Understanding Insufficient Effort Responding from a Self-Determination Theory Perspective

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ABSTRACT

Insufficient effort responding (IER), whereby participants lack attention and care when completing survey research, has grown in substantive importance within the field of psychology. Research on IER reveals that it is not only prevalent among undergraduate research participants, but that normal data cleaning procedures do not capture participants who engage in IER. Identifying these participants is important however, as a high prevalence of IER has the potential to change the substantive conclusions drawn from the data. Individual differences in personality has been shown to be related to IER. However, systematically removing participants based on individual differences can reduce the representativeness of samples used in psychological research. Therefore, it is necessary for researchers to identify variables that correlate with IER, with the hopes that these variables can be manipulated through intervention strategies to reduce IER among volunteer participants. Extending previous research, this dissertation aimed to explore IER from a motivational perspective using self-determination theory (SDT) across four studies. According to SDT, motivation can be lacking altogether (amotivation), or differ in quality based on the degree to which behaviors are reflective of the self (controlled versus autonomous motivation). Using proactive (instructed-response, bogus items) and reactive (longstring index, response time) measures, Study 1 examined the prevalence of IER within an online survey administered to undergraduate participants. In addition, time of semester, gender, and global motivation were explored as potential correlates of IER. Extending the findings of Study 1, Study 2 included an assessment of Academic motivation, and Study 3 and Study 4 also included an assessment of motivation toward research participation. Furthermore, Study 3 compared the rates of IER among participants based on location (laboratory vs online) x warning message (warning vs no warning). Finally, in Study 4, the effectiveness of using an autonomy supportive intervention strategy to reduce IER was examined, by introducing the study using

non-pressuring language, providing rationale, perspective-taking, and acknowledging participants' negative feelings. Results of these studies indicated that a) IER occurs at problematic rates within the University of Ottawa sample b) IER is positively correlated with student's lack of motivation at the academic and research-specific levels, c) testing participants within a laboratory setting versus online may not be sufficient to deter IER, nor does providing a warning message, and d) framing research in a manner that supports participants' sense of autonomy may suppress the positive relationship between amotivation towards research and IER. Overall, the results of these studies support the on-going need to identify IER, and to study IER within a motivational framework in order to improve the reliability and validity of findings drawn from psychological survey research.

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CHAPTER ONE

GENERAL INTRODUCTION

Problem Statement

In survey research, it is often taken for granted that data provided by participants are of high quality – that survey items are considered with sufficient effort and that participants' responses reflect their true opinions. However, a growing body of research on insufficient effort responding (IER) has challenged this assumption (Bowling et al., 2016; Huang, Curran, Keeney, Poposki, & DeShon, 2012). IER is a type of problematic response style that is characterized by a lack of effort, or motivation, to follow survey instructions, interpret item content, or otherwise provide an accurate response to survey items. Although not commonly addressed through standard data cleaning procedures (e.g., outlier analysis, normal distribution), IER can threaten the integrity of results if left unidentified. For example, Clark, Gironda, and Young (2003) noted that IER rates as low as 10-15% can lead to misleading conclusions. The rate of IER in survey research may be particularly concerning within undergraduate research participation pools, as approximately 10-12% of undergraduate participants have previously been identified as engaging in IER (Meade & Craig, 2012).

An understanding of why students engage in research participation pools may shed light on factors that predict IER among this commonly sampled population. Undergraduate research participation pools have been implemented in many Canadian universities to facilitate research, allowing researchers access to a large pool of participants, while minimizing the costs of recruitment. On the other hand, the University setting is often a student's first encounter with research, and they may not yet understand nor appreciate the research process. Nonetheless, undergraduate students are often incentivized by participation credits that contribute to their

course grade, as well as an experiential learning experience. Students are usually afforded some agency in what type of study they participate in, as well as selecting when and where participation takes place. However, participating in departmental research participation pools are often mandatory, and therefore some students may feel coerced into participating in research studies. As an alternative to participation in research, universities often allow students to gain participation credit through other means, such as writing an essay; however, this is often seen as a negative time-consuming experience, and therefore many students choose to participate in research in lieu of this. Students who participate in research solely for the course credit, but otherwise see limited value in research, may not be motivated to complete the survey in a careful manner. Thus, students who engage in survey research mainly due to the acquisition of participation credits may display more tendencies towards IER than those who are interested in the research itself. In the present program of research, we propose to examine IER through a motivational lens to further our understanding of why IER occurs, and what can be done to reduce the likelihood of IER among undergraduate participants.

Self-determination theory (SDT; Deci & Ryan, 1985) is a theory of human motivation that can aid our understanding of IER among undergraduate participants. According to SDT, motivation differs in quality, and concerns the underlying reasons for behavior which can be separated into two forms. First, autonomous motivation refers to participating in an activity because it is inherently interesting or because it aligns with ones' values or personal goals. For example, undergraduate students may participate in a study because they enjoy doing so, they genuinely want to learn more about themselves, or because they want to become researchers. Second, controlled motivation refers to participating in an activity because they feel that they have to, or due to an external reward. In this instance, undergraduate students may feel that they

must participate in research, otherwise they are losing out on course marks. According to research based on SDT, autonomous motivation is associated with engagement in tasks (e.g., sustained attention/interest) in comparison to controlled motivation. Therefore, students who participate in research solely for external rewards may be less engaged during survey research, and more likely to engage in IER. Consequently, interventions that increase students' autonomous motivation towards research participation may help to reduce IER among undergraduate participants.

An analysis of IER within any given undergraduate research participation pool is warranted because universities may differ in how their research participation system is implemented. First, participation in research may not be mandatory for undergraduate students. Second, participation credits accrued through research may be added to a student's base grade, or as bonus points, and therefore perceived to be more or less coercive. Third, students may require a different number of participation credits, or hours of research, to complete their designated requirement, if any. Fourth, the participation pool may be introduced and advertised using different strategies. For example, some institutions may highlight being part of the research community by participating in research, while others may focus solely on the associated increase in course grade gained from participation credits. Finally, students who feel more connected to their university or department may be more willing to contribute and volunteer for research activities than those who do not feel a sense of connection to the broader university community. Given these factors, it is important to consider IER within a given psychology research participation pool.

The University of Ottawa is an institution that includes in their psychology undergraduate program access to a research participation pool, the Integrated System of Participation in

Research (ISPR). Thus far, it has not been assessed whether IER occurs within this research participation pool, and to what extent. Furthermore, limited research has focused on examining the determinants of IER. This research is important given that IER, if not identified, can substantively change the results of survey studies, which can further lead to problems with replicability. Therefore, it is important that researchers not only be able to identify IER, but also have a greater understanding of why it occurs. By understanding some of the determinants of IER, it is hoped that intervention strategies can be developed to reduce IER among undergraduate samples and facilitate engagement towards survey research in order to improve data quality.

Overall, this program of research aims to address the following questions: Does IER occur within the University of Ottawa's ISPR, and if so, to what extent? Do logistical factors (e.g., time of semester, location, warning messages) influence the prevalence of IER? Is there a relationship between IER and participants' quality of motivation, in general, towards school, or towards research? Can motivational message framing be used to support participant engagement, and reduce the prevalence of IER?

This thesis comprises six chapters. Chapter 1 presents a review of undergraduate research participation pools, IER, and the theoretical framework of interest, SDT. This chapter also outlines the goals of this thesis, the four studies conducted to address these goals, and their associated hypotheses. Chapter 2 describes the first study of this program of research. The primary goal of this study was to examine the prevalence of IER within the University of Ottawa's ISPR, as well as to examine logistical and individual factors that may contribute to IER (e.g., time-of-semester effects, gender, global motivation). Afterwards, Chapter 3 describes the second study, which examines the relationship between motivation at various levels of

specificity (i.e., global, academic, research) and IER. The third study examines whether warning participants of IER detection, or hosting the study in the lab environment or online, influences the prevalence of IER among participants and is outlined in Chapter 4. Chapter 5 outlines the final study of this program of research, and examines whether autonomy-supportive message framing at the start of the survey study can decrease IER. Finally, in Chapter 6, the findings of the four studies are summarized. Furthermore, limitations of each study are outlined, and the contribution of each study to the field is discussed. Suggestions for future research are also examined in this section, as well as a discussion on the continued use of undergraduate research participation pools.

Undergraduate Psychology Research Participation Pools

In the field of Psychology, academic researchers have a longstanding history of recruiting participants through their institution's undergraduate research participation pool (Sharpe & Poets, 2017). Within the Canadian context, Lindsay and Holden (1987) found that 36 of the 42 Canadian Psychology departments at the time had an established research participation pool. Furthermore, of the 325 American Psychology departments contacted by Sieber and Saks (1989), approximately 74% reported that they had some form of participant recruitment system in place.

The creation of research participation pools has facilitated the growth of research within the university setting as it allows researchers easy access to a consistently changing pool of participants with minimal costs. Therefore, research participation pools afford researchers the opportunity to conduct a myriad of studies with reduced concerns for independent sampling and allows researchers to recruit a large number of participants in order to account for sufficient statistical power in their analyses.

Students, on the other hand, are given an opportunity to experience research firsthand. Given that a multitude of researchers are recruiting participants at any one time, students are generally able to choose an area of research that is of personal interest to them. By participating in research, students are also exposed to different research methodologies which may help cement their knowledge of course content, particularly regarding research deign. Accordingly, the majority of students perceive participating in research as a valuable experience (Flagel, Best, & Hunter, 2007).

In exchange for participating in psychology participation pools, students are also given tangible compensation for their time. The most common incentive for student participation in research is that students gain participation credit towards their course grade. This is typically a mandatory requirement of the program, and students are often required to complete more than one study in order to receive maximum credit towards their course. In the end, participation credits are translated into a percentage of the student's final grade. In addition, students may also be offered other incentives, such as being entered into a lottery for a prize or given a monetary reward. Although these incentives are not meant to be coercive in nature, a majority of students do identify these incentives as reasons for participating in research.

In a recent examination of Canada's U15 universities, a collective of research institutions in which the University of Ottawa is a member, 12 of the 15 universities have psychology departments with an established research participation pool. Of the 12 institutions, 6 (or 50%) have a mandatory participation component, 2 (or 17%) have both a mandatory and optional component, and 4 (or 33%) have an optional component counted towards their first year undergraduate psychology coursework.

In reviewing students' experiences in participating in research in Canada, Flagel, Best, and Hunter (2007) found that of 101 students who had participated in research, the predominant reason for participating in research was because of the bonus marks associated with participation (90%). However, of those surveyed, the majority of students also indicated that they wanted to help the researcher (60%), and to a lesser extent, that they were interested in research (40%). Students also appear to gain knowledge and satisfaction from their research involvement. For example, Bowman and White (2003) recruited student participants at the end of the semester to evaluate their experiences in a) participating as a volunteer in a research study b) participating in a mass testing session, and c) writing about already published work. The results of their study suggested that students who participated as a volunteer experienced the most satisfaction from their involvement -- they understood more about psychology, had greater interest in the field, and found their experience more rewarding. In addition, it appears that students also receive educational benefit from participating in research. In one study, Elliot, Rice, Trafimow, Madson, and Hipshur (2010) compared participating in an experiment to listening to a lecture on the experiment's concept. They found that students preferred the experiential learning experience over listening to a classroom lecture. Furthermore, participating in an experiment was as effective at conveying the learning material as was attending the lecture. That is, students learned as much about the psychological concept by participating in the research study as they did in the lecture format.

Despite a preference for experiential learning, students' reactions to participating in research may change over the course of their experience within the research participation pool. Despite the benefits listed above, students may perceive diminishing returns from their participation. For example, Cromer, Reynolds, and Johnson (2013) found that participants who

participated in the University of Tulsa's research participation pool across multiple classes (i.e., they needed a greater number of participation hours to fulfill their requirement) perceived less positive experiences, and increased negative experiences than those who only participated in the pool due to one class. However, it is notable that overall, students still perceived the research experience as positive rather than negative, independent of the number of psychology classes taken by students. Further, Miles, Cromer, and Narayan (2015) surveyed university students who had completed three hours worth of research-related activities in order to evaluate their perceived costs/benefits for participating in research. Similar to previous findings, they found that students identified participating in research to be generally positive experiences that outweigh the costs. However, they also noted diminishing returns, such that the perceived benefits of research participation decreased as the number of required hours increased. Therefore, after a certain extent, students may find the need to participate in research in order to receive course credit as coercive. Indeed, students may perceive the extra points awarded for participation as coercive in nature (Miller & Kreiner, 2008). When credits for participation were removed, Sharp, Pelletier, and Levesque (2006) found that participation rates decreased. Therefore, it appears that participants are to a certain extent motivated to participate in research solely due to the existence of participation credits. However, these negative feelings may be diminished by providing a meaningful rationale for participation (Sieber, 1999).

Undergraduate samples are used in a large portion of research published in Psychology. Arnett's (2008) critique of the state of psychological research identified that even in top tiered journals, such as the Journal of Personality and Social Psychology (JPSP), undergraduate participants comprised of two-thirds of studies published in American samples, and four-fifths of samples outside of America in 2007. However, the proportion of research being conducted and

published in top-tiered journals may be changing. In a recent analysis of publications published in JPSP in 2015, out of 112 samples, only 22.3% of the samples came directly from participation pools (Sharpe and Poets, 2017). In fact, their review of samples indicated that the majority of samples (29.5%) were composed of non-students. The next major sample, comprising of 24.1%, were from the internet. Therefore, it appears that researchers publishing in top-tiered journals may be focused on using more representative samples of the population by recruiting outside of university research participation pools.

Crowdsourcing Platforms for Participant Recruitment

With increased access to the internet, researchers have turned towards crowdsourcing services as a viable alternative to traditional research participation pools. One recruitment platform that has emerged in popularity is Amazon's Mechanical Turk (MTurk), which markets itself as a "marketplace for work that requires human intelligence", promising access to a global and culturally diverse pool of participants. Similar to University-based research participation pools, services such as MTurk allow researchers to easily access a large sample of participants for relatively low-costs when compared to traditional methods of participant recruitment. Furthermore, given that crowdsourcing services recruit participants from across the internet, MTurk promises an on-demand workforce with greater demographic diversity compared to the typical composition of a university campus. For example, Buhrmester, Kwang, and Gosling (2011) found that MTurk participants are significantly more diverse than the typical American college sample in terms of demographics (e.g., age, race, location). However, because convenience sampling occurs within the MTurk system, participants recruited are still not likely to be representative of the population. To that end, Buhrmester, Kwang, and Gosling (2011) noted that although samples gathered are slightly more diverse than other Internet samples,

MTurk participants are not representative of the American population. Whereas research participation pool participants may be described as WEIRD (Western, educated, industrialized, rich, and democratic), De Soto (2016) warned that MTurk samples may be described as largely American, young, overeducated, and underemployed which may present similar biases. Furthermore, although MTurk advertises a diverse pool of participants, recent research suggests that only 7300 unique IP addresses are available to researchers at any given time (Chandler, Mueller, and Paolacci, 2014). Hence, the diversity of participants that was first promised to researchers may in fact be limited, and no more representative of the population than a University's research participation pool. Further, it does not benefit students in providing an experiential learning experience. In addition, MTurk samples may also suffer from the same shortfalls of other forms of online research. For example, Necka, Cacioppo, Norman, and Cacioppo (2016) found that participants recruited from MTurk self-reported more multitasking behaviours during their research participation in comparison to student samples and community members who complete the same study in the lab. Given these limitations, undergraduate participation pools remain a popular source of participants for University researchers.

University of Ottawa's Integrated System for Participation in Research

The University of Ottawa's School of Psychology facilitates research by connecting researchers with undergraduate students who are interested in participating in research using the Integrated System for Participation in Research (ISPR). The School of Psychology advertises the "chance to contribute directly to our growing knowledge" of psychological phenomenon and emphasizes "helping researchers to answer all sorts of important questions." The ISPR also encourages students to participate in order to help students understand the research process and to experience research first-hand. Students are introduced to the ISPR through their professors,

description of the system through their course syllabus, and a 10-minute introductory video shown in their class at the start of the semester. Students are further sent several reminder emails about the system throughout the semester. The ISPR mainly consists of students enrolled in introductory courses in psychology but is also open to other disciplines.

Participation in research studies through the ISPR is a mandatory component of several introductory courses in psychology, communications, and linguistics. In exchange, students can earn up to four percent of their course grade by receiving the equivalent number of participation credits within the system, where one research participation credit is equivalent to one hour of participation. Students who sign into the ISPR have the option of selecting a myriad of studies that either take place in the lab or online. These studies cover a variety of topics so that participants largely have the opportunity to choose a study that is personally interesting to them. However, in order to encourage students to participate in laboratory-based studies, changes in the requirements were made in 2014 to the ISPR system in which at least one of the four participation credits obtained must be completed in-person. As an alternative to participating directly in the School of Psychology's research studies, students also have the option of fulfilling their research credit by viewing films about various topics related to human behaviour and research methods, and then completing a questionnaire regarding what they viewed. Similar to participating in a research study, each hour spent watching a video and filling out the corresponding survey is worth one research participation point.

