), 609–633.

- Cobb, P. (2004). Mathematics, literacies, and identity. *Reading Research Quarterly*, 39(3), 333–337.
- Cobb, P., Gresalfi, M., & Hodge, L. L. (2009). An interpretive scheme for analyzing the identities that students develop in mathematics classrooms. *Journal for Research in Mathematics Education*, 40(1), 40–68.
- Cohen, G. (2017, September 7). Guy Cohen – *Hakol Yihey Be'Seder* (in Hebrew) [Video file]. YouTube. Retrieved from <https://www.youtube.com/watch?v=rIawlouHXsc>
- Cohen, J. (2012). Imaginary community of the mainstream classroom: Adolescent immigrants' perspectives. *The Urban Review*, 44(2), 265–280.
- Cohen, S. (2017, January 21). Shachar Cohen – *Hakol Yihey Be'Seder* (in Hebrew) [Video file]. YouTube. Retrieved from <https://www.youtube.com/watch?v=VRlKq9He-7s>
- Cole, M. (2009). The perils of translation: A first step in reconsidering Vygotsky's theory of development in relation to formal education. *Mind, Culture, and Activity*, 16(4), 292–295.
- Connelly, F. M., & Clandinin, D. J. (2006). Narrative inquiry. In J. L. Green, G. Camilli, & P. B. Elmore (Eds.), *Complementary methods for research in education* (pp. 477–487). Mahwah, NJ: Lawrence Erlbaum.
- Cook, V. (1999). Going beyond the native speaker in language teaching. *TESOL Quarterly*, 33(2), 185–209.
- Corbin, J., & Strauss, A. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (3rd ed.). Newbury Park, CA: Sage.
- Cresswell, J., & Smith, L. (2012). Embodying discourse analysis: Lessons learned about epistemic and ontological psychologies. *Discourse and Society*, 23(5), 619–625.
- Damarin, S. (2000). The mathematically able as marked category. *Gender and Education*, 12(1), 69–85.
- Daniel, D. (2009, September 10). *Dor Daniel – Tomorrow Yihey Be'Seder*, (in Hebrew) [Video file]. YouTube. Retrieved from <https://www.youtube.com/watch?v=w4DoGBLU-mQ>
- Danto, C. (1997). Translation and betrayal. *Anthropology and Aesthetics*, 32, 61–63.
- Darragh, L. (2013). Constructing confidence and identities of belonging in mathematics at the transition to secondary school. *Research in Mathematics Education*, 15(3), 215–229.
- Darragh, L. (2016). Identity research in mathematics education. *Educational Studies in Mathematics*, 93(1), 19–33.
- Davies, B., & Harré, R. (1990). Positioning: The discursive production of selves. *Journal for the Theory of Social Behaviour*, 20(1), 43–63.

- Davis, P. (2008, September). The influence of students' life narratives on identification with learning mathematics. Paper presented at the *International Society for Cultural and Action Research (ISCAR)*, San Diego, CA, USA. Retrieved from http://www.transmaths.org/tlrp-papers/iscar%20Davis_et_al_paper_WILLIAMS_SYMPOSIUM.pdf
- Davydov, V. V. (1991). A psychological analysis of multiplication. In L. P. Steffe, (Ed.), *Psychological abilities of primary school children in learning mathematics. Soviet Studies in Mathematics Education Series*, 6 (pp. 1–85). Reston, VA: NCTM.
- Derrida, J. (1985). *The ear of the other: Otobiography, transference, translation: Texts and discussions with Jacques Derrida* (p. Kamuf, Trans., C. V. McDonald, English Ed.). New York: Schocken Books.
- Di Martino, P. & Zan, R. (2010). 'Me and maths': Towards a definition of attitude grounded on students' narratives. *Journal of Mathematics Teacher Education*, 13(1), 27–48.
- Dillon, P. W. (2001). Labeling and English language learners: Hearing recent immigrants' needs. In G. M. Hudak & P. Kihn (Eds.) *Labeling: Pedagogy and politics*, (pp. 93–105). London, England: Routledge Falmer.
- Director General's Circular. (2015). *Diplomas and certificates: Ranking and mapping*. Jerusalem, Israel: Ministry of Education. Retrieved from <http://cms.education.gov.il/EducationCMS/Applications/Mankal/EtsMedorim/3/3-1/HoraotKeva/K-2015-4-1-3-1-52.htm> (In Hebrew).
- Doolittle, E., & Glanfield, F. (2007). Balancing equations and culture: Indigenous educators reflect on mathematics education. *For the Learning of Mathematics*, 27(3), 27–30.
- Dreher, A. & Kuntze, S. (2015). Teachers' professional knowledge and noticing: The case of multiple representations in the mathematics classroom. *Educational Studies in Mathematics*, 88(1), 89–114.
- Dreher, A., Kuntze, S., & Lerman, S. (2012). Pre-service teachers' views on using multiple representations in mathematics classroom-an intercultural study. In T. Y. Tso (Ed.), *Opportunities to learn in mathematics education. Proceedings of the 36th conference of the International Group of the Psychology of Mathematics Education*, (Vol. 2, pp. 211–218). Taipei, Taiwan: PME.
- Duff, P. A. (2001). Language, literacy, content, and (pop) culture: Challenges for ESL students in mainstream courses. *Canadian Modern Language Review*, 58, 103–132.

- Dunlop, W. L., Guo, J., & McAdams, D. P. (2016). The autobiographical author through time: Examining the degree of stability and change in redemptive and contaminated personal narratives. *Social Psychological and Personality Science*, 7(5), 428–436.
- Education Quality and Accountability Office Act. (1996, chapter 11). http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_96e11_e.htm
- Ellis, C. (2004). *The ethnographic I: A methodological novel about autoethnography*. Walnut Creek, CA: AltaMira Press.
- Epstein, D., Mendick, H., & Moreau, M. P. (2010). Imagining the mathematician: Young people talking about popular representations of maths. *Discourse: Studies in the Cultural Politics of Education*, 31(1), 45–60.
- Erdinast-Vulcan, D. (2008). The I that tells itself: A Bakhtinian perspective on narrative identity. *Narrative*, 16(1), 1–15.
- Ernest, P. (1998). Introduction: Changing views of ‘The gender problem’ in mathematics. *Counting girls out: Girls and mathematics* (pp. 1–14), London: Falmer.
- Fang, F. G. (2016). Investigating attitudes towards English accents from an ELF framework. *The Asian Journal of Applied Linguistics*, 3(1), 68–80.
- Farber, S. (2009, June 23). Shila Farber – *Yihey Be'Seder* (in Hebrew) [Video file]. YouTube. Retrieved from <https://www.youtube.com/watch?v=iqI4VX19AmA>
- Fellus, O. (2018). From principles of vision and division to a system premised on and subject to interanimated dimensions: Some reflections on identity in mathematics education. In E. Bergqvist, M. Österholm, C. Granberg, & L. Sumpter (Eds.). *Proceedings of the 42nd conference of the International Group for the Psychology of Mathematics Education*. (Vol. 2, pp. 411–418) July 2018. Umeå, Sweden: PME
- Fellus, O. (2017). Harnessing complexity: A framework for teenagers’ identity as learners of mathematics. In B. Kaur, W. K. Ho., T. L. Toh, & B. H. Choy (Eds.). *Proceeding of the 41st conference of the International Group for the Psychology of Mathematics Education*. (Vol. 2, p. 25). July 2017. Singapore: PME.
- Fellus, O., & Glanfield, F. (2017). Reflections on the FLM preconference. *For the Learning of Mathematics*, 37(1), 15–18.
- Fellus, O., Heyd-Metzuyanim, E., Lunney Borden, L. A., McFeetors, J., Sabbah, S., & Westaway, L. (2018, April). Venturing the terrains of mathematical identities: Theoretical perspectives on participation and inclusion in mathematics education. In