Few studies have examined internally the state of the University of Ottawa's own research participation pool. Rocchi, Beaudry, Anderson, and Pelletier (2016) invited students who had logged into the ISPR system at least once during the semester, and those who had not logged in at all, to participate in a study regarding their experience as a participant within the

pool, or alternatively why they chose not to participate. Of the 41 respondents who had not logged into the participation pool system at all that semester, the most frequently (31.7%) reported reason for nonparticipation was that they "didn't think it was worth the time or effort" (p. 291). However, they found that nonparticipants still recognized the potential for research to serve as a learning activity, as much as those who did participate. Unsurprisingly, differences in levels of protest were found between the two groups, such that nonparticipants reported higher levels of protest for participating in research compared to attending class or taking exams. Furthermore, nonparticipants reported that they expected lower levels of enjoyment from participating in research compared to those who did participate. Understanding the perspectives of nonparticipants is important, as continued nonparticipation can bias the results of studies conducted within the ISPR. Furthermore, combined with the research reviewed above, this study also highlighted the potential coercive nature of the research participation pool, given that participants are largely incentivized to participate in research to obtain participation credit.

The potential coercive nature of the psychology departments' research participation pool can be problematic as students may not be invested in providing high quality data. This is of concern given that some researchers depend heavily on their institution's research participation pools in order to support their ongoing research. Therefore, the quality of conclusions drawn from research using undergraduate research participation pools may not only be limited by participant demographics, but also because of lack of sufficient effort. Indeed, Ramsey, Thompson, McKenzie, and Rosenbaum (2016) warned that the "weakest link in psychological research may be the quality of the data provided by participants, many of whom are undergraduates "coerced" into participation as one way to satisfy class research requirements"

(p. 359). The concern over data quality due to problematic responses is not one to be taken lightly and necessitates an examination in and of itself.

Types of Problematic Responses in Survey Research

Two types of problematic responses in survey research have been identified, which fall broadly into the categories of content responsive faking and content non-responsivity (Nichols, Greene, & Schmolck, 1989). Content response faking, which includes impression management and concerns for social desirability, involves participants carefully responding in a way that they believe will make the researchers think a certain way about them. In order to do so, participants must pay close attention to item content and answer in a careful manner in order to achieve their goal of presenting themselves in a particular way, whether or not it be truthful. In contrast, content non-responsivity involves participants responding to items while ignoring the actual content of said items. Therefore, no care is taken into how the participants respond to the survey, however, this does not necessitate that the participants are responding in a truly random manner. Although content response faking and content non-responsivity have been examined together in the past, these two types of problematic responding should be considered distinct from one another. Whereas social desirability and impression management require attentiveness, content non-responsivity is defined by the lack thereof. Research conducted on content non-responsivity responding has shifted nomenclature over the years from careless or inattentive responding to random responding. However, recent works have established insufficient effort responding (IER) as the most representative term to encapsulate this phenomenon.

Insufficient Effort Responding

IER is defined as a “specific response set in which the respondent responds to survey measures with low or little motivation to comply with survey instructions, interpret item

contents, or to provide accurate responses" (Huang et al., 2012, p. 100). When participants disengage from a survey, their motivation shifts from answering the questions posed by the survey toward finishing the survey with the least amount of effort, and often time, as possible. The degree of effort participants commit to filling out a survey is likely to vary throughout the administration, with less attention paid toward the end of longer surveys (Berry et al., 1992). As effort wanes, IER may take on different forms. For example, participants may only partially read item stems, getting a general sense of the items and then haphazardly filling out a response. More extreme levels of IER may be evident when participants repeat a pattern of responses without considering the item content at all, or when they try to select responses in a way that creates an image out of their responses. Participants who engage in IER may also try to respond randomly to items. In these instances, survey items and instructions are likely to be haphazardly considered, or ignored altogether. Therefore, the definition of IER is broad, and encompasses both random and non-random responding.

How is Insufficient Effort Responding Detected?

Participants may adapt different response styles when they disengage from a questionnaire, such as invariant or random responding. Because of this, regular data cleaning procedures used by researchers may not be sufficient in identifying participants who have engaged in IER. Notably, individuals who engage in IER tend to respond around the midpoint of the scale, therefore techniques such as outlier analysis would not identify these participants as problematic, as it assumes that IER is typified by extreme responding (Curran, 2016). Therefore, a variety of methods have been developed to identify participants who have engaged in IER. These methods can be classified into proactive or reactive types. Proactive methods require the researcher to include additional items within the original survey design to detect IER. Proactive

methods of IER detection are akin to attention check measures in that they are generally used to gauge participants' attention at a moment in time based on their ability to provide an obvious correct answer. IER detection measures expand on attention check measures, however, as they also include a family of reactive methods based on archival and statistical information (DeSimone, Harms, & DeSimone, 2014). Reactive methods are used to examine evidence of IER after data collection is complete, and does not require the researcher to include additional items.

Proactive methods of IER detection. Proactive methods of IER require researchers to include items that are designed to actively identify IER. However, because these items are often direct, respondents may perceive the underlying intention of the items and consequently increase their level of awareness and effort (DeSimone, Harms, & DeSimone, 2014).

Self-report of data quality. One proactive method of detecting IER in survey data is to directly ask participants about their level of effort or attention while completing the survey. This method relies on participants to be truthful, and is vulnerable to demand characteristics (DeSimone, Harms, & DeSimone, 2014). Therefore, this method of IER detection is likely best employed when participants' responses are anonymous.

Instructed items. Instructed items ask participants to give a specific response to a survey item, such as "select Strongly Agree to this item". This method assumes that participants who read the instructed item with sufficient effort will consequently provide the associated instructed response. Therefore, participants who do not answer as specified are assumed to be engaging in IER (DeSimone, Harms, & DeSimone, 2014; Huang et al., 2012).

Bogus items. Bogus items involve content that is reflective of universal truths or falsities, such as "I was born on February 30th" (Meade & Craig, 2012). In this instance, participants responding with sufficient effort are expected to choose similarly-valanced response options (i.e.,

some level of disagreement). Therefore, participants who express some level of agreement to this universal falsity are assumed to be engaging in IER.

Reactive methods of IER detection. IER detection that involves reactive methods generally do not require additional care from the researcher when establishing the survey design. Notably, reactive methods may be considered as post-hoc methods of IER detection as they involve analyzing participants' data for trends, or lack thereof, after data is already gathered.

Semantic synonyms. The semantic synonyms method is designed to identify participants who report widely different responses on items that are determined to be semantically similar (Goldberg & Kerlikowski, 1985). Participants who answer disparate responses to two semantically similar items would be identified for IER, such as "Strongly agree" to "I am happy", but "Disagree" to "I am cheerful". In this case, the participant is assumed to not have read at least one of the items or is responding in an inconsistent way suggesting that the participant is engaging in IER.

Semantic antonyms. The semantic antonyms method is intended to identify participants who report responses that are similar on items that are determined to be semantically different (Goldberg & Kilkowski, 1985). For example, participants who answer "Agree" to "I live a healthy lifestyle", and "Strongly agree" to "I consider my lifestyle to be unhealthy" would be flagged for IER. Similar to semantic synonyms, the participant is assumed to not have read at least one of the items carefully and is not varying their responses accordingly.

Response time. The response time method of identifying IER is intended to identify participants who complete the survey in a short enough amount of time that raises concern as to whether participants had the necessary time to thoughtfully read survey instructions, items, and to provide accurate responses (Meade & Craig, 2012). Although some variability in response

times is expected among participants, given individual differences in reading and processing speed, the response time method of IER detection is concerned with identifying participants who respond too quickly to the survey instructions, items, and responses to consider them thoughtful responders.

Long-string. The long-string method of IER detection is intended to identify participants who have selected an abnormal number of consecutive identical responses (Huang, Curran, Keeney, Poposki, & DeShon, 2012; Meade & Craig, 2012). For example, participants who answer “5”s across an entire page of a survey would be identified as engaging in IER. This method assumes that it is statistically unlikely that participants endorse each item to an equal degree. Invariant responses are especially problematic when the survey in question in multidimensional or contains positively and negatively worded items. However, the number of consecutive invariant responses in a row that is needed in order to classify IER is subjective and may also depend on the number of items and response options available.

Psychometric synonyms. The psychometric synonyms method of IER detection is similar to the semantic synonyms approach in that it identifies items that are similar in nature (Johnson, 2005). However, the psychometric synonyms method uses a statistical approach to identify similar pairings rather than a priori semantic pairings that are subjectively determined by the researcher. Pairs of items with the highest positive inter-item correlation are identified. Similar to the semantic synonym technique, this method assumes that participants do not change their thoughts, attitudes, or beliefs over the course of the survey administration. Therefore, participants who are attentive are expected to respond to similar items with similar responses, and therefore have high inter-item correlations. Individuals with lower inter-item correlations on these items are therefore identified as engaging in IER.

Psychometric antonyms. The psychometric antonyms method of IER detection is similar to the semantic antonyms approach in that it identifies items that are dissimilar in nature. However, the psychometric antonyms method uses statistical methods to identify pairs of items that are disparate from one another, rather than semantically determined by the researcher. Pairs of items with the most negative inter-item correlation are identified. Again, this method assumes that participants do not change their beliefs or attitudes over the course of the survey. Therefore, participants who select similar response options to items that are opposite of each other would be identified as engaging in IER. Psychometric synonyms and antonyms approaches may best be implemented in surveys that are long in length, as it allows for sufficient statistical power.

Which Insufficient Effort Responding Detection Method Should be Used?

Previous research suggests that a multi-method approach, that includes both proactive and reactive types, are best for identifying participants who have engaged in IER. For example, Dunn, Heggestad, Shanock, and Theilgard (2016) found that different IER indices do not classify the same respondents as displaying IER. This may be due to differences in how participants respond when they disengage from a survey. For example, the long-string index may be most suitable for classifying participants who tend to engage in invariant responding when they lose focus on a survey, whereas this method would be less suitable at identifying participants who try to respond randomly. Furthermore, the optimal type of detection method examined may also depend on the nature of the survey itself. For example, the long-string index may be less suitable as a method of identifying IER when examining responses to a unidimensional scale with only positively worded items. Similarly, examining psychometric synonyms/antonyms may be less useful when examining a survey that is short in length, due to the necessary statistical power that is needed to detect a difference between IER and non-IER responders.

Limitations of Insufficient Effort Responding Detection Methods

The IER detection methods summarized above are not without their own limitations. First, there is a lack of definitive guidelines for acceptable cut-off values for the various methods (Dunn, Heggestad, Shanock, & Theilgard, 2016). This is unlikely to be agreed upon in the future as objective cut-off values would likely depend on the type of survey completed. Second, missing data influences the outcome of IER detection methods in different ways. For example, a participant who misses one response in the midst of selecting "Strongly Disagree" ten times in a row on a multidimensional scale is unlikely to be identified for IER. Third, it is difficult to determine whether those identified as insufficient effort responders should be removed from the dataset as they may represent a subset of the sample. For example, Dunn et al. (2016) found that some IER detection methods are related to personality. Therefore, by deleting these cases, researchers may exclude a specific subgroup of participants which would affect the generalizability of their findings. Finally, the prevalence of different IER indices as well as the tendency to use different cut-off values can obscure how often IER occurs.

How Often Does Insufficient Effort Responding Occur?

The prevalence of IER has been found to vary across studies. For example, Johnson (2005) found a relatively low rate of 3.5%, whereas Meade and Craig (2012) identified 10-12% of their undergraduate sample as carless using latent class analysis. In their series of studies, Maniaci and Rogge (2014) also identified approximately 3-9% of their samples as exhibiting inattention. However, Oppenheimer, Meyvis, and Davidenko's (2009) study with undergraduate participants classified as many as 35-45% of their sample as inattentive. The variability in IER rates amongst surveys is likely due to differences in how IER is operationalized and measured in each study. Furthermore, the rate of IER is likely to change depending on numerous factors,

including the length of the survey and where the survey is taken. For instance, longer surveys in low-stakes settings are likely to have a greater occurrence of IER. Further, websites like MTurk tend to collect responses that have a higher prevalence of IER in comparison to traditional paper and pencil surveys (Fleischer, Mead, & Huang, 2015). In addition, the rate of IER over the course of a survey administration is likely to change. For example, Meade and Craig (2012) found that participants tend to engage in IER more often at the end of the survey, when participants have had time to grow more tired and bored of completing the survey. In their study, Meade and Craig (2012) found that less than 5% of participants were identified as inattentive at the beginning of the survey. However, this increased to 25% toward the end of the survey.

Consequences of Insufficient Effort Responding

Since participants who engage in IER do not provide representative responses, they contribute additional statistical noise or error to the collected data. Previous research conducted on IER has identified statistical concerns that arise when IER is present. First, IER may have overall psychometric implications (Maniaci & Rogge, 2014). Specifically, random responses contribute to inflated error variance, which can then reduce internal consistency estimates, and create inaccurate factor analytic structures. For example, when comparing attentive and IER subgroups, Johnson (2005) found distinct factor analytic structures on responses. Furthermore, on scales with negatively worded items, two factors can emerge based on the negative or positive valence of items for the same scale when IER is present. This has been found to occur when as little as 10% of participants respond carelessly to reverse coded items (Schmitt & Stults, 1985; Woods, 2006). Furthermore, the presence of IER can either attenuate (McGrath, Mitchell, Kim, & Hough, 2010) or artificially inflate correlations between substantive measures (Huang et al. 2015).

Although researchers have assumed that IER is more likely to lead to Type II rather than Type I error due to increases in random error, recent research suggests that IER may also increase Type I error rates in some cases. Specifically, Huang et al. (2014) argue that IER can introduce systematic variance, thereby inflating observed relationships between substantive variables, and increasing the likelihood of Type I error, due to the tendency of IER responses to be located around the scale's midpoint.

What Predicts Insufficient Effort Responding?

Recent research, mainly in organizational psychology, has moved beyond treating IER as a methodological nuisance, but a variable worthy of examining in its own right. Although this research has been limited in scope, researchers have identified some situational and personality factors that influences the presence of IER in survey data. For example, it has been examined as to whether IER rates can be reduced if participants are warned about consequences of engaging in IER prior to a survey study. Before their survey, Huang et al. (2012) warned participants in the experimental condition that demonstration of IER could lead to a loss of participation credits, although no participants actually lost credit as a consequence of engaging in IER. In their study, participants who were warned that there were sophisticated techniques being used that could detect IER and that being identified could lead to a loss of participation credits, were less likely to engage in IER than participants who were not warned. This study was the first to explore one method of reducing IER, although this technique may have some ethical concerns. In addition, researchers have also begun to examine individual differences as a factor in predicting IER.

One individual difference factor that has been examined in relation to IER is personality. For example, Bowling et al. (2016) examined personality as a proxy for motivation to respond carefully on a survey. They argued that careful responding is motivated by a willingness to be

attentive, to conform to instructions, a desire to help the researcher, and an interest in learning about oneself, that is likely to be related to the five-factor model of personality. Given that personality is assumed to be relatively stable, IER is expected to display rank-order consistency across time and situations when compared to other individuals (Huang et al., 2015; Maniaci & Rogge, 2014). In their series of studies, Bowling et al. (2016) found that IER displayed rank-order consistency over the course of 12 months, as well as over multiple research situations. They also found that acquaintance-reported conscientiousness, agreeableness, extraversion, and emotional stability were negatively related to IER. Finally, they identified that IER was related to college grade point average and class absences. Interestingly, the authors used personality as a proxy of motivation, but did not examine motivation directly. Also, due to its stable nature, interventions designed to target personality may not be as fruitful in reducing IER in comparison to task-specific motivation.

Limitations of Research on Insufficient Effort Responding

Although there has been a recent call to treat IER as a substantive variable rather than just a methodological nuisance (Bowling et al., 2016), limited research has been conducted on this subject. First, there appears to be no agreement as to whether IER should be treated as an individual difference variable that is stable across time and situation (Bowling et al., 2016), or whether it is a transitory phenomenon whereby the same individual may have varying levels of motivation to attend carefully to the survey depending on the situation and nature of the survey (Maniaci & Rogge, 2014). It is likely that a combination of individual difference and situational factors influence the rate of IER in survey research conducted using undergraduate participation pools. For example, participants' interest in the topic area, the length of the survey, the time of day or month of semester that the survey is completed may contribute to the prevalence of IER.

Second, apart from a warning message that can be seen as controlling (i.e., threat of taking away participation points), limited research has examined how to deter IER in an undergraduate sample. Third, although IER has been defined in terms of "low or little motivation to comply with survey instructions, correctly interpret item content, and provide accurate responses" (Huang et al., 2012, p. 100), motivation has not been directly assessed as a predictor of IER.

Self-Determination Theory

According to self-determination theory (SDT), motivation concerns the underlying reasons for behaviour and how well those reasons stem from within. Therefore, motivation is not defined by its quantity, but rather by the extent to which a behavior is freely endorsed by an individual, or their level of self-determination. SDT proposes a motivational continuum that reflects the degree to which behaviors have been integrated, or their level of quality. Within this continuum, SDT distinguishes between intrinsic and extrinsic types of motivation, as well as amotivation. Intrinsic motivation concerns engaging in a behaviour for reasons inherent to itself, such as for joy and interest. On the other hand, extrinsic motivation concerns engaging in a behaviour for reasons that are external to the behaviour itself. Finally, on the opposite end of the motivational continuum from intrinsic motivation is amotivation. Amotivation consists of non-regulation, and is marked by a lack of intention to act. Amotivation is defined by an inability to perceive the reasons for why a behaviour is engaged in, and therefore represents an absence of motivation.

Extrinsic motivation can be subcategorized into four different types depending on their level of integration. The least integrated form of extrinsic motivation is external regulation. External regulation refers to behaviors that individuals perform in order to meet external demands, gain rewards, or avoid punishment. A second type of extrinsic motivation is introjected

regulation. Introjected regulation refers to when individuals engage in a behavior because they feel internal pressure to do so, such as out of a sense of guilt or obligation. This type of regulation style represents partial endorsement of the behaviour by the self, but in a manner that one experiences as controlling. The third type of extrinsic motivation is identified regulation. Identified regulation refers to when individuals engage in a behavior because it is personally important to them, and is therefore endorsed by the self. The last type of extrinsic motivation is integrated regulation, which refers to when individuals engage in a behavior because it is fully integrated into their sense of self, and is in line with other aspects of their self-identity. Integrated regulation represents the highest quality of extrinsic motivation, as the behavior is fully endorsed by the individual and is congruent with their other values.

Because extrinsic motivation can be separated into types of regulation that are more or less internally- or externally-oriented, Shahar, Henrich, Blatt, Ryan, and Little (2003) have argued that the distinction between intrinsic and extrinsic motivation may not be as important as the distinction between autonomous and controlled forms of motivation. Autonomous motivation refers to when a behaviour originates from an internal perceived locus of causality, or is governed by the self (i.e., intrinsic motivation, identified, and integrated regulation). In contrast, controlled motivation refers to when the behavior originates from an external locus of causality, or is governed by external agents (i.e., external and introjected regulation).

Motivational Consequences in Education

The distinction between autonomous and controlled forms of motivation have been shown to be important within various domains, including education. In this context, autonomous motivation refers to performing academic-related behaviors out of choice or interest, whereas controlled motivation refers to engaging in academic-related activities out of a sense of

obligation or reward. Within this domain, autonomous relative to controlled academic motivation has been shown to be related to positive outcomes including greater academic achievement in elementary school (Boggiano, Flink, Shields, Seelback, & Barrett, 1994; Grolnick & Ryan, 1987), decreased high school drop-out (Vallerand et al., 1997), lower anxiety and grade-focused performance goals in a college-level organic chemistry course (Black & Deci, 2000), less superficial information processing of information (Vansteenkiste, Simons, Lens, Sheldon et al., 2004), and greater teacher-reported ratings of students' level of effort and persistence in physical education classes (Standage, Duda, & Ntoumanis, 2013). Of importance when examining potential for IER in an undergraduate research participation pool is that autonomous academic motivation is related to student engagement.

Whereas IER refers to the lack of participants' motivation to use attentional resources to complete a survey, student engagement refers to the extent to which students are actively involved in a learning activity. According to Reeve (2013), student engagement can be subcategorized into behavioral, emotional, cognitive, and agentic types. Behavior engagement concerns student's level of concentration, attention, and effort when engaging in a learning activity, such as paying attention to survey instructions, items, and their responses. Emotional engagement concerns task-facilitating emotions while completing a learning activity, such as showing interest or curiosity in what the survey is measuring, or the absence of task-withdrawing emotions such as boredom while completing a survey. Finally, cognitive engagement refers to the use of complex rather than superficial learning strategies, and agentic engagement refers to being proactive in the learning experience rather than passively absorbing information. Of note, behavioral and emotional engagement may play a particularly important role when examining how motivation translates to attentive responding among undergraduate research participants.

Motivation and Insufficient Effort Responding

Because autonomous relative to controlled academic motivation is positively related to student engagement, in the present program of research, we expect that individuals who are behaviorally and emotionally engaged in their learning experience would also be less likely to engage in IER when completing a school-related task, such as completing a survey as part of course credit. The association between domain-specific (i.e., academic) motivation and task-specific (i.e., completing a survey for research purposes) motivation is further explained by Vallerand's (1997) hierarchical model of intrinsic and extrinsic motivation (HMIEM).

According to HMIEM, motivation can be differentiated into three levels based on their degree of generality - global, contextual, and situational. The global level of motivation refers to individual differences in how one tends to regulate and approach new behaviors in an autonomy, controlled, or amotivated orientation. Therefore, global motivation reflects one's personality and speaks to general tendencies. In contrast, the contextual level of motivation concerns individuals' orientations in a particular applied domain, such as sports or education. Finally, the situational level of motivation refers to individuals' task-specific motivation within a domain, such as an individuals' motivation toward research participation. These three levels of motivation are organized on a hierarchy, and have reciprocal influences on each other, from global to situational.

Based on the propositions set forth by HMIEM, motivation at the domain-level can influence task-specific motivation, exhibiting a top-down effect (Vallerand, 1997). That is, individuals who are autonomously motivated towards education may also pursue specific tasks related to their academics in a similar manner (Lavigne & Vallerand, 2010).

For example, students who engage in their courses out of personal choice or interest, rather than guilt or external rewards, may also be more likely to pursue other school-related tasks, such as participating in an undergraduate participation pool, because of these same reasons. Consequently, students who are autonomously motivated toward their education are expected to be more engaged in school-related tasks such as participation in research, and therefore less likely to display behaviors that suggest insufficient effort when completing a survey as part of a course credit.

The HMIEM also postulates that motivation at a lower level of generality (e.g., situational) can exert an influence on motivation at a higher level (e.g., domain), exerting a bottom-up effect (Vallerand, 1997). Accordingly, a student who frequently engages as a research participant out of genuine interest is also likely to experience higher quality motivation toward their general course work as well.

Facilitating Engagement through Autonomy Support

Social context can influence the motivation by which students engage in learning activities. Specifically, the quality of student motivation, and hence engagement, can be facilitated through the provision of need supportive behaviors, namely autonomy, competence, and relatedness support (Niemiec & Ryan, 2009). According to SDT, the integration of behaviors requires the satisfaction of the three basic psychological needs, autonomy, competence, and relatedness (Deci & Ryan, 2002). The need for autonomy represents the need for individuals to act out of their own volition. The need for competence represents the need to feel effective and optimally challenged in one's environment. Finally, the need for relatedness represents the need to feel connected and have meaningful relationships with others.

The satisfaction of the three needs provides the necessary foundation for optimal growth and well-being. Autonomy, competence, and relatedness support reflects the degree to which individuals in our environment support our needs and aid in the integration process. The goal of autonomy support is to promote a sense of ownership over one's behavior and to develop a personal sense of agency, whereas competence support aims to promote a sense of self-efficacy and to expand one's capabilities through optimal challenges. Finally, relatedness support aims to provide a sense of belonging and integration into one's social group.

In relation to the behavior of IER among volunteer undergraduate participants, autonomy support may be the most relevant type of support in the University environment. Competence support may only have limited application in regard to IER, as the act of reading and responding to items is a relatively easy, rather than difficult behavior. Most participants would already feel capable of this task, as students are not typically, or explicitly, measured on their performance. Furthermore, participants are reminded as part of the consent process, that there are no right or wrong answers. Therefore, because completing a research survey does not assess one's capabilities given the lack of difficulty at the task at hand, competence support is likely unnecessary in the context of IER. Relatedness support may also have limited application in regard to IER, as participants often have limited interaction with research assistants, or none at all, when the research is conducted online. In order to build a meaningful connection with others, there needs to be a greater depth of interaction between participants and research assistants over time than that afforded by survey administration. Therefore, because the interaction between research assistant and participant is transactional in nature at best, relatedness support in the context of IER is likely to play a minimal role, especially when the administration of the survey is conducted online.

Autonomy supportive behaviours is an interaction style in which personal autonomy can be supported by taking another's perspective, providing relevant choices, supporting and nurturing interests, providing optimal challenges, and highlighting congruence between an individual and their goals. Autonomy supportive behaviours have been shown to lead to a range of positive outcomes such as increased classroom engagement, and greater conceptual learning. Autonomy support can also be manipulated by the way in which instructions are given. For example, using an autonomy supportive communication style can increase conceptual learning through its influence on relative autonomous motivation. Previous research suggests that students who are taught by an autonomy supportive teacher have greater persistence while learning (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004) which may especially be prudent when determining whether student participants engage in survey research in an effortful manner. Therefore, introducing a survey in a manner that promotes autonomy support may increase students' motivation for the task at hand, and therefore decrease the prevalence of IER when compared to a motivationally neutral introduction.

Goals of the Thesis

The primary goal of this thesis will be to examine the prevalence and predictors of IER within survey research among undergraduate participants recruited through the University of Ottawa's ISPR. Furthermore, this thesis will explore a potential intervention strategy grounded in SDT that may be used to prevent IER among undergraduate participants. These goals will be examined through a series of four studies.

In the first study, we examine the prevalence of IER using pre-screen data that was collected from undergraduate students recruited through the ISPR. The pre-screen at the time the data was collected was mandatory and was collected during the early years of the ISPR. The

mandatory nature of the pre-screen allows for an examination of data with limited self-selection bias. We also examine whether logistical characteristics, such as time of semester, is related to the presence of IER. In addition, other individual characteristics are examined, such as gender and global motivation. Finally, it is examined whether individuals who are identified as IER responders during the pre-screen, are just as likely to fulfill their research participation credits than those who are not identified as IER responders. This will help inform whether participants who lack effort when completing survey research are likely to self-select out of research participation, or if they remain a cause for concern in future research. It is hypothesized that students who wait until later in the semester to complete the mandatory pre-screen questionnaire are more likely to engage in IER. Furthermore, it is hypothesized that students who are identified as IER responders are just as likely to participate in future research studies compared to those who are not identified as IER responders. Based on previous research, it is also hypothesized that male participants are more likely to be identified as insufficient effort responders than female participants.

In the second study, we examine antecedents of IER within the ISPR in terms of motivational quality at different levels of generality according to the HMIEM (Vallerand, 1997). Specifically, we examine motivation at two levels, global and academic motivation, and determine their relationship with IER. We also examined if participants are likely to self-report IER at the end of the study if they are reminded that their responses are anonymous, and that there are no repercussions. Overall, it was hypothesized that amotivation and controlled motivation at the global and academic levels would have a positive relationship with IER. In contrast, autonomous motivation at both levels was expected to have a negative relationship with

IER. Finally, given the anonymous nature of the survey, it was expected that participants self-report measure of IER would be related to their actual behavior.

In the third study, we examine whether the prevalence of IER changes depending on where participants complete the survey study. Specifically, this study compared the rate of IER between participants who complete the survey in a laboratory setting, or if they complete it at a location of their choosing. Furthermore, we examined if a warning message will deter participants from IER. It was expected that participants in the laboratory would engage in less IER than those who completed the study online. Furthermore, it was hypothesized that students who receive a warning message prior to completing the study would engage in less IER. Study 3 also included the third level of motivation – situational motivation, to examine the complete hierarchy. Like global and domain-specific motivation, situational amotivation and controlled motivation was expected to be positively related to IER, whereas situational autonomous motivation was expected to be negatively related to IER.

In the fourth study, we examine if introducing the study in an autonomy supportive (i.e., by providing a sense of agency, and rationale, while recognizing negative emotions) manner would reduce the prevalence of IER when compared to a neutrally worded introduction. Specifically, this study examined if autonomy supportive framing was enough to increase participants' motivation towards research, and in turn, decrease the likelihood of IER responding as expected.

Anticipated Contributions

The program of research described in this thesis is expected to contribute to the existing literature in multiple ways, as well as have important practical insights into the quality of survey

research conducted within the ISPR. First, an estimate of IER among undergraduate participants volunteering for survey research through the ISPR needs to be established in order to determine if levels are high enough to warrant a further examination of this phenomenon. Second, if problematic levels do exist, an examination of predictors of IER is needed given the paucity of research into this methodological problem thus far. By examining non-individual difference variables as predictors, such as motivation, strategies can be developed to prevent the occurrence of IER in the future. Furthermore, this dissertation also examines if changes in methodology can prevent IER. Specifically, this program of research examines whether a change in location (i.e., in the lab versus online) and/or providing a warning message (i.e., warning versus no warning) is enough to deter IER among undergraduate students, or if a motivational strategy should be implemented, such as using autonomy supportive message framing to introduce the study.

At the practical level, this program of research will examine the prevalence of IER within the University of Ottawa's ISPR. From this, we can determine if greater attention is needed in survey design to ensure that IER can be captured using proactive and reactive measures, given that IER is not commonly captured using normal data cleaning procedures. An overall awareness of IER as an issue of motivational quality can also spur researchers to adapt methodologies that increase the chances that participants are engaged and provide high quality data throughout the survey administration to support the reliability and validity of the conclusions drawn from survey research.

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CHAPTER TWO

STUDY ONE

Undergraduate research participation pools are pivotal to aiding academics conduct research by providing a platform for recruiting participants, while simultaneously promoting an experiential learning experience. The University of Ottawa's Integrated System of Participation in Research (ISPR), within the School of Psychology, was developed between 2003 and 2006. Since it's creation, the ISPR has proven to fulfill its mandate of facilitating research within the department and providing an experiential learning experience to undergraduate students. By 2013, the ISPR had facilitated over 60,000 hours of undergraduate research participation among nearly 30,000 students (Anderson, 2013). Among these hours, online studies, which typically rely on survey methodology, made up most of the research being conducted. For example, in 2012, online studies made up approximately 8,000 of the points granted, whereas laboratory studies only made up approximately 1,500 points (Anderson, 2013). Given that most of the research being conducted within the system involves survey research, the ISPR appears to be an important platform to examine the prevalence of IER.

The ISPR typically functions corresponding to the length of the fall, winter, and spring semesters each academic year. Specifically, study recruitment begins following the first week of the semester, to the last day of classes. Therefore, students are allowed to not only self-select the study they participate in, but also choose when they participate. For example, some students may prefer to fulfill their research requirements earlier in the semester, while others may wait until the end of the semester when the ISPR closes. Previous research suggests that there may be some individual differences in participants based on when they sign up for studies within the semester. These differences may also have the potential to lead to discrepancies in data quality.

Students who engage in research late in the semester may be more likely to feel forced to participate due to external factors. For example, Bender (2007) found that participants recruited late in the semester were more grade-oriented and had lower academic performance. In addition, previous research suggests that participants who are recruited at the end of the semester also report having less positive attitudes toward research (Adair & Fenton, 1971). Consequently, the month in which participants complete their research activities may reflect how much they intrinsically value research, rather than being solely focused on the acquisition of participation credit to fulfill course requirements. Individual differences in personality may also influence when students participate in studies. For example, some evidence suggests that conscientious students are more likely to participate earlier in the semester (Witt, Donnellan, & Orlando, 2011).

Previous research also suggests some gender differences in time of participation. For example, female students tend to participate in research earlier in the semester (Aviv, Zelenski, Rallo, & Larsen, 2002; Zelenski, Rusting, & Larsen, 2003), even after controlling for personality (Witt, Donnellan, Orlando, 2011). Furthermore, female students tend to hold more positive perceptions of Psychology (Bowman & Waite, 2003).

A time of participation effect, in which participants who volunteer at different points of the semester vary in their motivational or cognitive characteristics, may be problematic. Hom (1987) found that the effect of extrinsic reward on intrinsic motivation can only be supported in early-term participants, but not with those who participate late in the semester. Time of participation effects may also influence the level of energy participants are willing to put into an experimental task. For example, Casa de Calvo and Reich (2007) found that participants who signed up late in the semester spent less time completing a difficult anagram task than those who

signed up early in the academic semester. Therefore, time of participation may represent not only differences in personality, but also in task performance, and how much effort participants are willing to expend on a research related task.

Motivation also appears to play a role in the differences found in time of semester effects. In a comparison between course credit participants and paid participants, Nicholls, Loveless, Thomas, Loetscher, and Churches (2015) found that although there were no differences in sustained attention between these two groups early in the semester, course credit participants performed worse late in the semester. Furthermore, they found that the course credit participants displayed less intrinsic motivation with time. Therefore, it was found that early in the semester participants showed greater sustained attention and intrinsic motivation in comparison to those who waited until the end of semester to participate. Such differences in energy, commitment, and intrinsic motivation may influence the quality of data given over the course of the semester.

However, research on individual differences in personality and task performance has not been fully supported. For example, Robinson and Unsworth (2016) conducted a series of four experiments in which they found no significant differences in cognitive abilities (ex., working memory, attentional control), task motivation, or the Big Five personality traits when comparing participants early in the semester to those who participated later in the semester. Similarly, Chan, Rajsic, and Pratt (2017) found no significant differences in performance between students who participated early versus late in the semester on various visual cognitive measures (e.g., rapid serial visual presentation task, flanker task).

Although it may be commonly assumed that students who participate earlier in the semester are both more motivated and conscientious, past research on this topic appears to be equivocal. Therefore, a closer examination of these effects is warranted. Furthermore, an

examination of the prevalence of IER within the ISPR system is crucial to examining the quality of data collected within the system, given that the majority of research conducted within the ISPR is survey-based.