- M. S. Gresalfi, & V. M. Hand (Chairs), *Venturing the terrains of mathematical identities: Theoretical perspectives on participation and inclusion in mathematics education*. Symposium conducted at the annual meeting of the American Educational Research Association (AERA), New York City, NY.
- Feynman, R. P. (1965). New textbooks for the “new” mathematics. *Engineering and Science*, 28(6), 9–15.
- Fleming, D., Bangou, F., & Fellus, O. (2012). ESL teacher-candidates’ beliefs about language. *TESOL Canada Journal*, 29(1), 39–56.
- Friedman, G. & Yanay, M. (2017, September 17). *Sweetie, the magic troll – Yihey Be’Seder* (in Hebrew) [Video file]. YouTube. Retrieved from <https://www.youtube.com/watch?v=7Vx7-JpHfYA>
- Gallucci, A. (2016). *A phenomenological investigation of newcomer youths’ experiences of integration into high school and transition to post-secondary education in Canada* (Master’s dissertation). University of Calgary, Calgary.
- Gamerman, M. (2016, May 2016). *Micha Gamerman – Yihey Be’Seder* (in Hebrew) [Video file]. YouTube. Retrieved from <https://www.youtube.com/watch?v=qrfWsNfIUM0>
- Gao, Y. (2014). Faithful imitator, legitimate speaker, playful creator, and dialogical communicator: Shift in English learners’ identity prototypes. *Language and Intercultural Communication*, 14(1), 59–75.
- Gardiner, H. W., & Kosmitzki, C. (2002). *Lives across cultures: Cross-cultural human development*. Boston, MA: Allyn & Bacon.
- Gati, I., & Saka, N. (2001). High school students’ career-related decision-making difficulties. *Journal of Counselling and Development*, 79(3), 331–340.
- Gee, J. P. (2001). Identity as an analytic lens for research in education. In W. G. Secada (Ed.), *Review of research in education*, (Vol. 25, pp. 99–125). Washington, DC: American Educational Research Association.
- Gerdes, P. (1994). Reflections on ethnomathematics. *For the Learning of Mathematics*, 14(2), 19–22.
- Gergen, K. J. (1991), *The saturated self: Dilemmas of identity in contemporary life*. New York: Basic.

- GLZradio (2015, November 2). *The GLZ Commanding Officer Award – Yihey Be'Seder* (in Hebrew) [Video file]. YouTube. Retrieved from https://www.youtube.com/watch?v=FqIfRG0_ukQ
- Goffman, E. (1959). *The presentation of self in everyday life*. New York, NY: Garden City.
- Goggin, S. N., & Theodoridis, A. G. (2016). Disputed ownership: Parties, issues, and traits in the minds of voters. *Political Behavior*, 1–28.
- Graham, J., Haidt, J., & Nosek, B. A. (2009). Liberals and conservatives rely on different sets of moral foundations. *Journal of Personality and Social Psychology*, 96(5), 1029–1046.
- Graven, M., Hewana, D., & Stott, D. (2013). The evolution of an instrument for researching young mathematical dispositions. *African Journal of Research in Mathematics, Science and Technology Education*, 17(1–2), 26–37.
- Gresalfi, M. S., & Cobb, P. (2006). Cultivating students' discipline-specific dispositions as a critical goal for pedagogy and equity. *Pedagogies*, 1(1), 49–57.
- Gresalfi, M. S., Martin, T., Hand, V., & Greeno, J. (2009). Constructing competence: An analysis of student participation in the activity systems of mathematics classrooms. *Educational Studies in Mathematics*, 70(1), 49–70.
- Gu, M. (2008). Identity construction and investment transformation: College students from non-urban areas in China. *Journal of Asian Pacific Communication*, 18(1), 49–70.
- HaDor HaAharon (2015, August 21). *Yihey Be'Seder – HaDor HaAharon* (in Hebrew) [Video file]. YouTube. Retrieved from <https://www.youtube.com/watch?v=D88XsUVnrgw>
- Hall, J. (2012). Gender issues in mathematics: An Ontario perspective. *Journal of Teaching and Learning*, 8 (1), 59–72.
- Harklau, L. (2000). From the “good kids” to the “worst”: Representations of English language learners across educational settings. *TESOL Quarterly*, 34(1), 35–67.
- Harré, R., & Gillett, G. (1994). *The discursive mind*. Thousand Oaks, CA: Sage Publications.
- Heath, S. B. (1983). *Ways with words: Language, life, and work in communities and classrooms*. Cambridge: Cambridge University Press.
- Hemmings, P. (2010). Israeli education policy: How to move ahead in reform. *OECD Economics Department Working Paper No. 781* ECO/WKP(2010)37. Retrieved from [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?doclanguage=en&cote=eco/wkp\(2010\)37](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?doclanguage=en&cote=eco/wkp(2010)37).

- Heyd-Metzuyanim, E. (2013). The co-construction of learning difficulties in mathematics—teacher-student interactions and their role in the development of a disabled mathematical identity. *Educational Studies in Mathematics*, 83(3), 341–368.
- Heyd-Metzuyanim, E. (2017). Identity as a nexus of affect and discourse in mathematical learning. *For the Learning of Mathematics*, 37(3), 33–38.
- Heyd-Metzuyanim, E., & Sfard, A. (2011). Identity struggles in the mathematics classroom: On learning mathematics as an interplay of mathematizing and identifying. *International Journal of Educational Research*, 51–52, 128–145.
- Hodgen, J., & Marks, R. (2009). Mathematical ‘ability’ and identity: A sociocultural perspective on assessment and selection. In L. Black, H. Mendick and Y. Solomon (Eds.), *Mathematical relationships in education: Identities and participation* (pp. 31–42). Abingdon: Routledge.
- Hogan, M. P. (2008). The tale of two Noras: How a Yup'ik middle schooler was differently constructed as a math learner. *Diaspora, Indigenous, and Minority Education*, 2(2), 90–114.
- Holland D, Lachicotte W., Skinner D, & Cain C. (1998). *Identity and agency in cultural worlds*. Cambridge, MA: Harvard University Press.
- Holquist, M. (1985). The Carnival of discourse: Baxtin and simultaneity. *Canadian Review of Comparative Literature/Revue Canadienne de Littérature Comparée*, 12(2), 220–234.
- Holquist, M. (1983). Answering as authoring: Mikhail Bakhtin's trans-linguistics. *Critical Inquiry*, 10(2), 307–319.
- Ibrahim, A. E. K. M. (1999). Becoming black: Rap and hip-hop, race, gender, identity, and the politics of ESL learning. *TESOL Quarterly*, 33(3), 349–369.
- Inoue, M. (2002). Gender, language, and modernity: Toward an effective history of Japanese women's language. *American Ethnologist*, 29(2), 392–422.
- Itakura, H. (2015). Constructing Japanese men's multidimensional identities. *Pragmatics. Quarterly Publication of the International Pragmatics Association*, 25(2), 179–203.
- Ivanič, R. (1998). *Writing and Identity: The discursal construction of identity in academic writing*. Amsterdam: John Benjamins.
- Ivanič, R. (2006). Language, learning, and identification. In R. Kiely, P. Rea Dickens, H. Woodfield, and G. Clibbon (Eds.), *Language, culture and identity in applied linguistics*, (7–29). London: British Association of Applied Linguistics and Equinox.

- Ivanič, R., & Camps, D. (2001). I am how I sound: Voice as self-representation in L2 writing. *Journal of Writing in a Second Language [Special issue]*, 10(1), 1–31.
- Iyer, R., Graham, J., Koleva, S., Ditto, P., & Haidt, J. (2010). Beyond identity politics: Moral psychology and the 2008 Democratic primary. *Analyses of Social Issues and Public Policy*, 10(1), 293–306.
- Jones, R. (2008). *Development of seventh Grade pre-algebra students' mathematical problem solving through written explanations and justification*. (Unpublished Masters dissertation), University of Central Florida Orlando, Florida.
- Jones, S., & Myhill, D. (2004). Seeing things differently: Teachers' constructions of underachievement. *Gender and Education*, 16(4), 531–546.
- Jones, T. G. (2002, February). Preparing all teachers for linguistic diversity in K–12 schools. Paper presented at the annual meeting of the American Association of Colleges for Teacher Education, New York, NY Retrieved from <https://files.eric.ed.gov/fulltext/ED463264.pdf>
- Jorgensen, R. (2014). Social theories of learning: A need for a new paradigm in mathematics education. In J. Anderson, M. Cavanagh, & A. Prescott. (Eds.), *Curriculum in focus: Research guided practice* (Proceedings of the 37th annual conference of the Mathematics Education Research Group of Australasia, pp.311–318). Sydney: MERGA.
- Kanes, C., Morgan, C., & Tsatsaroni, A. (2014). The PISA mathematics regime: Knowledge structures and practices of the self. *Educational Studies in Mathematics*, 87(2), 145–165.
- Kanigel, R. (1991). *The man who knew infinity: A life of the genius Ramanujan*. New York: Scribner.
- Katriel, T. (1985). Gripping as a verbal ritual in some Israeli discourse. In M. Dascal (Ed.), *Dialogue in interdisciplinary approaches* (pp. 367–382). Amsterdam: John Benjamins.
- Katriel, T. (1988). Gibush: A study in Israeli cultural semantics. *Anthropological Linguistics*, 199–213.
- Katriel, T. (1993). Lefargen: A study in Israeli semantics of social relations. *Research in Language and Social Interaction*, 26(1), 31–53.
- Katriel, T. (2004). *Dialogic moments: From soul talks to talk radio in Israeli culture*. Wayne State University Press.
- Katriel, T. (2015). Dugri. In K. Tracy, C. Ilie, and T. L. Sandel (Eds.), *The international encyclopedia of language and social interaction* (pp. 493–498). Boston: John Wiley & Sons.
- Katriel, T. & Neshet, P. (1986). 'Gibush': The rhetoric of cohesion in Israeli school culture. *Comparative Education Review*, 30, 216–231.