In this study, global motivation from a self-determination theory (SDT) perspective will be examined. Global motivation reflects the broadest level of Vallerand's Hierarchical Model of Intrinsic and Extrinsic Motivation (HMIEM; 1997) or individual differences in motivation. Specifically, global motivation refers to the reasons why individuals tend to do things in their lives in general, whether it be for reasons coming from within, or because of external sources.

In addition to examining time of semester effects, as well as possible gender and motivational differences, this study aimed to identify whether students who engage in IER still go on to complete their required research participation credits. This question is important to address as it would help researchers using the ISPR identify if they need to be concerned about the levels of IER occurring within the ISPR in general, or if it is of minimal concern in the event that participants who decide that research is not worth their energy also tend not to complete their required hours of research participation.

Purpose

The overall purpose of this study was to examine the prevalence of IER within the ISPR, and whether time of semester, gender, or global motivational resources were related to IER. Furthermore, this study also examined if there was a relationship between IER and the number of participation credits granted at the end of the semester as a proxy for whether or not those who engage in IER drop out of the research process.

Hypotheses

Hypothesis 1: Male participants will engage in more IER than female participants.

Hypothesis 2: Male participants will tend to complete the study later in the semester than female participants.

Hypothesis 3: The prevalence of IER is greater late in the semester compared to early in the semester.

Hypothesis 4: Global amotivation and controlled motivation will be positively associated with IER, while global autonomous motivation will be negatively related to IER.

Hypothesis 5: All 3 variables (i.e., time of semester, gender, and motivation) will be positively correlated with IER after controlling for the effects of each other.

Hypothesis 6: There will be a negative association between IER and the number of participation points granted at the end of the semester.

Method

Participants and Procedure

1,784 undergraduate students (n_{females} = 1284, n_{males} = 500) enrolled in introductory psychology courses at the University of Ottawa participated in this study in exchange for participation credit. Participants were aged between 16 and 57, with an average age of 19.59 years (*SD* = 4.18). The majority, or 65% (n = 1,163) of participants recruited in this study were Caucasian. Of participants who reported their student status, 94% (*n* = 1,675) indicated that they were full-time status and 71% (*n* = 1,272) indicated that they were in their first year of their undergraduate program. Participants were recruited during the Fall semester of 2010 through the ISPR as part of the mandatory pre-screen questionnaire. The pre-screen questionnaire consisted of a battery of approximately 200 questions, assessing a variety of topics including demographic information and personal history. In addition, researchers at the time of the pre-screen were able to include questions related to their research to serve as inclusion and exclusion criteria for

recruitment purposes. In this iteration of the pre-screen questionnaire, participants were asked about their life satisfaction, beliefs and motivation towards the environment, positive and negative affect, attitudes towards school, as well as general background information (e.g., age, gender, family demographics). On average, participants took 39.85 (*SD* = 16.71) minutes to complete the survey.

Participants completed the ISPR pre-screen online, and at a time of their choosing between September and December of 2010. The data collected from this pre-screen were further augmented by administrative information at the end of the semester. Specifically, the number of participation credits students received over the course of the semester was included in the final data set.

Measures

Substantive measures. Although a variety of measures were included in the pre-screen questionnaire, only one measure was of relevance to this study. Specifically, the Global Motivation Scale (GMS; Pelletier & Dion, 2007; Pelletier, Dion, Slovinec-D'Angelo, & Reid, 2004) was used to assess participants' general disposition to regulate their behaviours in certain ways. Specifically, the 18 items of this scale represent the six types of behavioural regulation proposed by SDT, ranging from amotivation to intrinsic motivation. The GMS asks participants to identify the degree to which they generally do things in their life because of amotivation (e.g., "even though I do not have a good reason for doing them"), external (e.g., "in order to show others what I am capable of"), introjected (e.g., "because otherwise I would feel guilty for not doing them"), identified (e.g., "in order to help myself become the person I aim to be"), integrated (e.g., "because they reflect what I value the most in life"), and intrinsic (e.g., "for the pleasure of acquiring new knowledge") reasons. Three composite scores were calculated using this scale to represent amotivation, controlled, and autonomous motivation. Descriptive statistics and intercorrelations between

regulation subtypes are shown in Table 2.1. Amotivation was calculated by averaging the three items in the amotivation subscale (α = .75). The composite score for controlled motivation was calculated by averaging the six items of the external and introjected subscales (α = .71). Finally, the composite score for autonomous motivation was formed by averaging the six items of the identified and intrinsic subscales (α = .69).

IER indices. A variety of indices were used to detect IER within the survey to capture different ways of engaging in IER. Specifically, three approaches to calculating IER indices were used: response time approach, inconsistency approach, and response pattern approach. Furthermore, an overall IER index was computed by counting the number of IER violations committed according to the defined criteria below. Where multiple violations could occur within a single category (such as the response pattern approach), only a maximum of one violation was counted. Therefore, the overall IER index used in this study ranged between zero to four violations.

Response time approach. The response time approach assumes that in order to cognitively process information and provide an appropriate response, a minimum amount of time is required to elapse (Huang et al., 2012). Therefore, participants that respond too quickly are likely engaging in IER. In the current study, participants who completed the questionnaire faster than the allocated 2 seconds per item, as recorded by the external survey system, were coded as 1, or having engaged in IER.

Inconsistency approach. The inconsistency approach assumes that participants who are engaged in the survey throughout the administration will respond consistently to similar items (Goldberg & Kilkowski, 1985). Furthermore, it is assumed that participants will respond inconsistently to dissimilar items. In this study, semantic synonyms and antonyms were used as indicators of IER. Specifically, pairs of semantic synonyms were identified among the items (e.g.,

"I don't feel that I have the competence to do these things for the environment" and "I don't have what it takes to do these things") and it was determined if responses were similar within the pair. If responses were similar (within +/- 1 response option), then the participant was coded as 0, or as attentive in this area. However, if responses were dissimilar (beyond +/-1), the participant was coded as 1, and as having engaged in IER. Similarly, for semantic antonyms, items that were dissimilar were identified and paired (e.g., "I look forward to going to school" and "I wish I didn't have to go to school"). If responses to the two items were similar (within +/- 1 response option) then the participant was coded as 1, and as having engaged in IER. However, if the responses were dissimilar (beyond +/-1), the participant was coded as 0, or as attentive in this area.

Response pattern approach. The response pattern approach identifies IER by examining the pattern of responses entered by the participant. For example, on a multi-dimensional scale, it is unlikely that a participant who is paying attention will enter the same response option for each of the administered items. For this study, the long string index was used to identify IER. The long string index was coded as 0 for a responder who was attentive in this area, and as 1 if the responder was coded as having engaged in IER. The long string approach currently has no established global cut off score for identifying problematic responders given the scale specific nature of technique (Curran, 2016). That is, depending on the nature and valence of the items, respondents may be more or less likely to respond to items in a similar manner, even when carefully attending to survey items and their responses.

Initially, Costa & McCrae (2008) suggested that respondents should be identified as engaging in IER if they give 6 to 14 invariant responses in a row, depending on the response option. However, in a study conducted by Curran (2016), he proposed identifying respondents as engaging in IER if they responded to over half the length of the scale with the same response option.

Furthermore, he noted that this cut off could be too lenient on scales with item variation, such as in multidimensional scales. Due the to the multi-dimensional nature of the survey items, and the inclusion of positively and negatively valence items, a more conservative approach was taken for the purposes of this dissertation. The long string index was considered to have been violated if the participant selected the same response five times in succession on any of the included multidimensional scales.

Participation credit. In addition to data gathered from the pre-screen survey, participants' total number of participation credits earned at the end of the semester was also examined. The required number of participation credits needed to obtain full credit during the semester was four, with the pre-screen questionnaire contributing one point towards the final total. Therefore, participants who received full credit would have needed to participate in a total of three additional credits or hours of participation.

Results

An index score for IER was computed by summing the number of identified violations using the reactive measures discussed above. Table 2.2 shows a frequency distribution of IER violations that were identified among participants, which ranged between 0 and 4 in this study. In addition, the frequency of participation by month is shown in Table 2.3, and descriptive statistics and correlations for global motivation subtypes and IER are displayed in Table 2.4.

Time of Semester

A one-way ANOVA was conducted to determine if IER was different depending on the time of semester (see Figure 2.1). Participants completed the survey in either September (n = 942), October (n = 318), November (n = 361), or December (n = 167). The prevalence of IER was statistically significant depending on the month of participation, $F(3, 1784) = 10.20$, p <

.001, $\omega^2 = .02$. Post hoc analysis was conducted using Hochberg GT2 because the sample sizes were unequal. This analysis revealed that there was statistically significant increase in IER in November (.23, 95% CI [.11, .34]) compared to September ($p < .001$). Furthermore, the increase in IER in December (.19, 95% CI [.03, .35]) from September was statistically significant as well ($p = .011$). No other group differences were statistically significant. Results of these analyses indicated that there was a small effect of time of semester on the prevalence of IER (Kirk, 1996).

Time of Semester and Gender

A chi-square test of independence was conducted between gender and month of participation (see Figure 2.2). There was a statistically significant association between gender and month of participation, $\chi^2 (3) = 26.15$, $p < .001$. The relationship between gender and month of participation was small (Cohen, 1988), *Cramer's V* = .12. An examination of the standardized residuals indicated that more female participants participated in the study during September than expected compared to males. Furthermore, more male participants completed the study in November and December than expected compared to female participants.

Time of Semester and Global Motivation

A series of one-way ANVOAs were conducted to determine if the quality of global motivation changed depending on the time of semester. Overall, the results of these analyses indicated that there were no changes in the quality of global motivation across the fall semester for amotivation, *Welch's* $F(3, 534.09) = 0.71$, $p = .550$, controlled motivation, $F(3, 1777) = .48$, $p = .694$, or autonomous motivation, $F(3, 1778) = .77$, $p = .510$.

Gender

An independent t-test was conducted to determine if IER differs on gender. Results of this analysis indicated that male participants ($M = 2.29$, $SD = 0.70$) engaged in more IER than

female participants (*M* = 2.17, *SD* = 0.73), *t*(1782) = 3.31, *p* = .001. The effect size of gender on IER was small, Cohen's d = 0.17.

Gender and Global Motivation

A series of independent t-tests were conducted to examine if participants differed on their reported levels of global amotivation, controlled, and autonomous motivation based on gender. Results of these analyses indicated statistically significant gender differences in amotivation, such that males (*M* = 3.01, *SD* = 1.20) reported greater global amotivation than females (*M* = 2.87, *SD* = 1.17), *t*(1775) = 2.33, *p* = .020, *d* = .13. However, there were no statistically significant differences between males (*M* = 4.03, *SD* = 1.06) and females (*M* = 4.14, *SD* = 1.04) in global controlled motivation, *t*(1777) = 1.88, *p* = .060, nor were there any differences between males (*M* = 4.84, *SD* = 0.85) and females (*M* = 4.87, *SD* = 0.83) in global autonomous motivation, *t*(1778) = 0.70, *p* = .483.

Gender, Global Motivation, and Time of Semester

A multiple regression analysis was conducted to predict IER based on gender, month of participation, global amotivation, global autonomous, and global controlled motivation. The multiple regression model was found to be statistically significant, $F(7, 1769) = 7.61$, $p < .001$, adj. $R^2 = .03$. Gender, month of participation, global amotivation, and global autonomous motivation contributed to the model. Regression coefficients and standard errors can be found in Table 2.5.

In order to examine potential interactive effects between gender, quality of motivation, and month of participation, a series of moderation analyses were conducted using the PROCESS v3 (model 1) macro in SPSS (Hayes, 2017). Results of these analyses indicated that the overall interaction effects between gender and the different types of motivation, gender and month of

participation, and month of participation and different types of motivation were statistically insignificant ($p > .05$).

Finally, in order to examine the association between IER and number of participation credits awarded at the end of semester, a Pearson correlation was conducted. These results indicated no relationship between IER and the number of participation credits awarded at the end of the semester, $r = .02$, $p = .401$

Discussion

The primary goals of this study were to examine the prevalence of IER within the ISPR, and determine its association with time of semester, gender, and global amotivation, controlled and autonomous motivation. Finally, this study aimed to determine if those who engage in IER are just as likely to complete their assigned four hours of research participation than those who do not engage in IER.

The identification of IER within survey research appears to be relevant within the University of Ottawa's ISPR. In this study, less than 1% of the sample was identified as having made no violations. 14.24% made one violation, 50.03% made two violations, 33.60% made three violations, and 1.35% made four violations. Furthermore, the results of this study suggest that IER is more likely to occur in the last two months (i.e., November and December) of the Fall semester than in September. The current study also supported evidence that female participants are less likely to engage in IER than male participants and tend to participate earlier in the semester. With regards to motivation, male participants appear to report higher levels of global amotivation compared to female participants, however, no other gender differences in motivation were noted in this sample. When accounting for each other, gender, month of participation, global amotivation, and global autonomous motivation were found to be related to IER. Global

amotivation held a positive relationship with IER when taking into account all other variables, and global autonomous motivation held a negative relationship. However, the relationship between global motivation and IER was weak which was possibly due to the level of generality of the motivation measure.

The results of this study indicated that researchers using the ISPR to conduct online survey research should be wary of the occurrence of IER. Although the IER indices used in this study were limited to the response time, inconsistency, and response pattern approach, up to 34.95% of the sample were identified as possible IER responders (three to four violations). Given that Clark, Gironda, and Young (2003) identified that up to 10% of the data as IER can be problematic, further research is needed in this area.

Of importance, the results of this study suggest that there is a time of semester effect. This time of semester effect supports not only common assumptions, but also previous research suggesting that participants who complete their participation credits earlier in the semester are more likely to be engaged in the study process compared to students who wait until the end of the semester to fulfill their credits (Casa de Calvo & Reich, 2007; Witt, Donnellan, & Orlando, 2011). Furthermore, differences in data quality throughout the semester may warrant a further examination into when an intervention may be needed. For example, if future research supports that IER is found to be less prevalent in surveys conducted in a lab setting, than researchers could consider administering surveys in the lab to counteract time of semester effects with the aim of increasing data quality. Future research would be needed to determine if this is an effective strategy for researchers to reduce the occurrence of IER among survey responders.

This study supported previous research suggesting that there are gender differences in IER. Specifically, male participants appear more likely to engage in IER than female

participants. However, it is notable that the sample in the study was disproportionately female. This is not uncommon in psychological research as the majority of students majoring in psychology are female. A further analysis of results indicated that gender is related to time of participation. That is, male participants were disproportionately more likely to wait until the end of the semester to complete the study. Future research is needed to examine why male students may be less engaged in research, and if IER is particularly likely to occur in online surveys.

Finally, results of this study indicated a nuanced relationship between IER and global self-determination. Specifically, participants who have the general tendency to regulate their behaviours out of their own volition, rather than external factors, were less likely to engage in insufficient effort responding. In addition, global amotivation was positively related to IER. These results are consistent to what would be expected according to SDT and previous research on self-determination and behavioural engagement in the educational setting (Reeve, 2012). These findings also provide a unique contribution to research examining IER, as limited research has examined what individual differences influence the likelihood of IER apart from personality. However, motivation at the global level may not be the most relevant level to examine, given its level of generality. Similar to personality, interventions designed to influence global motivation in order to reduce IER may not be feasible given that it is a stable construct. Therefore, research is needed to examine a more nuanced level of motivation, such as academic motivation, to determine if future interventions based on motivation are plausible.

Despite its novel contributions, this study is not without limitations. First, although this is typical of sample distributions in Psychology, the number of females to males participants were unequal. Future studies examining gender differences in IER will do well to recruit a comparable number of both genders. Second, this study was only available to participants online. Therefore,

the rates of IER may be different in another setting, such as in the laboratory. Finally, no proactive IER indices were used in this study. Therefore, all IER measures were implicit in their assumption that the participant was not providing sufficient effort. Future research would benefit from the use of proactive methods, such as bogus items, to more definitively classify individuals as insufficient effort responders.

Overall, the results of this study suggest that IER occurs within the ISPR system when examining online survey research. In addition, time of semester, gender, and global motivation appear to be related to IER. Further research is needed to determine if IER can be reduced, without alienating participants based on their gender or motivational profile. Although IER occurred in this study, there were no differences between attentive and insufficient effort responders in terms of how many credits they completed in the semester. This is important to consider, as it appears that insufficient effort responders do not self-select themselves out of the research process. It would therefore be prudent for researchers to take this into consideration when designing their survey, and when cleaning data to ensure that those who provide insufficient effort are identified.

To further our understanding of IER, and to increase the robustness of how IER is measured, Study 2 was conducted to address some of the limitations in this current study by expanding substantive measures to include a measure of academic motivation and using proactive measures of IER.

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Table 2.1

Study 1: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Global Motivation

Measure	Mean	SD	1	2	3	4	5
1. Global Amotivation	2.91	1.18	-				
2. Global External Regulation	4.33	1.17	.23**	-			
3. Global Introjected Regulation	3.88	1.35	.31**	.39**	-		
4. Global Identified Regulation	5.28	.95	-.10**	.32**	.14**	-	
5. Global Intrinsic Motivation	4.79	1.00	.11**	.24**	.15**	.42**	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 2.2

Study 1: Frequency Distribution of Insufficient Effort Responding

	N	Percentage of Sample
0 Violations	14	0.79%
1 Violation	253	14.24%
2 Violations	889	50.03%
3 Violations	597	33.60%
4 Violations	24	1.35%

Table 2.3

Study 1: Frequency Distribution of Participation by Month in Fall Semester

	N	Percentage of Sample
September	942	52.70%
October	318	17.80%
November	361	20.20%
December	167	9.30%

Table 2.4

Study 1: Spearman's Rho Correlations between Global Motivation Subtypes and Insufficient Effort Responding

Measure	Mean	SD	1	2	3
1. Global Amotivation	2.91	1.18	-		
2. Global Controlled	4.10	1.05	.32**	-	
3. Global Autonomous	4.87	0.83	-0.04	.26**	-
4. IER	2.20	0.72	.08**	.01	-.04*

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 2.5

Study 1: Summary of Multiple Regression Analysis with Gender, Month of Participation and Global Motivation Predicting Insufficient Effort Responding

Variable	*B*	*SE B*	β
Constant	2.16	0.11	
Gender	0.10	0.04	.06*
September vs. October	0.11	0.05	.06*
September vs November	0.20	0.05	.11**
September vs December	0.17	0.06	.07**
Global Amotivation	0.05	0.02	.08**
Global Controlled	0.01	0.02	.01
Global Autonomous	-0.04	0.02	-.05*

Note. * $p < .05$; ** $p < .01$.

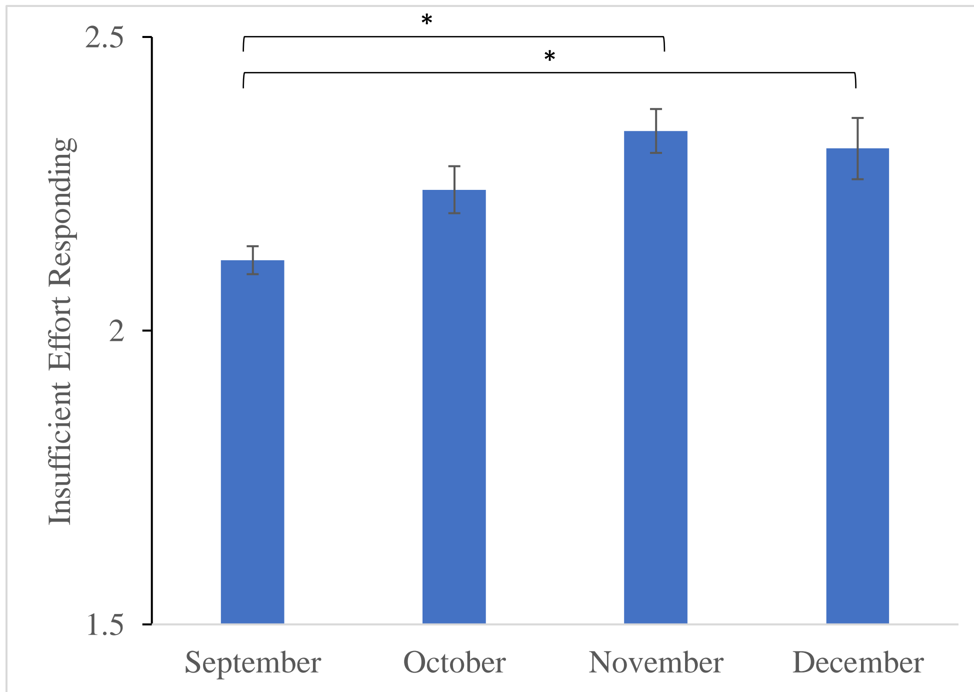

Figure 2.1. Study 1: Mean IER scores by month of participation. Greater IER was prevalent during the months of November and December compared to September. Standard errors are represented in the figure by the error bars attached to each column.

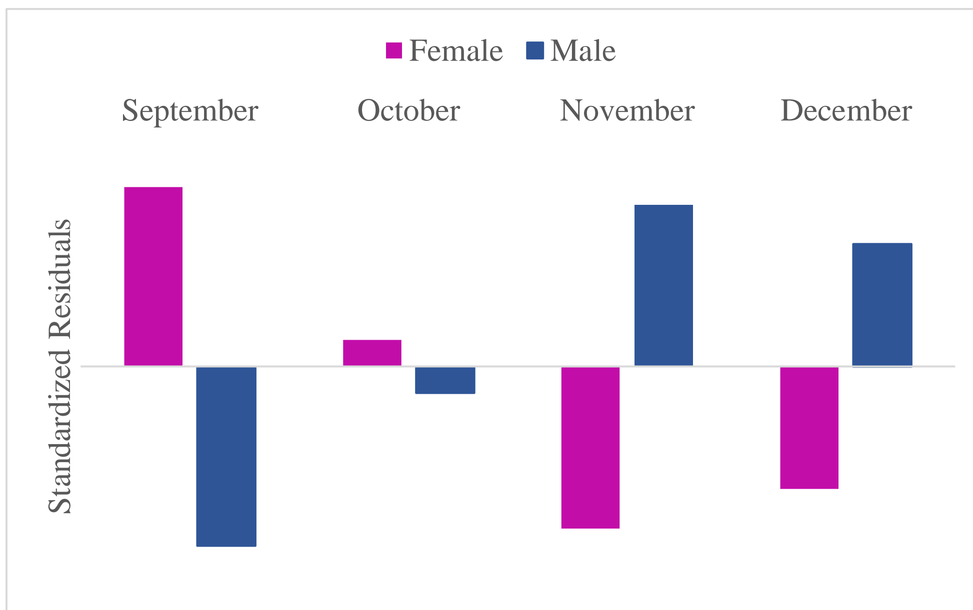

Figure 2.2. Study 1: Standardized residuals of chi-square analysis examining the association between month of participation and gender.

CHAPTER THREE

STUDY TWO

Motivation may be best examined from a nuanced perspective where the reasons underlying a behavior is considered from different levels of generality. Results from Study 1 suggested that students' global amotivation and global autonomous motivation is associated with insufficient effort responding (IER). However, given that global motivation describes a dispositional tendency to engage in behaviours because of certain reasons, it may have limited capacity as an intervening variable. That is, global motivation is assumed to display consistency across time and situations, like that of personality.

Indeed, personality correlates have also been observed with IER among undergraduate students. Bowling and colleagues (2016) found that acquaintance-reported measures of personality were correlated with IER. Specifically, they found that conscientiousness, agreeableness, extraversion, and emotional stability were negatively related to IER in an online study amongst undergraduate students recruited through a departmental participation pool.

Taken together, these results suggest that individual differences, such as global motivation and personality, may partially underlie IER among undergraduate participants. Although researchers may be tempted to exclude participants from their studies based on these characteristics, they should be wary in doing so as it will limit the representativeness of their sample to the general population.

Given these limitations, it would be prudent for researchers conducting studies using an undergraduate participation pool to examine other factors that may relate to the prevalence of IER. Since global motivation was found to be a statistically significant correlate of IER, one such variable may be academic motivation.

According to the hierarchical model of intrinsic and extrinsic motivation (HMIEM, Vallerand, 1997), motivation can be divided into three levels of generality – global, contextual, and situational. The global level is the most general and represents the general disposition to regulate one's behaviour in certain ways (i.e., global motivation). Contextual motivation refers to domain specific levels of motivation, such as motivation towards education (e.g., academic motivation). Finally, situational motivation refers to motivation at the current moment, or state level. Therefore, within the context of examining IER present among students participating in departmental research, academic motivation, at the domain level, represents the next level of specificity after global motivation.

As in global motivation, academic motivation can also be divided into different regulations, according to SDT. Intrinsic motivation, the most self-determined form of motivation, refers to engaging in a behaviour for its own sake. Uniquely within academic motivation, intrinsic motivation has been proposed to be divided into three types – to know, to accomplish things, and to experience stimulation (Vallerand et al., 1992). Intrinsic motivation to know refers to the inherent satisfaction one experiences from learning and exploring new things. Intrinsic motivation to accomplish things refers to the inherent satisfaction one experiences trying to accomplish or create something. Finally, intrinsic motivation to experience stimulation refers to the inherent pleasure that one feels when engaging in a behaviour, whether sensory pleasure, or fun and excitement. Therefore, a student may read a manual, because of the joy it brings them to learn something new (i.e., to know). They may further use this information to try and build something for pleasure (i.e., to accomplish), and experience a sense of flow while accomplishing this task (i.e., to experience stimulation).

Unlike intrinsic motivation, extrinsic motivation refers to engaging in a behaviour because of something external to the behaviour itself. According to SDT, the three different subtypes within extrinsic motivation can be ordered depending on their level of self-determination. From most self-determined to least, they are identified regulation, introjected regulation, and external regulation. Identified regulation refers to when someone does something because it is personally important to them. For example, a student may study for an exam because it is personally important for them to do well. Introjected regulation refers to when someone engages in a behaviour because they would feel guilty or ashamed if they did not. In this instance, a student may study for an exam because they would feel bad about themselves if they got a bad mark. Finally, external regulation refers to when someone engages in a behaviour because of an external factor, such as a reward. For example, a student may study for an exam because their parents told them to.

Anchoring the other side of the self-determination continuum, opposite to intrinsic motivation, is amotivation. Amotivation refers to a lack of controllability over behaviour, whereby the person does not perceive contingencies between their behaviour and an outcome. For example, a student may not understand why they bother going to school at all. Amotivation is therefore sometimes characterized as a lack of motivation.

Within the domain of education, researchers have commonly categorized these subtypes into autonomous and controlled motivation. Autonomous motivation reflects intrinsic motivation, as well as internalized forms of extrinsic motivation (i.e., identified regulation). Autonomous motivation is characterized by engaging in a behaviour because it reflects personal interests and values. On the other hand, controlled motivation reflects externalized forms of

extrinsic motivation (i.e., external and introjected regulation). Controlled motivation is typified by engaging in a behaviour because you feel internal or external pressure to do so.

Autonomous academic motivation has been found to lead to positive behavioral, cognitive, and affective outcomes when compared to controlled academic motivation. For example, autonomous motivation has been shown to be related to greater academic achievement (Fortier, Vallerand, & Guay, 1995; Grolnick, Ryan, & Deci, 1991, Guay, Ratelle & Chanal, 2008) and better grades (Black & Deci, 2000). In addition, Vallerand et al. (1989) found that students who reported high levels of academic motivation reported greater enjoyment of academic work, and more positive emotions in the classroom. Furthermore, students who are autonomously motivated are also more likely to persist in an uninteresting task (Jang, 2008), and to be more behaviourally and emotionally engaged (Skinner, Kindermann, & Furrer, 2009).

Although research in the education domain has mainly focused on the relative difference between autonomous academic motivation and controlled, an examination of amotivation may be especially important with regards to IER. For example, students may not see the benefit of participating in undergraduate research studies, and will therefore invest little energy or effort to participate. Amotivation has been associated with high school dropout (Vallerand et al., 1997), boredom and low involvement in physical education (Ntoumanis, Pensgaard, Martin, & Pipe, 2004) and poor concentration in classrooms (Vallerand et al., 1993). Amotivation has also been found to be negatively associated with academic performance and time spent studying, and positively related to lack of academic interest (Legault, Green-Demers, & Pelletier, 2006).

The nature of the behavior itself may need to be considered when predicting which forms of motivation is most likely to be influential in predicting behavioural outcomes (Vallerand, Pelletier, Koestner, 2008). For example, behaviors that involve the absence of effort, such as

IER, may be better predicted by amotivation than controlled or autonomous forms motivation, given that the participant may not see the contingency between completing a survey and any benefit to the self.

Purpose

The purpose of the current study was to extend the findings of Study 1 by examining motivation at the contextual level, specifically, academic motivation. An examination of motivation at this level of specificity will allow researchers the ability to determine if interventions on academic motivation may be a feasible strategy to deter IER in the future. Specifically, the goal of the study was to examine if motivation at the contextual level would mediate the relationship between global motivation and IER across different forms of motivation (i.e., amotivation, controlled, autonomous). In addition to examining motivational variables, the current study also improved the methodology of Study 1 and addressed some limitations. For example, the current study included proactive IER measures within the survey itself. Furthermore, duration measurements for this study were taken per page, allowing a more thorough examination of time spent on the survey as an IER measure. This study also included a self-report measure of participant inattentiveness. This question was demarcated to participants at the end of the study as examining students' experiences while completing the survey, with the hopes that students who engage in IER still attend to this question and answer truthfully.

Hypotheses

Hypothesis 1: Academic amotivation will mediate the positive relationship between global amotivation and IER.

Hypothesis 2: Academic controlled motivation will mediate the positive relationship between global controlled motivation and IER.

Hypothesis 3: Academic autonomous motivation will mediate the negative relationship between global autonomous motivation and IER.

Hypothesis 4: Self-report measure of inattentiveness would predict IER after controlling for mediation models.

Method

Participants and Procedure

208 undergraduate students (n_{female} = 137, n_{male} = 71) enrolled in introductory courses in the behavioural sciences (i.e., Psychology, Linguistics) participated in this study in exchange for participation credit. Participants were aged between 16 and 37, with an average age of 19.89 years (*SD* = 3.00). Recruited participants were predominantly Caucasian (47%) or of Asian descent (17%). Participants were invited to participate in this study through the ISPR, Participants were ostensibly recruited for an online survey study on the relationship between Facebook use and well-being. The study was advertised to take 30 minutes to complete and students were immediately given access to the study website after signing up. Given that the survey was online, students had the freedom to choose the time and place in which they completed the study.

After participants consented to the study, participants completed a measure of their academic motivation. Afterward, participants completed a series of questionnaires designed to measure their affect, eudaimonic well-being, reasons for using Facebook, their Facebook use, life goals, and personality. Participants completed a total of 168 items as part of this study, across six web pages. On average, participants took 22.18 minutes (*SD* = 16.30) to complete the administered items as well as read the consent and debriefing forms. Pre-screen data, which was

completed prior to the study, was also used to retrieve demographic information about participants, such as age and gender, as well as to assess their global motivation.

Measures

Substantive measures. Although participants completed various measures within this study related to their Facebook use and well-being, only three measures were pertinent to this study. First, participants completed the Global Motivation Scale (GMS; Pelletier & Dion, 2007; Pelletier, Dion, Slovinec-D'Angelo, & Reid, 2004). The GMS is an 18-item scale assessing enduring individual differences in how individuals orient towards behaviors for certain reasons. Specifically, the GMS utilizes three items to measure intrinsic motivation, four types of extrinsic regulation (i.e., integration, identification, introjection, external), and amotivation. Descriptive statistics and intercorrelations between Global regulation subtypes are shown in Table 3.1. A global controlled motivation subscale was created by averaging the items measuring external and introjected regulations ($\alpha = .76$). A global autonomous motivation subscale was created by averaging the items measuring identified and intrinsic regulations ($\alpha = .81$). Finally, a global amotivation subscale was created by averaging the three items assessing amotivation ($\alpha = .76$).

The Academic Motivation Scale (AMS) was administered to assess participants' academic autonomous and controlled motivation. The AMS is a 28-item scale (Vallerand, Pelletier, Blais, Briere, Senecal, & Vallieres, 1992) assessing academic motivation according to the tenets of SDT. The AMS is composed of seven subscales, representing three types of intrinsic motivation (i.e., to know, to accomplish things, and to experience simulation), three types of extrinsic motivation (i.e., identified, introjected, and external regulation), and amotivation. Descriptive statistics and intercorrelations between Academic regulation subtypes are shown in Table 3.2. A controlled motivation subscale was formed by averaging item

responses from the introjected and external regulation subscales (α = .89).An autonomous motivation subscale was formed by averaging item responses from the identified and intrinsic regulation subscales (α = .94). Finally, an academic amotivation subscale was created by averaging the three items assessing amotivation (α = .88).

One item was presented to participants at the end of the study to identify the degree to which participants' self-reported that they did not pay attention to the survey (Huang, Bowling, Liu, & Li, 2015; Meade & Craig, 2012). To denote the end of the survey, participants were informed that the last three questions were related to their experience while filling out the survey. Within the item, participants were also reminded that responses were anonymous to encourage a truthful assessment of their attention. The self-report item read "I have paid no attention to this study so far (remember, your response is anonymous!)." Participants were asked to respond to this item using a 5-point scale ranging from "Strongly Disagree" to "Strongly Agree."

Insufficient effort responding indices. Building upon the indices used in Study 1, the current study employed a proactive method of IER detection. Specifically, approaches to IER detection including infrequency items were used. Furthermore, as in Study 1, reactive methods of IER detection were also used.

Infrequency items approach. The infrequency items approach to IER detection involves the inclusion of items that elicit a single high probable response among participants. That is, attentive responders are assumed to respond to the item in the same way. The shortened infrequency scale (Huang, Bowling, Liu, & Li, 2015) was used in this survey. This scale consisted of three items that represented infrequency items that attentive responders would disagree to. These items included "I eat cement occasionally," "I can teleport across time and space," and "I have never used a computer." Participants who agreed to any of the above

statements were coded as having engaged in IER (1) or coded as (0) if they did not agree. Depending on the number of violations on the infrequency items approach, participants had a score ranging from 0-3.