- Kharchenko, N. (2014). Imagined communities and teaching English as a Second Language. *Journal of Foreign Languages*, 2(1), 21–39.
- Kishon, E. (Writer & Director), & Golan, M. (Producer). (1964). *Sallah Shabati*. [Motion picture]. Israel: Golan and Globus.
- Klein, E. (1967). *A comprehensive etymological dictionary of the English language*. New York: Elsevier Scientific Publishing Company.
- Kupferberg I, Gilat I. (2012). The discursive self-construction of suicidal help seekers in computer-mediated discourse. *Communication and Medicine* 9(1), 23–35.
- Kvale, S. (1996). *InterView: An Introduction to qualitative research interviewing*. Thousand Oaks, CA: Sage Publications.
- Kvale, S. (2006). Dominance through interviews and dialogues. *Qualitative Inquiry*, 12(3), 480–500.
- Lakoff, G. (2004). *Don't think of an elephant! Know your values and frame the debate: The essential guide for progressives*. White River Junction, VT: Chelsea Green Publishing.
- Langer-Osuna, J. (2015). From getting “fired” to becoming a collaborator: A case on student autonomy and the co-construction of identity and engagement in a project-based mathematics classroom. *Journal of the Learning Sciences*, 24(1), 53–92.
- Langer-Osuna, J. M. (2016). The social construction of authority among peers and its implications for collaborative mathematics problem solving. *Mathematical Thinking and Learning*, 18(2), 107–124.
- Langer-Osuna, J. M. (2017). Authority, identity, and collaborative mathematics. *Journal for Research in Mathematics Education*, 48(3), 237–247.
- Langer-Osuna, J. M., & Esmonde, I. (2017). Identity in research on mathematics education. In J. Cai (Ed.), *Compendium for research in mathematics education* (pp. 637–648). Reston, VA: National Council of Teachers of Mathematics.
- Lapadat, J. C., & Lindsay, A. C. (1999). Transcription in research and practice: From standardization of technique to interpretive positionings. *Qualitative Inquiry*, 5(1), 64–86.
- Larnell, G. V. (2016). More than just skill: Examining mathematics identities, racialized narratives, and remediation among black undergraduates. *Journal for Research in Mathematics Education*, 47(3), 233–269.
- Lather, P. (1993). Fertile obsession: Validity after poststructuralism. *The Sociological Quarterly*, 34(4), pp. 673–693.

- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, MA: Cambridge University Press.
- Le Ha, P. (2009). English as an international language: International student and identity formation. *Language and Intercultural Communication*, 9(3), 201–214.
- LeCompte, M. D. (2000). Analyzing qualitative data. *Theory into practice*, 39(3), 146–154.
- Lerman, S. (2000). The social turn in mathematics education research. In J. Boaler (Ed.), *Multiple perspectives on mathematics teaching and learning* (pp. 19–44). Westport, CT: Ablex Publishing.
- Lerman, S. (2006). Cultural psychology, anthropology, and sociology: The developing ‘strong’ social turn. In J. Maasz & W. Schloeglmann (Eds.), *New mathematics education research and practice* (pp. 171–188). Rotterdam, The Netherlands: Sense.
- Levi-Strauss, C. (1962). *The savage mind* (George Weidenfeld & Nicolson Ltd., Trans.). Chicago, IL: The University of Chicago Press.
- Leyva, L. A. (2017). Unpacking the male superiority myth and masculinization of mathematics at the intersections: A review of research on gender in mathematics education. *Journal for Research in Mathematics Education*, 48(4), 397–433.
- Lilgendahl, J. P., & McAdams, D. P. (2011). Constructing stories of self-growth: How individual differences in patterns of autobiographical reasoning relate to well-being in midlife. *Journal of Personality*, 79(2), 391–428.
- Lopez, E. (2001). Guidance of Latino high school students in mathematics and career identity development. *Hispanic Journal of Behavioural Sciences*, 23(2), 189–207.
- Lutovac, S., & Kaasila, R. (2017). Future directions in research on mathematics-related teacher identity. *International Journal of Science and Mathematics Education*, 1–18.
- Maher, C. A., & Martino, A. M. (1996). The development of the idea of mathematical proof: A 5-year case study. *Journal for Research in Mathematics Education*, 194–214.
- Mann, E. L. (2006). Creativity: The essence of mathematics. *Journal for the Education of the Gifted*, 30(2), 236–260.
- Martin, D. (2007). Mathematics learning and participation in African American context: The co-construction of identity in two intersecting realms of experience. In N. Nasir & P. Cobb (Eds.), *Diversity, equity, and access to mathematical ideas* (pp. 146–158). New York, NY: Teachers College Press.

- Martin, D. B. (2000). *Mathematics success and failure among African-American youth: The roles of sociohistorical context, community forces, school influence, and individual agency*. Mahwah, NJ: Erlbaum.
- Marx, N. (2002). Never quite a 'native speaker': Accent and identity in the L2-and the L1. *Canadian Modern Language Review*, 59(2), 264–281.
- Mason, R. & McFeetors, J. (2007). Student trajectories in high school mathematics: Issues of choice, support, and identity-making. *Canadian Journal of Science, Mathematics, and Technology Education*, 7(4), 291–316.
- McAdams, D. P., Josselson, R., & Lieblich, A. (Eds.). (2001). *Turns in the road: Narrative studies of lives in transition*. Washington, D.C.: American Psychological Association Press.
- McAdams, D. P. (1995). *The life story interview*. Evanston, IL: Northwestern University.
Retrieved from http://www.urbanlab.org/articles/McAdams_2008_LifeStoryInterview.pdf
- McAdams, D. P., & Bowman, P. J. (2001). Narrating life's turning points: Redemption and contamination: Narrative studies of lives in transition. In D. P. McAdams, R. Josselson, & A. Lieblich (Eds.), *Turns in the road: Narrative studies of lives in transition* (p. 3–34). Washington, D. C.: American Psychological Association Press.
- McAdams, D. P., & Olson, B. D. (2010). Personality development: Continuity and change over the life course. *Annual Review of Psychology*, 61, 517–542.
- McFeetors, J., & Mason, R. (2005). Voice and success in non-academic mathematics courses: (Re)Forming identity. *For the Learning of Mathematics*, 25(3), 16–23.
- McGee, E. O. (2015). Robust and fragile mathematical identities: A framework for exploring racialized experiences and high achievement among black college students. *Journal for Research in Mathematics Education*, 46(5), 599–625.
- McGee, E. O., & Martin, D. B. (2011). "You would not believe what I have to go through to prove my intellectual value!" Stereotype management among academically successful black mathematics and engineering students. *American Educational Research Journal*, 48(6), 1347–1389.
- McGinley, A. (2009). Hillary Clinton, Sarah Palin, and Michelle Obama: performing gender, race, and class on the campaign trail. *Denver University Law Review*, 86, 709–725.
- McKay, S. L., & Wong, S. L. C. (1996). Multiple discourses, multiple identities: Investment and agency in second-language learning among Chinese adolescent immigrant students. *Harvard Educational Review*, 66(3), 577–609.

- Mclean, K. C., Breen, A. V., & Fournier, M. A. (2010). Constructing the self in early, middle, and late adolescent boys: Narrative identity, individuation, and well-being. *Journal of Research on Adolescence*, 20(1), 166–187.
- Melfi, T., & Schroeder, A. (Writer), & Melfi, T. (Producer). (2016). *Hidden Figures* [Motion picture]. U.S.A: 20th Century Fox.
- Menard-Warwick, J. (2005). Both a fiction and an existential fact: Theorizing identity in second language acquisition and literacy studies. *Linguistics and Education*, 16(3), 253–274.
- Mendick, H. (2004). A mathematician goes to the movies. *Proceedings of the British Society for Research into Learning Mathematics*, 24(1), 43–48.
- Mendick, H. (2005). A beautiful myth? The gendering of being/doing ‘good at maths.’ *Gender and Education*, 17(2), 203–219.
- Merrill, N., & Fivush, R. (2016). Intergenerational narratives and identity across development. *Developmental Review*, 40, 72–92.
- Milgram, S. (1963). Behavioral study of obedience. *The Journal of Abnormal and Social Psychology*, 67(4), 371–378.
- Ministry of Defence. (2014, November 6). *Yitzhak Rabin in 1992 – Yiheye Be’Seder, an unbearable collocation* (in Hebrew) [Video file]. YouTube. Retrieved from <https://www.youtube.com/watch?v=kYQMd2gJIZU>
- Mishler, E. G. (1986). *Research interviewing: Context and narrative*. Cambridge, Massachusetts
- Morita, N. (2004). Negotiating participation and identity in second language academic communities. *TESOL Quarterly*, 38(4), 573–603.
- Moschkovich, J. (2002). A situated and sociocultural perspective on bilingual mathematics learners. *Mathematical Thinking and Learning [Special issue]*, 4(2&3), 189–212.
- Moschkovich, J. (2007). Using two languages when learning mathematics. *Educational Studies in Mathematics*, 64(2), 121–144.
- Moschkovich, J. (2013). Principles and guidelines for equitable mathematics teaching practices and materials for English language learners. *Journal of Urban Mathematics Education*, 6(1), 45–57.
- Nakamaru, S. (2011). Investment and return: Wiki engagement in a “remedial” ESL writing course. *Journal of Research on Technology in Education*, 44(4), 273–291.
- Naraghi, N. M. (2013). *The experience of cultural transition among adolescent newcomers* (Master’s dissertation). University of British Columbia, Vancouver.

- Nasir, N. I. S. & McKinney de Royston, M. (2013). Power, identity, and mathematical practices outside and inside school. *Journal for Research in Mathematics Education*, 44(1), 264–287.
- Nasir, N. I. S., & Shah, N. (2011). On defense: African American males making sense of racialized narratives in mathematics education. *Journal of African American Males in Education*, 2(1), 24–45.
- NCTM (2000). *Principles and standards for school mathematics*. Reston, VA: National Council of Teachers of Mathematics.
- Negru-Subtirica, O., Pop, E. I., & Crocetti, E. (2017). Good omens? The intricate relations between educational and vocational identity in adolescence. *European Journal of Developmental Psychology*, 1–16.
- Noble, R. (2011). Mathematics self-efficacy and African American male students: An examination of models of success. *Journal of African American Males in Education*, 2(2), 188–213.
- Nollenberger, N., Rodríguez-Planas, N., & Sevilla, A. (2016). The math gender gap: The role of culture. *The American Economic Review*, 106(5), 257–261.
- Norton Peirce, B. (1995). Social identity, investment, and language learning. *TESOL Quarterly*, 29(1), 9–31.
- Norton, B. (2001). Non-participation, imagined communities, and the language classroom. In M. Breen (Ed.), *Learner contributions to language learning: New directions in research* (pp. 159–171). Harlow, England: Pearson Education.
- Norton, B. (1997). Language, identity, and the ownership of English. *TESOL Quarterly*, 31(3), 409–429.
- Norton, B. (2000). *Identity and language learning: Gender, ethnicity, and educational change*. Harlow, England: Longman/Pearson Education.
- Norton, B. (2006). Identity as a sociocultural construct in second language education. In K. Cadman & K. O'Regan (Eds.), *TESOL in Context [special issue]*, 22–33
- Norton, B., & Gao, Y. (2008). Identity, investment, and Chinese learners of English. *Journal of Asian Pacific Communication*, 18(1), 109–120.
- Norton, B., & Kamal, F. (2003). The imagined communities of English language learners in a Pakistani school. *Journal of Language, Identity, and Education*, 2(4), 301–317.
- Noy, C. (2008). Sampling knowledge: The hermeneutics of snowball sampling in qualitative research. *International Journal of Social Research Methodology*, 11(4), 327–344.

- O'Sullivan, D. (2015). Voicing others' voices: Spotlighting the researcher as narrator. *International Electronic Journal of Elementary Education*, 8(2), 211–222.
- Oakes, J. (1990). *Multiplying inequalities: The effects of race, social class, and tracking on opportunities to learn mathematics and science*. Santa Monica, CA: The RAND Corporation.
- Ochs, E. (1990). Indexicality and Socialization. In J. W. Stigler, R. A. Shweder, G. Herdt (Eds.), *Cultural Psychology* (pp. 287–308). Cambridge: Cambridge University Press.
- Ochs, E., & Capps, L. (1996). Narrating the self. *Annual Review of Anthropology*, 25, 19–43.
- Ontario Ministry of Education. (2007). *English language learners, ESL and ELD programs and services: Policies and procedures for Ontario elementary and secondary schools, kindergarten to grade 12*.
<http://www.edu.gov.on.ca/eng/document/esleldprograms/esleldprograms.pdf>
- OECD. (2016). *Education at a glance 2016: OECD indicators*. Paris, France: OECD Publishing.
 Retrieved from <http://dx.doi.org/10.1787/eag-2016-en>
- Ortmeier-Hooper, C. (2008). "English may be my second language, but I'm not 'ESL'." *College Composition and Communication*, 59(3), 389–419.
- Pepin, B. (2011). Pupils' attitude towards mathematics: A comparative study of Norwegian and English secondary students. Beliefs and Beyond: Affecting the Teaching and Learning of Mathematics. *ZDM: The International Journal on Mathematics Education*, 43(4), 535–546.
- Pestigal, the Official Channel (2014, October 29). *Gidi Gov – Yihey Be'Seder, the 1987 Pestigal* (in Hebrew) [Video file]. YouTube. Retrieved from
<https://www.youtube.com/watch?v=-htjMcbESwA>
- Picot, G. & Sweetman, A. (2012). *Making it in Canada: Immigration outcomes and policies. Montreal: IRPP Study*. <http://irpp.org/wp-content/uploads/assets/research/diversity-immigration-and-integration/making-it-in-canada/IRPP-Study-no29.pdf>.
- Piller, I. (2002). Passing for a native speaker: Identity and success in second language learning. *Journal of Sociolinguistics*, 6(2), 179–208.
- Polkinghorne, D. E. (1991). Narrative and self-concept. *Journal of Narrative and Life History*, 1(2), 135–153.
- Polkinghorne, D. E. (1988). *Narrative knowing and the human sciences*. SUNY Press.
- Pratt, M. W., Arnold, M. L., & Mackey, K. (2001). Adolescents' representations of the parent voice in stories of personal turning points. In D. P. McAdams, R. Josselson, & A. Lieblich

- (Eds.), *Turns in the road: Narrative studies of lives in transition* (p. 227–252). Washington, D.C.: American Psychological Association Press.
- Prusak, A. (2015, June). Nurturing students' creativity through telling mathematical stories. In F. M. Singer, F. Toader, & C. Voica (Eds.), *The 9th mathematical creativity and giftedness international conference proceedings* (pp. 16–21). Romania: Sinaia.
- Prusak, A. (2003). *The nature and role of cultural factors in the learning of mathematics*. Unpublished doctoral dissertation (in Hebrew). The University of Haifa, Haifa, Israel.
- Quine, W. V. O. (1960). *Word and object*. Cambridge, Mass.: MIT Press.
- Radovic, D., Black, L., Salas, C. E., & Williams, J. (2017). Being a girl mathematician: Diversity of positive mathematical identities in a secondary classroom. *Journal for Research in Mathematics Education*, 48(4), 434–464.
- Reuman, D., Mac Iver, D., Eccles, J., & Wigfield, A. (1987, April). Changes in students' mathematics motivation and behavior at the transition to junior high school. Paper presented at the *Annual Meeting of the American Educational Research Association (AERA)*, Washington, DC.
- Richardson, E. (2009). My ill literacy narrative: Growing up Black, poor and a girl, in the hood. *Gender and Education*, 21(6), 753–767.
- Ritchie, J., & Spencer, L. (1994). Qualitative data analysis for applied policy research. In: A. Bryman, R. Burgess (Eds.), *Analysing qualitative data*. (p. 173–194). London: Routledge.
- Ricoeur, P. (1992). *Oneself as another*. Chicago, IL: The University of Chicago Press.
- Riessman, C. K. (2008). *Narrative methods for the human sciences*. Thousand Oaks, CA: Sage.
- Rodd, M., & Bartholomew, H. (2006). Invisible and special: Young women's experiences as undergraduate mathematics students. *Gender and Education*, 18(1), 35–50.
- Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context*. Cambridge, MA: Harvard University Press.
- Roth, W. M. (2010). Mathematics in the everyday world and at work: Prolegomena for rethinking the concept of interdisciplinarity. In *Interdisciplinarity for the Twenty-first Century: Proceedings of the Third International Symposium on Mathematics and Its Connections to Arts and Sciences, Moncton 2009* (No. 11, pp. 67–108). IAP.
- Rubdy, R., McKay, S. L., Alsagoff, L., & Bokhorst-Hang, W. D. (2008). Enacting English language ownership in the outer circle: A study of Singaporean Indians' orientations to English norms. *World Englishes*, 27(1), 40–67.