Response time approach. As in Study 1, the response time approach was used to determine participants who responded to items too quickly to assume that they had read the item thoroughly enough to provide an accurate response. In this study, response time was measured per survey page. Participants who responded at a rate faster than the allocated two seconds per item per page were recorded as having engaged in IER (1), or coded as (0) if they spent longer on the items. Depending on the number of violations on the response time approach, participants had a score ranging from 0-5.

Response pattern approach. The long string index was used to identify IER within each survey page of this study. Because this survey employed multidimensional scales, it was deemed unlikely that a participant who completed the study attentively would select the same response option multiple times across the same scale. The long string index was considered to have been violated if the participant selected the same response option that represented a quarter of the items in succession on any of the multidimensional scales (1), or (0) if they varied their responses. Depending on the number of violations, participants had a score ranging from 0-5 on the response pattern approach.

An overall IER score using both proactive and reactive measures was created by summing the number of violations identified through the approaches discussed above. In addition, separate sub-scores were calculated for the proactive (i.e., infrequency items approach) and reactive IER measures (i.e., response time and response pattern approach).

Results

Table 3.3 presents a frequency table of the combined proactive and reactive IER violations found in this sample, that ranged from 0 to 10 (out of the possible 13 violations). Table 3.4 presents a frequency table of the proactive IER violations, ranging from 0 to 3, and Table 3.5 presents a frequency table of the reactive IER violations, ranging from 0 to 10. Analyses in this study were conducted using IBM SPSS 23. Descriptive statistics (i.e., means and standard deviations) are shown in Table 3.6, and intercorrelations among main study variables are presented in Table 3.7. Notably, the correlations between the overall, proactive, and reactive IER indices and the substantive variables displayed a similar pattern of relationships. As a result, only the overall IER index was used to examine the relationship between IER and global and academic motivation as it has been previously argued that a multi-method approach (i.e., using both proactive and reactive measures) best captures IER.

In order to estimate the direct and indirect effects of global motivation on IER, ordinary least squares path analysis was used. Specifically, regression analyses with bootstrapping were conducted to estimate model coefficients in the mediation model, as recommended by Preacher and Hayes (2008). The bootstrapping method was found to be appropriate for these analyses as bootstrapping is a nonparametric resampling procedure that does not assume normal distributions for any variable. Furthermore, bootstrapping has been found to be the most powerful method for small samples sizes and to be the least susceptible method to Type 1 error. Mediation analyses were conducted using the PROCESS v3 (model 4) macro in SPSS (Hayes, 2017).

Three mediation analyses were conducted to examine the indirect effect of global motivation on IER through academic motivation. The type of motivation examined changed across each mediation model (i.e., amotivation, controlled motivation, autonomous motivation) as shown in Figures 3.1-3.3.

Amotivation

The results of the mediation analysis evaluating whether academic amotivation would mediate the relationship between global amotivation and IER is shown in Table 3.8. Initially, global amotivation had a positive relationship with IER, $b = .44$, $p < .001$. However, after accounting for academic amotivation, global amotivation no longer had a statistically significant direct effect on IER, $b = .10$, $p = .420$. Further, there was a statistically significant effect of global amotivation on IER through academic amotivation, *indirect* = .34, *SE* = .10, 95% CI [.17, .55].

Controlled Motivation

Table 3.9 summarizes the results of the mediation analysis evaluating whether academic controlled motivation would mediate the relationship between global controlled motivation and IER. Initially, global controlled motivation did not have a relationship with IER, $b = -.06$, $p = .703$. Although previous methodologies used to assess mediation models proposed by Baron and Kenny (1986) would first include an assessment of the relationship between global amotivation (X) and IER (Y), new approaches to mediation analysis forfeits establishing a correlation between these two variables in favor of establishing a statistically significant a x b indirect effect (Zhao, Lynch, & Chen, 2010). Results of the mediation analysis indicated that there was neither a direct, $b = -.04$, $p = .787$, nor indirect effect, *indirect* = -.02, *SE* = .04, 95% CI [-.10, .05] of global controlled motivation on IER.

Autonomous Motivation

The results of the mediation analysis evaluating whether academic autonomous motivation would mediate the relationship between global autonomous motivation and IER is summarized in Table 3.10. Initially, global autonomous motivation was negatively related to

IER, $b = -.41$, $p = .015$. After accounting for academic autonomous motivation, results of the mediation analysis indicated that there was still a significant direct effect, $b = -.42$, $p = .021$. However, there was no indirect effect of global autonomous motivation on IER through academic autonomous motivation, *indirect* = .02, *SE* = .08, 95% CI [-.14, .16].

Self-Report Measure of Insufficient Effort Responding

A Pearson correlation was conducted to examine the relationship between the self-report measure of attention during the survey and the IER index. Results indicated a positive relationship between the self-report measure and IER index formed by proactive and reactive measures, $r = .28$, $p < .001$.

A one-item self-report measure of IER was included as a covariate in the model examining the effect of global amotivation on IER through academic amotivation. The result of this analysis indicated that the self-report measure remained statistically significant after accounting for global and academic amotivation, $b = .42$, $p < .001$.

In addition, the self-report measure of IER was also included as a covariate in the model examining the effect of global autonomous motivation on IER through academic autonomous motivation. The result of this analysis also indicated that the self-report measure remained statistically significant after accounting for global and academic autonomous motivation, $b = .58$, $p < .001$.

Discussion

The primary aim of this study was to examine whether academic motivation, at varying levels of quality, can explain the relationship between global motivation and IER on an online survey. Consistent with the hierarchical model of intrinsic and extrinsic motivation (HMIEM; Vallerand, 1997), academic motivation was expected to mediate the relationship as it is a closer

proxy to the behaviour than global motivation, given that participating in a research activity is often construed as a school-related task. A secondary aim of this study was to determine if there is a positive relationship between a self-report measure of inattentiveness and participants' IER, over and above global and academic motivation, to examine its feasibility as a measure that can be used in future research to detect insufficient effort responders.

As predicted, academic amotivation fully explained the positive relationship between global amotivation and IER. Participants who reported generally not knowing why they do things in life engaged in more IER. This was found to be positively correlated with a lack of understanding of why they are in school. Interestingly, controlled motivation was not found to be related to IER in this study, regardless of level (global nor academic). Unexpectedly, results of this study indicated that although academic autonomous motivation was not related to IER, there was a negative relationship between global autonomous motivation and IER.

Consistent with HMIEM (Vallerand, 1997), a general disposition to not understand the contingencies between behaviour and outcome can translate to more specific domains, such as education. However, results regarding autonomous motivation suggests that a nuanced approach is best, in which each level of the hierarchy is examined. This study examined motivation at the global and contextual level. However, an examination of situational level motivation would be warranted in the future. Participants who are higher in academic amotivation may not see the benefit of being in school more generally, and this may influence how they orient towards other school-related tasks. For example, students who are high an academic amotivation may not see the benefit of participating in research activities and may also be high in research amotivation. However, other students may be motivated towards participating in research because of the extra credit they obtain towards their course grade (i.e., a controlled reason), or because of the

expertise and joy they gain from their participation (i.e., an autonomous reason). Participants who engage in research without understanding why they are doing so, may in turn devalue the behaviour and engage in IER as a consequence.

With respect to the self-report measure of inattentiveness, this one-item measure explained additional variance in IER over global and academic amotivation and autonomous motivation. This finding suggests that researchers may use this item as a useful screening tool when examining IER within their data. However, future research would need to examine if this tool provides unique information compared to other IER indices, and under what conditions participants are likely to answer this item truthfully.

Future research would do well to examine all three facets of the hierarchical model of intrinsic and extrinsic motivation, to obtain a deeper understanding of why students engage in IER. Furthermore, greater research is needed to see how individual differences in global motivation, as well as academic motivation, interact with situational factors to influence IER. For example, some students may benefit from an external warning about measures that counteract IER prior to completing the study. Other students may benefit from completing the survey in a more structured environment, such as a lab setting, other than online. Such situational factors could be used to decrease IER, without the risk of reducing the representativeness of the sample caused by removing data of certain participant profiles.

The results of this study suggest that the occurrence of IER among undergraduate participants enrolled in the ISPR remain a concern. Of the 210 participants in this online study, 31 participants (14.76%) were identified as having failed at least three measures of IER. Given that IER is rarely addressed in regular data cleaning strategies and can have a significant impact

on substantive statistical findings, greater research is needed to address how IER may be reduced among volunteer undergraduate research participants.

Although the results of this study add further understanding to potential processes underlying IER, some limitations should be taken into consideration. Given that the substantive measures themselves are self-reported, they may also be vulnerable to IER. Although these measures were presented at the beginning of the survey to reduce the likelihood of careless responding due to boredom, some participants may still have provided inaccurate responses to these items. Therefore, the replication of results examining predictors of IER is crucial to support their substantive importance.

Overall, the results of this study suggest that academic amotivation plays a role in the prevalence of IER among undergraduate research participants. Students who feel amotivated toward their studies lack intention to act and may devalue opportunities that are designed to transfer knowledge, such as experiential learning through participation in research. Instead, students who are amotivated may go through the motions of completing a study with little intention or effort, leading to IER.

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Table 3.1

Study 2: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Global Motivation

Measure	Mean	SD	1	2	3	4	5
1. Global Amotivation	2.88	1.16	-				
2. Global External Regulation	4.21	1.24	.21**	-			
3. Global Introjected Regulation	4.08	1.22	.25**	.42**	-		
4. Global Identified Regulation	5.22	1.05	-.19**	.29**	.10	-	
5. Global Intrinsic Motivation	4.87	1.01	.01	.29**	.09	.56**	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 3.2

Study 2: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Academic Motivation

Measure	Mean	SD	1	2	3	4	5
1. Academic Amotivation	2.26	1.41	-				
2. Academic External Regulation	5.52	1.30	-.16	-			
3. Academic Introjected Regulation	4.87	1.37	-.06	.62**	-		
4. Academic Identified Regulation	5.70	1.13	-.36**	.60**	.49**	-	
5. Academic Intrinsic Motivation	4.54	1.22	-.16*	.35**	.58**	.53**	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 3.3

Study 2: Frequency Distribution of Proactive and Reactive Insufficient Effort Responding Violations (N = 210)

Number of Violations	Frequency	Percent
0	85	40.48%
1	47	22.38%
2	29	13.81%
3	15	7.14%
4	7	3.33%
5	12	5.71%
6	3	1.43%
7	3	1.43%
8	4	1.90%
9	2	.95%
10	3	1.43%

Table 3.4

Study 2: Frequency Distribution of Proactive Insufficient Effort Responding Violations (N = 210)

Number of Violations	Frequency	Percent
0	149	70.95%
1	36	17.14%
2	15	7.14%
3	10	4.76%

Table 3.5

Study 2: Frequency Distribution of Reactive Insufficient Effort Responding Violations (N = 210)

Number of Violations	Frequency	Percent
0	106	50.48%
1	45	21.43%
2	24	11.43%
3	7	3.33%
4	9	4.29%
5	11	5.24%
6	3	1.43%
7	4	1.90%
8	0	0%
9	0	0%
10	1	0.48%

Table 3.6

Study 2: Means and Standard Deviations for Scores on Global Motivation, Academic Motivation, and Insufficient Effort Responding

Measure	Mean	Standard Deviation
Global Amotivation	2.88	1.16
Global Controlled Motivation	4.14	1.03
Global Autonomous Motivation	5.04	0.91
Academic Amotivation	2.26	1.41
Academic Controlled Motivation	5.20	1.21
Academic Autonomous Motivation	5.12	1.03
Insufficient Effort Responding (Overall)	1.70	2.27
Insufficient Effort Responding (Proactive)	0.46	0.82
Insufficient Effort Responding (Reactive)	1.24	1.83

Table 3.7

Study 2: Spearman's Rho Intercorrelations for Scores on Global Motivation, Academic Motivation, and Insufficient Effort Responding

		1	2	3	4	5	6	7	8
1	Global Amotivation								
2	Global Controlled Motivation	.26**							
3	Global Autonomous Motivation	-.15*	.23**						
4	Academic Amotivation	.40**	.08	-.31**					
5	Academic Controlled Motivation	.03	.20**	.10	-.13				
6	Academic Autonomous Motivation	-.09	.11	.38**	-.34**	.63**			
7	Insufficient Effort Responding (Overall)	.28**	-.06	-.07*	.38**	.02	-.00		
8	Insufficient Effort Responding (Proactive)	.22**	.04	-.11	.40**	-.02	-.02	.62**	
9	Insufficient Effort Responding (Reactive)	.23**	-.06	-.05	.28**	-01	.00	.90**	.28**

Note. * p < .05. ** p < .01

Table 3.8

Study 2: Path Coefficients and Model Summary for Indirect Effect of Global Amotivation on Insufficient Effort Responding (N = 200)

		Consequent						
		M (ACADEMIC AMOTIVATION)				Y (INSUFFICENT EFFORT RESPONDING)		
Antecedent		Coeff.	*SE*	*p*		Coeff.	*SE*	*p*
X (GLOBAL AMOTIVATION)	a	0.46 [.30, .62]	0.08	< .001	c'	0.10 [-.15, .35]	0.13	.421
M (ACADEMIC AMOTIVATION)					b	0.73 [.53, .93]	0.10	<.001
Constant	i_M	0.92 [.42, 1.41]	0.25	< .001	i_Y	-.36 [-1.10, .38]	0.38	.336
		$R^2 = .140$				$R^2 = .245$		
		F(1, 198) = 32.23, p < .001				F(2, 197) = 32.04, p <.001		

Table 3.9

Study 2: Path Coefficients and Model Summary for Indirect Effect of Global Controlled Motivation on Insufficient Effort Responding (N = 200)

		Consequent						
		M (ACADEMIC CONTROLLED MOTIVATION)				Y (INSUFFICENT EFFORT RESPONDING)		
Antecedent		Coeff.	*SE*	*p*		Coeff.	*SE*	*p*
X (GLOBAL CONTROLLED MOTIVATION)	a	0.25 [.09, .41]	0.08	.002	c'	-0.04 [-.35, .26]	0.15	.786
M (ACADEMIC CONTROLLED MOTIVATION)					b	-0.06 [-.33, .20]	0.14	.613
Constant	i_M	4.16 [3.50, 4.83]	0.34	< .001	i_Y	2.06 [.38, 3.75]	0.86	.017
		$R^2 = .048$				$R^2 = .002$		
		F(1, 198) = 10.00, p = .002				F(2, 197) = 0.18, p = .835		

Table 3.10

Study 2: Path Coefficients and Model Summary for Indirect Effect of Global Autonomous Motivation on Insufficient Effort Responding (N = 200)

		Consequent						
		M (ACADEMIC AUTONOMOUS MOTIVATION)				Y (INSUFFICENT EFFORT RESPONDING)		
Antecedent		Coeff.	*SE*	*p*		Coeff.	*SE*	*p*
X (GLOBAL AUTONOMOUS MOTIVATION)	a	0.42 [.29, .56]	0.07	< .001	c'	-0.42 [-.78, -.06]	0.18	.021
M (ACADEMIC AUTONOMOUS MOTIVATION)					b	0.04 [-.30, .37]	0.17	.832
Constant	i_M	3.01 [2.31, 3.71]	0.35	< .001	i_Y	3.51 [1.54, 5.47]	0.99	< .001
		R^2 = .158				R^2 = .030		
		F(1, 198) = 37.18, p < .001				F(2, 197) = 3.01, p = .051		

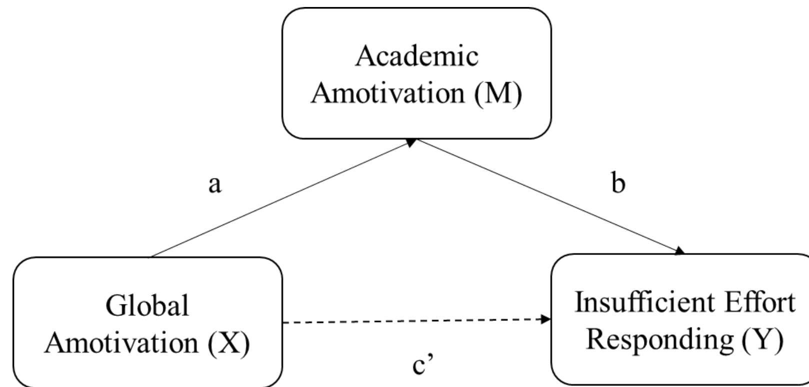

Figure 3.1. Study 2: Path diagram of direct and indirect effects of global amotivation on insufficient effort responding through academic amotivation. Statistically significant path effects are denoted by a solid line, whereas non-significant pathways are denoted by a dotted line.