- Safford, K., & Costley, T. (2008). 'I didn't speak for the first year': Silence, self-study and student stories of English language learning in mainstream education. *International Journal of Innovation in Language Learning and Teaching*, 2(2), 136–151.
- Sapir, E. (1921). *Language: An introduction to the study of speech*. New York: Harcourt, Brace & World.
- Schwartz, S. J., Montgomery, M. J., & Briones, E. (2006). The role of identity in acculturation among immigrant people: Theoretical propositions, empirical questions, and applied recommendations. *Human Development*, 49(1), 1–30.
- Seidman, I. (2006). *Interviewing as qualitative research: A guide for researchers in education and the social sciences*. (3rd ed.). New York: Teachers college press.
- Seufert, T. (2003). Supporting coherence formation in learning from multiple representations. *Learning and Instruction*, 13(2), 227–237.
- Sfard, A. (2000). On reform movement and the limits of mathematical discourse. *Mathematical Thinking and Learning*, 2(3), 157–189.
- Sfard, A. (2006). Participationist discourse on mathematics learning. In J. Maasz & W. Schloeglmann (Eds.), *New mathematics education research and practice* (pp. 153–170). Rotterdam, The Netherlands: Sense.
- Sfard, A. (2009). Disabling numbers: On the secret charm of numbers and why it should be resisted. In L. Black, H. Mendick and Y. Solomon (Eds.), *Mathematical relationships in education: Identities and participation* (pp. 9–18). New York, NY: Routledge.
- Sfard, A., & Kieran, C. (2001). Cognition as communication: Rethinking learning-by-talking through multi-faceted analysis of students' mathematical interactions. *Mind, Culture, and Activity*, 8(1), 42–76.
- Sfard, A., & Prusak, A. (2005). Telling identities: In search of an analytic tool for investigating learning as a culturally shaped activity. *Educational Researcher*, 34(4), 14–22.
- Shapiro, S. (2014). "Words that you said go bigger": English language learners' lived experiences of deficit discourse. *Research in the Teaching of English*, 48(4) 386–406.
- Sheffield, L. J. (2015, June). Myths about "gifted" mathematics students: How widespread are they? In F. M. Singer, F. Toader, & C. Voica (Eds.), *The 9th mathematical creativity and giftedness international conference proceedings* (pp. 114–119). Romania: Sinaia.
- Sheffield, L. J. (2017). Dangerous myths about "gifted" mathematics students. *ZDM: The International Journal on Mathematics Education*, 49(1), 13–23.

- Shih, M., Pittinsky, T. L., & Ambady, N. (1999). Stereotype susceptibility: Identity salience and shifts in quantitative performance. *Psychological Science*, 10(1), 80–83.
- Silver, E. A. (1997). Fostering creativity through instruction rich in mathematical problem solving and problem posing. *ZDM: The International Journal on Mathematics Education*, 29(3), 75–80.
- Sjøberg, S. (2015). PISA and global educational governance-A critique of the project, its uses and implications. *Eurasia Journal of Mathematics, Science and Technology Education*, 11(1), 111–127.
- Skilton-Sylvester, E. (2002). Should I stay or should I go? Investigating Cambodian women's participation and investment in adult ESL programs. *Adult Education Quarterly*, 53(1), 9–26.
- Solomon, Y. (2007a). Not belonging? What makes a functional learner identity in undergraduate mathematics? *Studies in Higher Education*, 32(1), 79–96.
- Solomon, Y. (2007b). Experiencing mathematics classes: Gender, ability, and the selective development of participative identities. *International Journal of Educational Research*, 46(1/2), 8–9.
- Solomon, Y., Radovic, D., & Black, L. (2016). “I can actually be very feminine here”: Contradiction and hybridity in becoming a female mathematician. *Educational Studies in Mathematics*, 91(1), 55–71.
- Statistics Canada (2010). *Projections of the diversity of the Canadian population: 2006 to 2031*. Ottawa, Canada: Statistics Canada.
- Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology*, 69(5), 797–811.
- Stinson, D. W. (2006). African American male adolescents, schooling (and mathematics): Deficiency, rejection, and achievement. *Review of Educational Research*, 76(4), 477–506.
- Stinson, D. W. (2008). Negotiating sociocultural discourses: The counter-storytelling of academically (and mathematically) successful African American male students. *American Educational Research Journal*, 45(4), 975–1010.
- Stinson, D. W. (2013). Negotiating the “White male math myth”: African American male students and success in school mathematics. *Journal for Research in Mathematics Education*, 44(1), 69–99.

- Street, B., Baker, D., & Tomlin, A. (2005). *Navigating numeracies: Home/School numeracy practices*. London, UK: Springer.
- Takeuchi, M. A. & Towers, J. (2016). Students' experiences of group work revealed through mathematics autobiographies. In M. A. Takeuchi, A. P. Preciado Babb, & J. Lock (Eds.), *Proceedings of the IDEAS: Designing for Innovation* (pp. 224–233). Calgary, Canada: University of Calgary.
- Timmis, I. (2002). Native-speaker norms and international English: A classroom view. *English Language Teaching Journal*, 56(3), 240–249.
- Toohey, K., & Derwing, T. M. (2008). Hidden losses: How demographics can encourage incorrect assumptions about ESL high school students' success. *Alberta Journal of Educational Research*, 54(2), 178–193.
- Towers, J., Hall, J., Rapke, T., Martin, L. C., & Andrews, H. (2016). Autobiographical accounts of students' experiences learning mathematics: A Review. *Canadian Journal of Science, Mathematics and Technology Education*, 1–13. DOI:10.1080/14926156.2016.1241453
- Turner, E., Dominguez, H., Maldonado, L., & Empson, S. (2013). English learners' participation in mathematical discussion: Shifting positionings and dynamic identities. *Journal for Research in Mathematics Education*, 44(1), 199–234.
- Ushioda, E. (2016). Language learning motivation through a small lens: A research agenda. *Language Teaching*, 49(4), 564–577.
- Van den Hoonaard, W. C. (2011). *The seduction of ethics: Transforming the social sciences*. University of Toronto Press.
- Visscher, K., Heusinkveld, S., & O'Mahoney, J. (2017). Bricolage and identity work. *British Journal of Management*. Advance online publication. DOI: 10.1111/1467-8551.12220
- Vitanova, G. (2005). Authoring the self in a non-native language: A dialogic approach to agency and subjectivity. In J. K. Hall, G. Vitanova & L. Marchenkova (Eds.), *Dialogue with Bakhtin on second and foreign language learning: New perspectives*. (149–169). Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Vitanova, G. (2013). Narratives as zones of dialogic constructions: A Bakhtinian approach to data in qualitative research. *Critical Inquiry in Language Studies*, 10(3), 242–261.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard university press.
- Walkerdine, V. (1998). *Counting girls out: Girls and mathematics*, London: Falmer.

- Walshaw, M. (2010). The performance of self in the art of research. *Educational Insights*, 13(1), retrieved from: <http://www.ccfi.educ.ubc.ca/publication/insights/v13n01/articles/walshaw/>.
- Walshaw, M. (2013). Post-structuralism and ethical practical action: Issues of Identity and power. *Journal for Research in Mathematics Education*, 44(1), 100–118.
- Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. New York: Cambridge University Press.
- Wetherell, M. (2007). A step too far: Discursive psychology, linguistic ethnography and questions of identity. *Journal of Sociolinguistics*, 11(5), 661–681.
- Wibeck, V., Dahlgren, M., & Öberg, G. (2007). Learning in focus groups: An analytical dimension for enhancing focus group research. *Qualitative Research*, 7(2), 249–267.
- Wigfield, A., Eccles, J. S., Fredricks, J. A., Simpkins, S., Roeser, R., & Schiefele, U. (2015). Development of achievement motivation and engagement. In R. M. Lerner (Series Ed.), M. Lamb (Volume Ed.), *Handbook of child psychology and developmental science*. Vol. 3. Socioemotional processes (7th ed., pp. 657–700). New York, NY: John Wiley.
- Williams, J., Black, L., Hernandez-Martinez, P., Davis, P., Hutcheson, G., Nicholson, S., Pampaka, M., & Wake, G. (2007). Storying mathematical identities with cultural models. In D. Pitta-Pantazi & G. Philippou (Eds.), *Proceedings of the fifth Conference of the European society for Research in Mathematics Education* (pp. 1607–1616). Nicosia: Department of Education, University of Cyprus.
- Wirtz, R. W., & Kahn, E. (1982). Another look at applications in elementary school mathematics. *The Arithmetic Teacher*, 30(1), 21–25.
- Wood, M. B. (2013). Mathematical micro-identities: Moment-to-moment positioning and learning in a fourth-grade classroom. *Journal for Research in Mathematics Education*, 44(5), 775–808.
- Yoon, B. (2008). Uninvited guests: The influence of teachers' roles and pedagogies on the positioning of English language learners in the regular classroom. *American Educational Research Journal*, 45(2), 495–522.
- Zack, V., & Graves, B. (2002). Making mathematics meaning through dialogue: "Once you think of it, the z minus three seems pretty weird." *Educational Studies in Mathematics*, 46(1–3), 229–271.
- Zazkis, D. (2015). Monsters, lovers, and former friends: Exploring relationships with mathematics via personification. *For the Learning of Mathematics*, 35(1), 33–38.

Appendices

Participant Recruitment Letter (English)

My name is Osnat Fellus and I am a PhD student in the Faculty of Education at the University of Ottawa. As part of my PhD research, I am conducting a study on the relationship among identity, school mathematics and English as an additional language. I am interested in learning about the experiences of newcomer families whose children have had at least one year of school mathematics in Israel and one year of school experience in Ontario at the intermediate or high school grade within the last two years. For this purpose, I am looking for at least one parent and one child from each family. This research project is being conducted independently from the organization from which you are recruited.

As a participant, you will be asked to share your experiences and thoughts about school mathematics and learning English as an additional language. Participation will include three 90-minute meetings and be conducted in Hebrew or English. The first meeting will be a family interview, the second will be an individual interview, and the third will be a parent group discussion and a children group discussion. These meetings will be concluded within eight weeks. Up to six families will be recruited on a first-come-first-served basis.

If you would like to participate in this research project or if you would like further information, please contact me via email at _____ or by telephone at _____ (cell).

Osnat Fellus

Ph.D. Candidate

University of Ottawa

Participant Recruitment Letter (Hebrew)

קריאה להשתתפות במחקר

שלום,

שמי אסנת פילוס, דוקטורנטית בפקולטה לחינוך באוניברסיטת אוטווה. כחלק מעבודת הדוקטורט שלי, אני עורכת מחקר על הקשר בין זהות תלמידים כלומדי מתמטיקה בית ספרית ואנגלית כשפה נוספת. מטרת המחקר היא ללמוד על נושאים אלה בקרב משפחות שילדיהם התנסו, בשנתיים האחרונות, בלפחות שנת לימודים אחת בתיכון או בחטיבת ביניים בישראל ובלפחות שנת לימודים אחת בתיכון או בחטיבת ביניים בקנדה. לשם כך, דרושות משפחות המעונינות להשתתף במחקר. מכל משפחה המעוניינת להשתתף דרושים הורה וילד.

כמשתתפי מחקר, תתבקשו לחלוק מנסיונכם ודעותכם לגבי לימוד מתמטיקה בית ספרית ואנגלית כשפה נוספת. ההשתתפות במחקר תכלול שלושה מפגשים בני 90 דקות כל אחד בעברית ו/או באנגלית. בפגישה הראשונה יערך ראיון מפתחתי, בפגישה השנייה יערך ראיון אישי, ובפגישה השלישית יערך ראיון לקבוצת ההורים וראיון לקבוצת הילדים. פגישות אלה יערכו בטווח זמן של שמונה שבועות. שש משפחות ישתתפו במחקר על בסיס כל הקודם זוכה. מחקר זה נערך באופן עצמאי ואינו קשור לפעילות של הארגון דרכו נשלח מכתב זה.

אם הינכם מעוניינים להשתתף במחקר זה או אם הינכם זקוקים למידע נוסף, אנא שילחו דוא"ל לכתובת: או התקשרו

לטלפון

בברכה,

אסנת פילוס

דוקטורנטית

אוניברסיטת אוטווה

Participant Consent Forms (English & Hebrew)

Title of study: Teenagers at a crossroad: Exploring newcomer teenagers' identity as learners of mathematics and English as an additional language

Researcher: Osnat Fellus

Supervisor: Barbara Graves (Ph.D.)

University of Ottawa

University of Ottawa

Faculty of Education

Faculty of Education

Email:

Email: bgraves@uottawa.ca

Phone:

Phone: 613.562.5800 x 4965

Invitation to Participate: I am invited to participate in the above-mentioned research study conducted by Osnat Fellus, Ph.D. Candidate, in the Faculty of Education at the University of Ottawa, under the supervision of Professor Barbara Graves. This research project is being conducted independently from the organization from which I am recruited.

Purpose of the Study: The purpose of the study is to explore beliefs, values, and experiences of school mathematics and learning English as an additional language among Israeli newcomers.

Participation: My participation will consist of three 90-minute interviews. The first interview will be family based where at least one parent and one child take part in the session. The second session will be a one-to-one interview. Upon request, the researcher will provide me with the transcript of the individual interview. The third interview will be a parent discussion group and a children discussion group to further explore my experiences related to mathematics and learning English as an additional language. The interviews will be scheduled for a time and place

convenient to me and my family. I understand that I will be asked to share my thoughts and feelings about school mathematics and learning English as an additional language. I understand that I am under no obligation to participate in the interviews or answer any questions and that I can withdraw at any time. I also understand that all sessions will be audio-recorded.

Risks: There are no foreseeable risks to participating in this study. However, since my participation will require that I volunteer personal information, this may cause me to feel emotional discomfort. I have received assurances from the researcher that I can withdraw at any time and that I can refuse to answer questions. If required the researcher will provide me with additional resources.

Benefits: My participation in this study will allow me to voice my thoughts and beliefs about mathematics education and learning English as an additional language. This, in turn, will advance current understanding of how learners of school mathematics interpret their experiences in mathematics classes and how their meaning making forms and shapes their identity as learners of mathematics and of English as an additional language. This information will be used for a doctoral dissertation and related publications.

Confidentiality and Anonymity: I have received assurances from the researcher that the information I share will remain strictly confidential. I understand that the contents will be used only for a doctoral dissertation and related publications and that my confidentiality will be protected and that no information that can identify me will be published or made public. My anonymity will be protected through the use of pseudonyms and places. However, I also understand that participating in a focus group entails limits to confidentiality and I agree to respect the confidentiality and anonymity of my fellow participants.

Conservation of Data: The data collected will include audio recordings of interviews, transcripts, and researcher notes. Data will be kept in a secure manner in a locked filing cabinet and password protected electronic files. Files will be stored and kept securely for the duration of the dissemination of related publications for a minimum of five years and will be accessible to only the researcher and the supervisor for this research project.

Voluntary Participation: I understand that I am under no obligation to participate and if I choose to participate, I may withdraw from the study at any time and/or refuse to answer any questions without experiencing any negative consequences. If I choose to withdraw, the personal interview data will be destroyed however, the focus group data will be used given that they are highly dependent on the overall group discussion. The family-based interview will be used if there is at least one parent and one child participating.

Acceptance: I, _____, agree to participate in the above research study conducted by Osnat Fellus of the Faculty of Education, University of Ottawa, and under the supervision of Professor Barbara Graves.

YES NO I would like a copy of the individual interview transcript.

If I have any questions about the study, I may contact the researcher or her supervisor. If I have any questions regarding the ethical conduct of this study, I may contact the Protocol Officer for Ethics in Research at the University of Ottawa.

Address: Officer for Ethics in Research
 Tabaret Hall, Room 154
 550 Cumberland Street

Ottawa, ON

K1V 6N5

Tel. #: 613.562.5387

Email: ethics@uottawa.ca

There are two copies of the consent form, one of which is mine to keep.