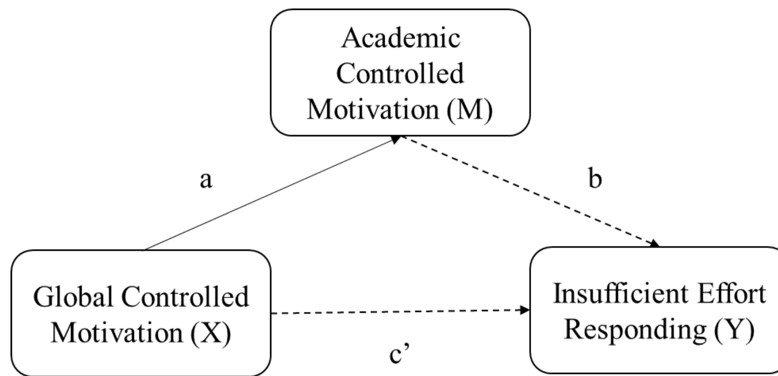

Figure 3.2. Study 2: Path diagram of direct and indirect effects of global controlled motivation on insufficient effort responding through academic controlled motivation. Statistically significant path effects are denoted by a solid line, whereas non-significant pathways are denoted by a dotted line.

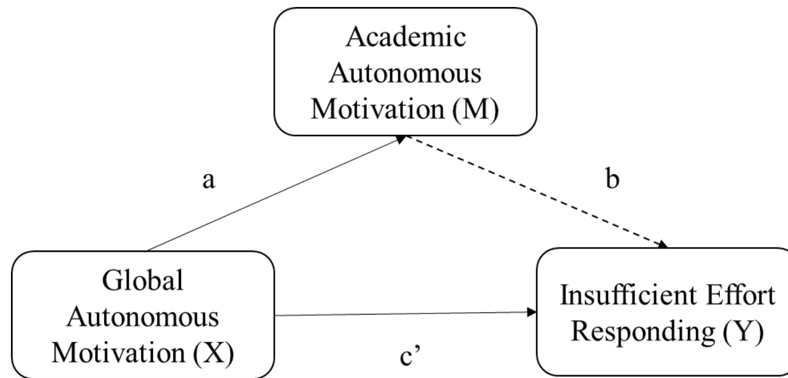

Figure 3.3. Study 2: Path diagram of direct and indirect effects of global autonomous motivation on insufficient effort responding through academic autonomous motivation. Statistically significant path effects are denoted by a solid line, whereas non-significant pathways are denoted by a dotted line.

CHAPTER FOUR

STUDY THREE

Concerns regarding data quality have stimulated the creation of more robust empirical measures and stricter research protocols to reduce potential confounds in the collection and interpretation of data. However, strategies to reduce statistical noise from a participation standpoint has been lacking. Specifically, limited research has been conducted to determine how participant engagement can be facilitated so that participants respond in an attentive and thoughtful manner when completing voluntary survey research. Participants who provide insufficient effort while completing survey items can contribute to poor data quality. For example, insufficient effort responding (IER) can lead to the introduction of systemic variance that can cause unstable factor analytic structures, and the attenuation or inflation of relationships (Maniaci & Rogge, 2014; Huang, Liu, & Bowling, 2014). Therefore, research examining potential interventions strategies should be explored. Furthermore, undergraduate research participants appear to be a formidable sample to target for intervention given that students form a large portion of samples used for psychological survey research (Sharpe & Poets, 2017).

Addressing rates of IER among undergraduate research participants appears prudent given that rates as low as 10-15% can cause researchers to draw misleading conclusions from their research (Clark, Gironda, & Young, 2003). In Study 1 and Study 2, rates of IER (i.e., participants who made 3 or more violations) were identified as 35% and 14%, respectively. Therefore, within the University of Ottawa's own research participation pool system, IER warrants a further examination of potential interventions that can be implemented to facilitate attentive responding in order to increase the quality of data collected by researchers.

Thus far, only one study has examined the effects of an experimental manipulation on explicitly decreasing IER among undergraduate student participants. In a study conducted by Huang, Curran, Keeney, Poposki, and Deshon (2012), participants recruited from a Midwestern university were either given normal instructions, or/and a warning prior to filling out a 300-item questionnaire on personality. Participants who received normal instructions were asked to answer honestly and were told that there were no right or wrong answers at the beginning of the survey. Participants in the warning condition were also told that responses would be checked for validity using sophisticated statistical methods. Furthermore, participants were warned that responding with insufficient effort could lead to the loss of participation credit. Although, undergraduate students did not in fact lose participation credit regardless of if they were identified as insufficient effort responders. Results from their study indicated that participants in the warning condition were less likely to violate various IER indices (i.e., psychological antonym, individual reliability, long string reversed) than participants who received normal instructions. Interestingly, there was no difference in the length of time participants took to complete the survey between the two conditions. The results of this study suggest that providing undergraduate participants a warning message may be an effective means of reducing IER within a survey study.

Warning participants against IER among undergraduate students may be one way to safeguard against poor data quality. However, threatening students with the potential loss of participation credits may contradict the spirit of voluntary participation set out by many undergraduate research participation pools, such as the ISPR. Furthermore, human research ethics boards governing studies conducted within the university are unlikely to interpret this as an acceptable solution, given that participants may inevitably feel coerced in providing data. However, given that warning participants against IER can be an easily implementable strategy

for researchers conducting survey research, further examination is needed. Specifically, it would be prudent to examine if a warning message prior to study commencement is sufficient to reduce IER, even if the warning does not include a threat of loss of participation credit.

Apart from providing participants a warning to persuade participants to be attentive, researchers may also consider the setting in which survey participation takes place. Although online surveys are easily accessible to students and require less resources in terms of time and space, online studies may be more prone to IER. That is, students may be more likely to be inattentive when completing an online survey because the environment is less controlled in comparison to a laboratory setting. Specifically, students may be susceptible to distraction when completing a study online due to external noise and stimuli that is otherwise reduced in the laboratory.

Currently within the ISPR, students can gain three credits out of a maximum of four participation credits through online studies. One credit of participation must therefore be gained through a laboratory study, which include all studies that require participants to go to a designated on-campus location to participate. With the introduction of the INSPIRE lab within the University of Ottawa’s Psychology department, researchers have access to a functional laboratory space that can allow for single or multiple participants to complete a study at once. This space therefore facilitates the implementation of various laboratory studies, but can also serve as a controlled environment in which participants can complete survey research with minimal distraction.

Although common assumptions may presume that completing a survey in the laboratory setting versus online would lead to less IER, that may not necessarily be the case. Brock, Barry, Lawrence, and Rolffs (2012) compared internet and paper administration of questionnaires

commonly used in couples research. In their study, they found evidence of psychometric equivalence between these two forms of administration. Other research has also supported the notion that the reliability and factor structure of psychological constructs are similar between paper and web versions of the same questionnaire (Buchanan & Smith, 1999; Gosling, Vazire, Srivastava, & John, 2004). Previous research therefore suggests that paper-and-pencil and online versions of a questionnaire are equivalent. However, paper-and-pencil questionnaires require greater resources from the experimenter and can lead to a greater chance of error due to problems with data entry errors, or participants selecting impossible response options on the paper forms. Therefore, researchers may opt to conduct online studies instead of traditional paper-and-pencil versions.

Conducting online studies in the laboratory allow researchers to control the environment in which data collection takes place, while minimizing possible errors introduced by paper-and-pencil surveys. Data collected through online surveys also have the additional benefits of changing the flow of items depending on participants' responses, and allowing researchers to obtain data regarding the survey that would not otherwise be available, such as the amount of time participants spend on each page.

To determine the equivalency of various methods of survey administration, Weigold, Weigold, and Russell (2013) recruited participants from undergraduate research participation pools to complete several questionnaires. Participants were randomly assigned to complete the survey using the following methods: paper-and-pencil (either in the lab or at home) or internet (either in the lab or at home). Participants in all conditions had a similar amount of contact with the researcher, such that they provided instruction and were available for any questions the participants may have had. The results of their study indicated equivalence (e.g., internal

consistency, intercorrelations) across the main variables. However, researchers noted more missing data in the internet conditions, although it was deemed as trivial. Furthermore, participants in the take-home paper-and-pencil survey condition also took longer to complete the survey than in all other conditions.

To examine the effects of survey conditions where participants do not come into face-to-face contact with the researcher, a further study was conducted to examine equivalency between mailed out paper-and-pencil surveys, and emailed internet surveys. Results from this study also indicated equivalence between conditions, indicating that either method may be suitable methods of administration. However, it is notable that these studies did not include any proactive measures of IER, and therefore was not a direct test of the presence of IER across the survey conditions.

In addition to examining situational factors that influence IER, such as the presentation of a warning message at the beginning of the survey, or the location in which participation takes place, an examination of how differences in motivation may interact to determine the effects of these conditions are needed (Bowling, Huang, Bragg, Khazon, Liu, & Blackmore, 2016). For example, completing a survey study in a controlled environment may only increase attentiveness for those who feel pressured, either externally or internally, to complete the survey, whereas the location may make no difference for participants who are already engaged.

In addition to examining potential situational level factors that may influence IER among undergraduate research participants, a closer examination of motivation at the behavioural level may also be warranted given the results of Study 1 and Study 2. According to the hierarchical model of intrinsic and extrinsic motivation (HMIEM; Vallerand, 1997), motivation at different levels of the hierarchy will predict and interact with one another to determine behavioural

outcomes. It stands to reason, therefore, that an assessment of research motivation, in addition to global and academic motivation, would provide additional understanding of why undergraduate research participants engage in IER when completing survey studies as part of their course credit. Indeed, participants may have vastly different reasons for participating in research. Some may volunteer their time for research in order to learn about themselves, to gain knowledge in an area they find interesting, or because of the inherent fun of participation. Other students may only participate in research in order to gain course credit, or because they would feel guilty for not being part of the research community. Finally, students may also not understand why they participate in research but go through the motion of participating anyways.

Purpose

The overall purpose of this study was to extend the findings of Study 2, and to examine if academic and research motivation mediates the relationship between global motivation and IER in serial order. Furthermore, this study aimed to examine if a) providing a warning to participants or b) having participants complete the study in the laboratory versus online setting would deter IER, or change the relationship between the two mediators (academic and research motivation) and the dependent variable (IER).

Hypotheses

Hypothesis 1: The positive relationship between global amotivation and IER will be mediated by academic amotivation then research amotivation. That is, global amotivation will be positively associated with academic amotivation, which would also then be positively associated with amotivation toward research.

Hypothesis 2: The positive relationship between global controlled motivation and IER will be mediated by academic then research controlled motivation. That is, global controlled motivation

will be positively related to academic controlled motivation, which in turn would be positively related to controlled motivation toward research participation.

Hypothesis 3: The negative relationship between global autonomous motivation and IER will be mediated by academic then research autonomous motivation. Specifically, global autonomous motivation will be positively related to reports of autonomous academic motivation, which would then be positively related to autonomous motivation toward research participation.

Hypothesis 4: Participants who complete the study in a laboratory environment will engage in less IER than those who participate online.

Hypothesis 5: Participants who receive a warning message prior to the study will engage in less IER than those who do not receive a warning message.

Hypothesis 6: Location of study participation will moderate the mediated effects hypothesized above, such that participants completing the study in the lab engage in less IER.

Hypothesis 7: Warning participants of measures against IER will moderate the mediated effects hypothesized above, such that participants who are warned will engage in less IER.

Method

Participants and Procedures

282 undergraduate students (n_{female} = 229; n_{mlae} = 52) were recruited through the University of Ottawa's ISPR. Participants were aged between 17 to 39 (*M* = 19.82; *SD* = 2.51). Participants in this study were predominantly Caucasian (43%), or of Asian descent (28%). Of those who reported their student status, 89% reported that they were full-time, and approximately 41% reported that they were in their first year of study. Participants were invited to participate in a survey study examining the relationship between Facebook use and well-being in the laboratory. The study was advertised to take up to 30 minutes, and participants received one

participation credit for completing the study. Participants could select from multiple time slots throughout the day at the time they signed up for the study. Prior to study recruitment, participants also completed a pre-screen questionnaire in which they filled out items related to their demographics, as well as their global motivation.

Participants were randomly assigned to either remain in the laboratory version of the study or be invited to participate online using a random number generator. Participants in the laboratory version of the study did not receive further contact from the experimenter until the time of participation. In the online condition, participants were sent an email script inviting them to complete the study online in lieu of coming into the laboratory. If participants agreed, the link to the survey was sent at the time in which they had originally agreed to participate.

Participants in the laboratory condition were greeted by the experimenter. They were then led to the participation room and asked to choose an empty computer. Participants were told that they could start the survey, and that they could leave the room once they were done. The experimenter left immediately afterward to minimize contact with the participants. Up to four participants were able to complete the study in the laboratory at a given time.

The administered survey to participants was nearly identical to that of Study 2. However, a few additions were made. Notably, depending on the experimental condition, participants received a warning prior to completing the main section of the study. Specifically, participants in the warning condition were told “Please be advised, this survey contains questions designed to check your attention.” In the neutral condition, participants were simply told “Please continue to the next page to start the study!” Furthermore, in addition to survey items pertaining to academic motivation, Facebook use, and well-being measures, one additional scale was used to measure motivation toward research participation (described below). One additional proactive measure of

IER was also included in this study. At the end of the survey, participants were asked to indicate where they completed the survey. Finally, as a manipulation check, participants were also asked to indicate if they received a warning message prior to starting the survey.

Measures

Substantive measures. The Global Motivation Scale (GMS; Pelletier & Dion, 2007; Pelletier, Dion, Slovinec-D'Angelo, & Reid, 2004) was used to assess participants' tendency to do things for certain reasons, whether external or internal. This measure was used as an individual difference measure of motivation consistent with the tenets of self-determination theory. Descriptive statistics and intercorrelations between Global regulation subtypes by experimental condition are shown in Tables 4.1-4.4. A global controlled motivation variable was created by averaging the items corresponding to external and introjected regulations ($\alpha = .83$). In addition, a global autonomous motivation variable was created by averaging the items corresponding to the intrinsic and identified regulations ($\alpha = .81$). Finally, a global amotivation variable was created by averaging the items corresponding to amotivation ($\alpha = .74$). As discussed in Chapter 3, the Academic Motivation Scale (AMS; Vallerand, Pelletier, Blais, Briere, Senecal, & Vallieres 1992) was administered in this iteration of the survey to measure participants' reasons for attending University. Academic controlled ($\alpha = .87$) and academic autonomous ($\alpha = .92$) motivation variables were created in a similar manner as global motivation, as well as academic amotivation ($\alpha = .85$). Descriptive statistics and intercorrelations between Academic regulation subtypes by experimental condition are shown in Tables 4.5-4.8. A self-report measure of attentiveness was also used at the end of the survey to examine participant's own perceived amount of effort in completing the survey (Huang, Bowling, Liu, & Li, 2015; Meade & Craig, 2012).

In addition to the above, six items were created as an exploratory measure of participants' motivation toward research participation. Prior to the item stems, participants read that "We are interested in learning about why students participate in the ISPR. Please indicate to what extent each of the following statements correspond to the reasons why you participate in research." One item was used to assess each of the six regulation subtypes as identified by SDT: intrinsic (I find these activities enjoyable – they are interesting and stimulating), integrated (Because interesting or not, I feel free to commit myself to something that I value and that could help me achieve my future goals), identified (Because I really believe that it is important to participate in research), introjected (Because I would feel guilty if I didn't – I feel that I ought to do it), external (Because somebody else wants me to or because I'll get participation points if I do), and amotivation (Honestly, I don't know; I feel that I am wasting my time participating in research). Participants responded on a 7-point Likert scale ranging from (1) Does not correspond at all to (7) Corresponds completely. As in global and academic motivation, a research controlled motivation variable was created by averaging the external and introjected items. In addition, a research autonomous motivation variable was created by averaging the intrinsic and identified items. Descriptive statistics and intercorrelations between Research regulation subtypes are shown in Tables 4.9-12.

Insufficient effort responding indices. As in Study 2, a variety of indices were used to target different types of IER. Namely, the Shortened Infrequency Scale (Huang, Bowling, Liu, & Li, 2015) was used as a proactive measure of IER, whereby participants responded to highly improbable items. If participants' responses indicated some agreement to an improbable item, they were coded as (1), or inattentive. Otherwise, they were coded as (0), or attentive. There were three items on this scale that was scattered throughout a single measure, therefore

participants could have a score ranging from 0 to 3 on this proactive measure. The long-string and the response-time approach was also used in this study. Participants who selected the same response option on a multi-dimensional scale representing a quarter of the items in succession was coded as having engaged in IER (1) on the page. Otherwise, they were coded as attentive (0) on that page. Participants responded to survey items across 6 pages, therefore, participants could have a score ranging from 0 to 6 on the long string approach. Furthermore, response-time was measured for each survey page. Participants were coded as inattentive (1) if they responded to survey items faster than 2 seconds per survey item on a given page. Otherwise, if they spent more than 2 seconds per items on average on a survey page they were coded as attentive (0). Participants could receive a score ranging from 0 to 6 on the response-time approach.

In addition to the measures used in Study 2, one additional proactive measure of IER was included in this study. Participants were asked to respond to an instructed-response item, whereby participants were asked to essentially ignore the item and select a specific response option. This item was included near the end of the survey, and within a 35-item questionnaire regarding goals, in which the 28th item read “To select five for this item” on a 7-point Likert scale. It was assumed that participants who are attentive will select five from the response scale options, whereas individuals who were not attentive would select a different response option. Therefore, participants that respond five on for this item were coded as (0) or attentive, whereas those who responded using any other response option were coded as (1), or inattentive.