Participant's Name: _____

Participant's Signature: _____

Date: _____

Researcher's Name: Osnat Fellus

Researcher's Signature: _____



uOttawa

Université d'Ottawa
Faculté d'éducation

University of Ottawa
Faculty of Education

נספח ב' - טופס הסכמה להשתתף במחקר

כותרת המחקר: הרחבת אופקים: הקשר בין זהות ולמידת מתמטיקה בית ספרית ואנגלית כשפה נוספת בקרב משפחות ישראליות באונטריו

מנחה: ברברה גרייבס (פרופסור)
אוניברסיטת אוטווה
פקולטה לחינוך

חוקרת: אסנת פילוס
אוניברסיטת אוטווה
פקולטה לחינוך

דוא"ל: bgraves@uottawa.ca

הזמנה להשתתף במחקר: אני מוזמן/מוזמנת להשתתף במחקר שנערך על ידי אסנת פילוס בהנחייתה של פרופסור ברברה גרייבס בפקולטה לחינוך באוניברסיטת אוטווה. מחקר זה נערך באופן עצמאי ואינו קשור לפעילות של הארגון דרכו אני מוזמן/מוזמנת להשתתף במחקר.

מטרת המחקר: מטרת המחקר היא לשפוך אור על הניסיון האישי, הערכים המנחים, והעמדות של לומדי מתמטיקה בית ספרית ואנגלית כשפה נוספת בקרב ישראלים המתגוררים בקנדה.

השתתפות: השתתפותי במחקר תכלול שלושה מפגשים באורך של עד 90 דקות כל אחד. המפגש הראשון יהיה ראיון משפחתי שיכלול הורה אחד וילד לפחות. המפגש השני יהיה ראיון אישי. על פי בקשתי, החוקרת תשלח אליי את תעתיק הראיון האישי שלי. המפגש השלישי יכלול ראיון לקבוצת ההורים וראיון לקבוצת הילדים על מנת להרחיב את הדיון על נסיון האישי במסגרת לימודי המתמטיקה הבית ספרית ואנגלית כשפה נוספת. הראיונות ייקבעו במקומות ובמועדים הנוחים לי ולבני משפחתי. אני מבין/מבינה שאתבקש לחלוק את מחשבותיי ורגשותיי לגבי מתמטיקה בית ספרית ולמידת אנגלית כשפה נוספת. אני מבין/מבינה שאין אני מחויב/מחויבת להשתתף במחקר או לענות על כל שאלה ושאני יכול/יכולה לפרוש מהמחקר בכל עת. כמו כן, אני מבין/מבינה שכל המפגשים יוקלטו.

סיכונים: ההשתתפות במחקר זה אינה כרוכה בסיכונים. אולם, מאחר וההשתתפות תדרוש שאנדם מידע אישי, הדבר עשוי לגרום לי להרגיש אי נוחות. החוקרת הדגישה שאוכל לפרוש מהמחקר בכל עת שארצה ושאיני חייב/חייבת לענות על כל שאלה. אם יידרש, החוקרת תספק מידע על מקורות תמיכה.

יתרונות: השתתפותי במחקר זה תאפשר לי להשמיע את דעתי, ועמדותי לגבי מתמטיקה בית ספרית ולמידת אנגלית כשפה נוספת. מידע זה יקדם את הידע הקיים לגבי כיצד נסיון אישי של למידת מתמטיקה בית ספרית ואנגלית כשפה נוספת יוצרת ומעצבת זהות לומדים. מידע זה ישמש לעבודת הדוקטורט ולפרסומים נלווים.

סודיות ואנונימיות: כל מידע שאמסור יהיה סודי בהחלט. אני מבין/מבינה שהתכנים ישמשו לעבודת דוקטורט ופרסומים נלווים והסודיות של המידע שאמסור תישמר ואף מידע שעשוי לזהות אותי יעבור לרשות הכלל. האנונימיות שלי תישמר באמצעות שימוש בשמות בדויים. אולם, אני כמו כן מבין/מבינה שהשתתפות בקבוצת דיון כרוכה במגבלות לסודיות ואני מסכים/מסכימה לכבד את הסודיות והאנונימיות של המשתתפים האחרים.

שימור החומר: המידע שייאסף יכלול הקלטות שמע של הראיונות, תעתיקים, והארות החוקרת. הנתונים יישמרו באופן בטוח בתיקייה נעולה ובתיקיות המוגנות בסיסמת גישה. המידע יאוכסן ויישמר לתקופה של כתיבת מאמרים ולפחות לחמש שנים. המידע יהיה נגיש לחוקרת ולמנחה של המחקר.

☎ 613-562-5804
📠 613-562-5146

145 Jean Jacques Lussier
Ottawa ON K1N 6N5 Canada
www.uOttawa.ca



uOttawa

Université d'Ottawa
Faculté d'éducation

University of Ottawa
Faculty of Education

השתתפות בהתנדבות: אני מבין/מבינה כי אין אני מחוייב/מחוייבת להשתתף במחקר וכי אם אבחר להשתתף, אני רשאי/רשאית לפרוש מהמחקר בכל עת שארצה או לסרב לענות על כל שאלה ללא השלכות כלשהן. אם אחליט לפרוש מהמחקר, ההקלטה של הראיון האישי שלי תושמד. מידע שנאסף במסגרת קבוצות הדיון יישמר לאור תלותו בתוצר הכוללני של הדיון. הראיון המשפחתי יישמר אם עדיין יוותרו לפחות הורה וילד כמשתתפים במחקר.

הסכמה: אני

מסכים/מסכימה להשתתף במחקר המוזכר מעלה שנערך על ידי אסנת פילוס בהנחיית של פרופסור ברברה גרייבס בפקולטה לחינוך באוניברסיטת אוטווה.

כן לא אני מעוניין/מעוניינת בעותק של התעתיק הראיון האישי שלי.

אם יש לי שאלות הנוגעות למחקר, אני רשאי/רשאית ליצור קשר עם החוקרת או המנחה של המחקר. אם יש לי שאלות הנוגעות לניהול האתי של המחקר, אני רשאי/רשאית ליצור קשר עם הממונה על אתיקה במחקר באוניברסיטת אוטווה.

כתובת: Officer for Ethics in Research

Tabaret Hall, Room 154

550 Cumberland Street

Ottawa, ON

K1V 6N5

613.562.5387

ethics@uottawa.ca

טלפון:

דוא"ל:

ישנם שני עותקים לטופס ההסכמה להשתתפות במחקר. אחד מהם הוא שלי למשמורת.

שם המשתתף/המשתתפת:

חתימת המשתתף/המשתתפת:

תאריך:

שם החוקרת:

חתימת החוקרת:

אסנת פילוס

☎ 613-562-5804
☎ 613-562-5146

145 Jean Jacques Lussier
Ottawa ON K1N 6N5 Canada
www.uOttawa.ca

Participant Assent Form

Title of study: Teenagers at a crossroad: Exploring newcomer teenagers' identity as learners of mathematics and English as an additional language

Researcher: Osnat Fellus

Supervisor: Barbara Graves (Ph.D.)

University of Ottawa

University of Ottawa

Faculty of Education

Faculty of Education

Email:

Email: bgraves@uottawa.ca

Phone:

Phone: 613.562.5800 x 4965

Invitation to Participate: I am invited to participate in the above-mentioned research study conducted by Osnat Fellus, Ph.D. Candidate, in the Faculty of Education at the University of Ottawa. This research project is being conducted independently from the organization from which I am recruited.

Participation: My participation will include the completion of three 90-minute interviews. The first interview will be family based where at least one parent and one child take part in the session. The second session will be a one-to-one interview. Upon request, the researcher will provide me with the transcript of the individual interview. The third interview will be a parent discussion group and a children discussion group to further explore my experiences related to mathematics and learning English as an additional language. The interviews will be scheduled for a time and place convenient to me and my family. I understand that I will be asked to share my thoughts and feelings about school mathematics and learning English as an additional

language. I understand that I am under no obligation to participate in the interviews or answer any questions and that I can withdraw at any time. I also understand that all sessions will be audio-recorded.

Benefits: My participation in this study will allow me to voice my thoughts and beliefs about mathematics education and learning English as an additional language.

Confidentiality and Anonymity: I have received assurances from the researcher that the information I share will remain strictly confidential. I understand that the contents will be used only for a doctoral dissertation and related publications and that my confidentiality will be protected and that no information that can identify me will be published or made public. My anonymity will be protected through the use of pseudonyms and places. However, I also understand that participating in a focus group entails limits to confidentiality and I agree to respect the confidentiality and anonymity of my fellow participants.

Acceptance: I, _____, agree to participate in the above research study conducted by Osnat Fellus of the Faculty of Education, University of Ottawa, and under the supervision of Professor Barbara Graves.

There are two copies of the consent form, one of which is mine to keep.

Participant's Name: _____

Participant's Signature: _____

Date: _____

Researcher's Name: _____ Osnat Fellus _____

Researcher's Signature: _____

Parents' Consent Form on Behalf of their Children

Title of study: Teenagers at a crossroad: Exploring newcomer teenagers' identity as learners of mathematics and English as an additional language

Researcher: Osnat Fellus

Supervisor: Barbara Graves (Ph.D.)

University of Ottawa

University of Ottawa

Faculty of Education

Faculty of Education

Email:

Email: bgraves@uottawa.ca

Phone:

Phone: 613.562.5800 x 4965

Invitation to Participate: My child is invited to participate in the above-mentioned research study conducted by Osnat Fellus, Ph.D. Candidate, in the Faculty of Education at the University of Ottawa, under the supervision of Professor Barbara Graves. This research project is being conducted independently from the organization from which my child is recruited.

Purpose of the Study: The purpose of the study is to explore beliefs, values, and experiences of school mathematics and learning English as an additional language among Israeli newcomers.

Participation: My child's participation will consist of three 90-minute interviews. The first interview will be family based where at least one parent and one child take part in the session. The second session will be a one-to-one interview. Upon request, the researcher will provide my child with the transcript of the individual interview. The third interview will be a parent discussion group and a children discussion group to further explore my child's experiences related to mathematics and learning English as an additional language. The interviews will be

scheduled for a time and place convenient to my child and my family. I understand that my child will be asked to share his or her thoughts and feelings about school mathematics and learning English as an additional language. I understand that my child is under no obligation to participate in the interviews or answer any questions and that my child can withdraw at any time. I also understand that all sessions will be audio-recorded.

Risks: There are no foreseeable risks to participating in this study. However, since my child's participation will require that he or she volunteer personal information, this may cause him or her to feel emotional discomfort. I have received assurances from the researcher that my child can withdraw at any time and that my child can refuse to answer questions. If required, the researcher will provide me and my child with additional resources.

Benefits: My child's participation in this study will allow for an opportunity to voice his or her thoughts and beliefs about mathematics education and learning English as an additional language. This, in turn, will advance current understanding of how learners of school mathematics interpret their experiences in mathematics classes and how their meaning making forms and shapes their identity as learners of mathematics and of English as an additional language. This information will be used for a doctoral dissertation and related publications.

Confidentiality and Anonymity: I have received assurances from the researcher that the information my child shares will remain strictly confidential. I understand that the contents will be used only for a doctoral dissertation and related publications and that my child's confidentiality will be protected and that no information that can identify my child will be published or made public. My child's anonymity will be protected through the use of pseudonyms and places. However, I also understand that participating in a focus group entails

limits to confidentiality and that my child will be asked to respect the confidentiality and anonymity of his or her fellow participants.

Conservation of Data: The data collected will include audio recordings of interviews, transcripts, and researcher notes. Data will be kept in a secure manner in a locked filing cabinet and password protected electronic files. Files will be stored and kept securely for the duration of the dissemination of related publications for a minimum of five years and will be accessible to only the researcher and the supervisor for this research project.

Voluntary Participation: I understand that my child is under no obligation to participate and if he or she chooses to participate, they may withdraw from the study at any time and/or refuse to answer any questions without experiencing any negative consequences. If my child chooses to withdraw, the personal interview data will be destroyed however, the focus group data will be used given that they are highly dependent on the overall group discussion. The family-based interview will be used if there is at least one parent and one child participating.

Acceptance: I, _____, agree that my child _____ participates in the above research study conducted by Osnat Fellus of the Faculty of Education, University of Ottawa, and under the supervision of Professor Barbara Graves.

YES NO My child would like a copy of the individual interview transcript.

If my child has any questions about the study, I may contact the researcher or her supervisor. If I have any questions regarding the ethical conduct of this study, I may contact the Protocol Officer for Ethics in Research at the University of Ottawa.

Address: Officer for Ethics in Research

Tabaret Hall, Room 154

550 Cumberland Street

Ottawa, ON

K1V 6N5

Tel. #: 613.562.5387

Email: ethics@uottawa.ca

There are two copies of the consent form, one of which is mine to keep.

Participant's Name: _____

Participant's Signature: _____

Date: _____

Researcher's Name: _____ Osnat Fellus _____

Researcher's Signature: _____

Interview Guide

To be read to the participants at every session: This is an interview about your experience of school mathematics in Canada. The interview may include parts of the past as you remember them and the future as you imagine it. Some of the questions focus on several key scenes in your experience of school mathematics. There are no right or wrong answers to any of the questions. Your task is simply to discuss your experience of school mathematics in Canada. Do you have any questions?

Family Interview: In the family focus group, the purpose is to have family members engage in conversation about mathematics and learning an additional language and to express your opinions, talk about values ascribed to learning and using mathematics, and engage in explanations of how things are in mathematics education. All contributions are important and there is no right or wrong answers or ideas. The moderator will not participate in the discussions but listen and take notes of questions she would like to ask or topics she would like to raise. All participants are encouraged to express their thoughts freely at any time. Participants are also encouraged to ask other members to provide examples or explanations to what they are saying. Three prompts will be given: (1) participants will be asked to speak about differences and similarities of mathematics education in Israel and in Canada; (2) participants will be asked to discuss two newspaper excerpts on the topic of mathematics education; (3) participants will be asked to think of their experience of school mathematics to prepare for the second interview.

One-to-One Interview: *An overview:* Please describe your overall experience with mathematics education. Please think of it as if it were a book that has a table of contents. Please describe what the titles of the main chapters in the book might be and tell me a little bit about what each chapter is about. You may have as many chapters as you like. This will give me an overall plot summary of your experience of school mathematics.

Key Scenes: Now that you have described the overall experience, I would like you to focus in on a few key scenes that stand out in your experience. Consider a key scene to be a specific incident that took place at a particular time and place and that was especially good, bad, important, or memorable. For each of the key scenes, I ask that you describe in detail what happened, when and where it happened, and what you were thinking and feeling in the event. In addition, I ask that you tell me why you think this particular scene is good or bad, important or memorable in your experience.

Turning Points: In reflecting on your experience of mathematics and of learning English as an additional language, please identify certain key moments that stand out as turning points. I ask that you describe in detail what happened, when and where it happened, and what you were thinking and feeling in the event. Please explain in what way has this turning point shaped your beliefs about mathematics and/or learning English as an additional language.

Imagined Future: Please describe your plans, dreams, or hopes that are related to mathematics and to learning English as an additional language. For example, what are your aspirations and how is mathematics or learning English as an additional language relevant to these aspirations? Please describe any plan or aspiration that you thought about, are currently

thinking about or would like to think about in the future. Tell me what the plan is, how it might develop, and why you think this plan is important for you and/or for other people.

Challenges: Looking back over your experience of school mathematics and learning English as an additional language, please identify and describe what you now consider to be the greatest single challenge you have faced in your experience. Please describe in detail what is or was the challenge or problem? How did the challenge or problem develop? How did you address or deal with this challenge or problem? What is the significance of this challenge or problem in your own experience? Please identify the challenge and describe it in detail. [Note: if participant ask for an explanation, ask: were there challenges in your experience of learning English as a second language? How did teachers and school written and unwritten policies address your use of Hebrew in mathematics classes? Was this challenge or problem significant in shaping your attitude toward mathematics or your future aspirations?]

Reflection: Thank you for this interview. I have just one more question for you. Some of the experiences that you shared with me are relevant to your experience as a newcomer to Canada. Is there anything else you would like to share about your experience of mathematics and of learning English as an additional language? Are there any experiences or concerns that we have not discussed that you would like to share?

[Note: When needed, ask questions of clarification and elaboration.]

Focus Group Discussions: In groups of up to eight members (Wibeck, Dahlgren, & Öberg, 2007), please discuss the questions that the moderator will provide and share as much detail and

elaboration as possible. The purpose of the prompts is to elicit extensive discussions on issues of mathematics education and learning English as an additional language.

Prompts

What do you know about what is framed as the math wars in the media?

How would you like your mathematics classes to look like?

If there is one thing that you like about mathematics, what would it be?

If there is one thing that you hate about mathematics, what would it be?

Ideally, what should a teacher's role be in a mathematics class?

What are your thoughts about English and learning English?

Research Design

Appendix E – Diagram of Research Design