Results

A manipulation check was used to determine if participants correctly identified whether they received a warning about items designed to check for their attention prior to completing the survey. The majority of participants correctly identified their condition (93.60%), while 1.80%

misidentified their condition (i.e., said they received a warning when they did not, or said they did not receive a warning when they did), and 4.60% said that they did not remember if they received a warning or not. Given that the majority of participants correctly identified their condition, and to maintain statistical power, participants were not excluded from the analysis based on the manipulation check.

An overall IER index was created by summing the number of identified violations using the proactive and reactive approaches discussed above. A frequency distribution of overall IER violations by study condition can be found in Table 4.13. A maximum of 16 violations could have been identified among participants, however, the range of violations was between 0 and 8. In addition, Tables 4.14 and 4.15 shows the frequency distribution of IER violations separated by proactive and reactive measures for each study condition respectively.
Descriptive statistics among substantive study variables are shown in Table 4.16 by study condition. Finally, Tables 4.17, 4.18, 4.19, and 4.20 show the intercorrelations between substantive measures by each of the four study conditions.

Ordinary least squares path analysis was used to estimate the direct and indirect effects of global motivation on IER. The overall IER index, including both proactive and reactive measures, was used in this analysis. Given that the two mediators were expected to be sequentially related to each other according to the HMIEM, serial mediation was conducted instead of parallel multiple mediation. Whereas serial multiple mediation assumes that a causal association exists between mediators, parallel multiple mediation assumes that mediators are not causally influenced by each other (Hayes, 2013). All serial mediation models were tested using regression with bootstrapping confidence intervals using PROCESS v3 (model 6) macro in SPSS (Hayes, 2017).

Three serial mediation analyses were conducted to examine the indirect effect of global motivation on insufficient responding. Global motivation served as the independent variable, with academic motivation and research motivation serving as mediators in sequential order. The type of motivation examined changed across each serial mediation model (i.e., amotivation, controlled motivation, autonomous motivation) as shown in Figures 4.1, 4.4, and 4.7.

Amotivation

Table 4.21 shows the results of the serial mediation model evaluating whether academic then research amotivation would mediate the relationship between global amotivation and IER. Initially, global amotivation did not have a statistically significant relationship with IER, $b = .18$, $p = .123$. Likewise, after accounting for the mediators, global amotivation did not have a statistically significant direct effect on IER, $b = .05$, $p = .637$. However, there was a statistically significant indirect effect of global amotivation on IER through academic amotivation, *indirect* = .05, *SE* = .03, 95% *CI* [.01, .10]. Furthermore, there was a statistically significant indirect effect of global amotivation on IER through academic amotivation then research amotivation, *indirect* = .04, *SE* = .02, 95% *CI* [.01, .09].

In order to retain power, only the variables of significance were retained for the conditional indirect effect model and was conducted using the PROCESS v3 (model 15) macro in SPSS (Hayes, 2017). The conditional indirect effect of academic amotivation on IER through research amotivation by location was estimated using ordinary least squares regression with bootstrapping procedures. The independent variable and mediator were mean-centered before analysis. The moderator was coded as (0) for the lab condition and (1) for the internet condition.

Table 4.22 shows the results of the moderated mediation analyses evaluating whether location moderates the relationship between academic amotivation and IER through research

amotivation. A statistically significant interaction term was found between academic amotivation and location (see Figure 4.2). Results indicated that in the lab condition, academic amotivation and IER were not related, $b = .04$, $p = .750$. However, in the internet condition, academic amotivation was positively related to IER, $b = .59$, $p = .006$. A statistically significant interaction term was also found between research amotivation and location. Results indicated that in the lab condition, research amotivation was positively associated with IER, $b = .74$, $p < .001$. Interestingly, this positive effect was attenuated in the internet condition, $b = .28$, $p = .038$. However, the index of moderated mediation, which examines the differences between the conditional indirect effects, and direct effects, was not statistically significant, *index* = -.21, 95% *CI* [-.44, .01]. This indicated that the location of the study did not moderate the relationship between academic amotivation and IER through research amotivation.

The conditional indirect effect of academic amotivation on IER through research amotivation by warning was also examined and is shown in Table 4.23. No statistically significant interactions were found in this analysis, indicating that warning participants did not change the relationship between academic, nor research amotivation and IER (see Figure 4.3).

Controlled Motivation

The results of the serial mediation model evaluating whether academic then research controlled motivation would mediate the relationship between global controlled motivation and IER is shown in Table 4.24. Initially, global controlled motivation did not have a statistically significant relationship with IER, $b = .08$, p .370. Likewise, after accounting for mediating variables, global controlled motivation did not have a statistically significant direct effect on IER, $b = .16$, $p = .104$. However, there was a statistically significant indirect effect of global

controlled motivation on IER through academic controlled motivation, *indirect* = -.09, *SE* = .04, 95% *CI* [-.16, - .03].

To further examine the potential effects of location on the relationship between global controlled motivation and IER through academic controlled motivation, a moderated mediation was conducted (see Table 4.25). No statistically significant interactions terms were found in this analysis, indicating that the effect of global and academic controlled motivation on IER does not change as a function of study location (see Figure 5.5).

The conditional indirect effect of global controlled motivation on IER through research controlled motivation by warning was also examined (see Table 4.26). No statistically significant interactions were found in this analysis, indicating that warning participants did not change the relationship between global nor academic controlled motivation and IER (see Figure 5.6).

Autonomous Motivation

Table 4.27 displays the results of the serial mediation model examining whether academic then research autonomous motivation would mediate the relationship between global autonomous motivation and IER. Initially, global autonomous motivation had a statistically significant relationship with IER, b = -.23, p = .084. After accounting for the two mediators, global autonomous motivation did not have a direct effect on IER, b = -.16, p = .272. However, there were no statistically significant indirect effects in this model, *indirect* = -.07, *SE* = .06, 95% *CI* [-.19, .03].

Location of Study Participation and Warning Message

A two-way ANOVA was conducted to examine the effects of location (laboratory versus online) and warning (warning versus no warning) on IER. Results of the analysis indicated that there was no statistically significant interaction between the effects of location and warning

message on IER, $F(1, 264) = 1.70$, $p = .193$. In addition, neither the main effects for location, $F(1, 264) = 0.81$, $p = .369$, nor warning message, $F(1, 264) = .04$, $p = .788$, were statistically significant.

In order to examine if manipulations only influenced how much attention to the actual item content, but not necessarily the survey as a whole, secondary analyses were conducted using only the proactive IER items. A two-way ANOVA was therefore conducted to examine the effects of location and warning on proactive measures of IER. Results of this analysis indicated that there was no statistically significant interaction between the effects of location and warning message on proactive IER measures, $F(1, 264) = 1.20$, $p = .274$. Results of this analysis also indicated that there were no statistically significant main effects for location, $F(1, 264) = 0.52$, $p = .472$, nor warning, $F(1, 264) = 0.01$, $p = .938$ on proactive IER measures.

Discussion

The primary goal of this study was to examine whether both academic and research motivation would mediate the relationship between global motivation and IER in serial order. Another goal of this study was to examine if location of study participation, or a warning message could deter IER among participants, or if they would moderate any mediated effects that exist.

Findings from this study align with Study 2 and suggests that amotivation plays a role in the degree to which participants engage in IER. Specifically, global amotivation has a positive relationship with academic amotivation, which in turn is positively related to IER. Furthermore, the positive relationship between global amotivation and IER is also associated with an increase in research amotivation, through academic amotivation. Therefore, it appears that both contextual and behavioural levels of amotivation are positively related to IER. Results of the

moderated mediation of academic amotivation on IER through research amotivation revealed that neither location nor warning changed the effects of this relationship.

In addition to amotivation, it appeared that controlled motivation also played a role in IER in this sample. Specifically, global controlled motivation was positively associated with academic controlled motivation. However, in turn, academic controlled motivation was negatively associated with IER. An examination of location and warning as a moderator to this mediated effect revealed that location of the study nor a warning message influenced this relationship.

Overall, the results of the study supported previous evidence (Weigold, Weigold, & Russel, 2013) suggesting that the location of study participation may not matter as much as would be commonly assumed. That is, the prevalence of IER among undergraduate participants was not predicted by whether they completed the study in the lab, or online. Furthermore, the findings of this study suggest that preceding the survey with a warning message may not deter participants from engaging in IER, after accounting for their global, academic, and task motivation. Contrary to the findings of Huang, Curran, Keeney, Poposki, and Deshon (2012), the results of this study suggest that informing students about IER detection methods throughout the survey did not deter IER. Notably, Huang and colleagues' (2012) warning message to participants included a threat of loss of participation credit, whereas this survey did not include such a threat abiding to current research ethics guidelines at the University of Ottawa.

In order to examine if the effects of location and a warning message only influenced participants level of attention to the items and not necessarily how much care they were taking in completing the overall survey, secondary analyses were conducted to examine the influence of these two intervention strategies on proactive IER measures. Because proactive measures of IER

are explicit to participants, they may be more attuned to them, over the implicit and reactive measures of IER, such as response time. However, these analyses also indicated that there were no differences between completing the study online versus in the laboratory or receiving a warning message or not.

Interestingly, it appeared that location of study participation did not predict IER as hypothesized. Participants who completed the study online may have done so within a school-setting, therefore priming them of their student schema. Therefore, participants in the online condition may have engaged in the study with more focus, even though they were completing the study at the time and place of their choosing. Furthermore, students who were later invited to participate in the study online were given a choice of where they participated. This additional provision of choice may have influenced how much autonomy the participant felt was given by the researcher. Previous research suggests that the provision of choice can lead to greater perception of needs being fulfilled. This could have indirectly led to less IER because students felt more motivated and engaged to complete this study. Further research is needed to examine if different modes of commonly perceived autonomy supportive behaviours can be used to increase students' motivation to participate in research, and promote greater attentive responding.

Autonomy support is defined as an interpersonal behaviour that one engages in to support another person's sense of volition. Within the academic context, autonomy supportive behaviours may include providing choice, acknowledging students' perspectives and experiences, and providing rationale. Autonomy supportive behaviors can be used to facilitate students' endorsement of classroom activities, including those that are uninteresting (Reeve, 2006).

On the other hand, the use of a warning message at the beginning of the study may have been perceived as controlling. Therefore, instead of having the desired effect of reducing IER, it may have had a neutral to negative effect on participants' motivation to complete the survey with care. Future research could examine if autonomy supportive messages prior to the survey could be used to increase students' sense of volition in completing the survey as a means to decrease IER.

One limitation of this study is that participants did not receive the same amount of contact with the researcher across conditions. Specifically, participants in the laboratory condition had face-to-face contact with the experimenter, although this exposure was kept to a minimum. On the other hand, participants in the online condition communicated with the researcher more through e-mail than those in the laboratory condition. It is unknown whether differences in exposure to the researcher (either in person or online) influenced the findings of this study.

In addition, although the setting of the laboratory condition remained generally the same, the number of additional participants in the room at a given time fluctuated. That is, there were a total of four available computers to collect data during any given timeslot in the laboratory condition. Therefore, it was not necessarily the case that participants were alone while completing the study, but could have had others (up to three other people) with them in the room. Although each participant had their own cubicle space, this may have influenced their level of attentiveness. Similarly, it is unknown whether participants in the online condition completed the survey where other people were around them, or if they were alone. It is also unknown as to whether participants in the online condition completed the study at school, where their role as a

student may have been primed by environmental cues. These factors may have influenced participants' level of attentiveness to differing degrees depending on condition.

Participants in the internet condition further had the advantage of not necessarily completing the study at their original study timeslot. Although participants were encouraged to fill out the survey once they received the survey link, participants in the internet condition were given a larger window of opportunity (i.e., to the end of the day) to complete the study. This sense of choice may have also influenced participants' general level of motivation to participate in this study, in comparison to the participants in the laboratory condition.

The results of this study leave the casual nature of the relationship between motivation and IER among undergraduate psychology students ambiguous. That is, the relationship may be explained by the effect that motivation has on IER, or the effect that IER has on motivation. Furthermore, a third variable, such as how well the student identifies with the study topic, may influence both motivation and IER. Although the tenets of SDT would suggest that motivation precedes behaviour, future research will need to examine this relationship further. For example, by examining if changes in motivation is associated with changes in IER, researchers would be able to provide further evidence of the causal nature of this relationship.

Limited research has examined how researchers can reduce IER among undergraduate research participants. This study examined two situational factors that may influence the amount of attention participants are likely to pay over the course of survey administration. First, the location of the study was manipulated such that participants were either assigned to either complete the study in a laboratory environment, or invited to participate online. Results from this study suggest that the location of participation did not influence the prevalence of IER, as was hypothesized. Second, a warning message was used prior to the study to warn participants about

IER detection among the survey items, in comparison to no warning message. Results from this study departed from what was expected, and it was found that a warning message had no impact on the prevalence of IER found among the groups. Overall, the results of this study suggest that some of the procedures that researchers may be able to manipulate, namely the choice of location and providing a warning message, may not be effective ways of discouraging participants from IER in a university student sample. However, amotivation at the contextual and behavioural level appear to be associated with IER tendencies. Therefore, future research should examine processes, such as autonomy supportive behaviours, that could be used to reduce student's lack of intentionality by bolstering the reasons for why an activity may be important or useful. By doing so, students may become more engaged and have purpose when engaging in research, even during an uninteresting research task (Jang, 2008), and be less likely to engage in behaviours consistent with IER.

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Table 4.1

Study 3: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Global Motivation for the Lab with No Warning Condition (n = 71)

Measure	Mean	SD	1	2	3	4	5
1. Global Amotivation	2.83	1.04	-				
2. Global External Regulation	3.86	1.40	.46**	-			
3. Global Introjected Regulation	3.29	1.49	.52**	.59**	-		
4. Global Identified Regulation	5.09	1.06	-.03	.37**	.23	-	
5. Global Intrinsic Motivation	4.78	1.00	.11	.34**	.29*	.71**	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 4.2

Study 3: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Global Motivation for the Lab with Warning Condition (n = 73)

Measure	Mean	SD	1	2	3	4	5
1. Global Amotivation	2.68	1.14	-				
2. Global External Regulation	3.93	1.18	.24*	-			
3. Global Introjected Regulation	3.47	1.24	.23	.42**	-		
4. Global Identified Regulation	5.20	.97	-.12	.29*	.20	-	
5. Global Intrinsic Motivation	4.66	1.03	.32**	.23	.20	.49**	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 4.3

Study 3: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Global Motivation for the Internet with No Warning Condition (n = 66)

Measure	Mean	SD	1	2	3	4	5
1. Global Amotivation	3.04	1.08	-				
2. Global External Regulation	4.10	1.25	.05	-			
3. Global Introjected Regulation	3.62	1.61	.27*	.59**	-		
4. Global Identified Regulation	5.30	1.07	-.23	.53**	.29*	-	
5. Global Intrinsic Motivation	4.96	.89	.04	.26*	.18	.53**	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 4.4

Study 3: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Global Motivation for the Internet with Warning Condition (n = 62)

Measure	Mean	SD	1	2	3	4	5
1. Global Amotivation	2.79	1.20	-				
2. Global External Regulation	3.97	1.34	.37**	-			
3. Global Introjected Regulation	3.66	1.26	.48**	.39**	-		
4. Global Identified Regulation	5.09	1.21	-.15	.35**	.12	-	
5. Global Intrinsic Motivation	4.87	1.07	.14	.40**	.28*	.62**	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 4.5

Study 3: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Academic Motivation for the Lab with No Warning Condition (n = 71)

Measure	Mean	SD	1	2	3	4	5
1. Academic Amotivation	1.76	1.13	-				
2. Academic External Regulation	5.69	1.03	-.15	-			
3. Academic Introjected Regulation	5.19	1.31	-.17	.60**	-		
4. Academic Identified Regulation	5.94	.85	-.57**	.53**	.39**	-	
5. Academic Intrinsic Motivation	4.97	1.10	-.43**	.26*	.56**	.58**	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 4.6

Study 3: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Academic Motivation for the Lab with Warning Condition (n = 73)

Measure	Mean	SD	1	2	3	4	5
1. Academic Amotivation	1.64	.85	-				
2. Academic External Regulation	5.88	.93	.01	-			
3. Academic Introjected Regulation	4.99	1.28	.08	.41**	-		
4. Academic Identified Regulation	6.08	.78	-.26*	.50**	.33**	-	
5. Academic Intrinsic Motivation	4.65	1.02	-.01	.12	.57**	.29*	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 4.7

Study 3: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Academic Motivation for the Internet with No Warning Condition (n = 66)

Measure	Mean	SD	1	2	3	4	5
1. Academic Amotivation	1.67	.90	-				
2. Academic External Regulation	5.70	1.08	-.12	-			
3. Academic Introjected Regulation	5.19	1.52	-.13	.58**	-		
4. Academic Identified Regulation	5.93	1.01	-.37**	.71**	.63**	-	
5. Academic Intrinsic Motivation	4.74	1.10	-.37**	.32**	.54**	.57**	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 4.8

Study 3: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Academic Motivation for the Internet with Warning Condition (n = 62)

Measure	Mean	SD	1	2	3	4	5
1. Academic Amotivation	1.76	1.01	-				
2. Academic External Regulation	5.79	.97	-.09	-			
3. Academic Introjected Regulation	4.95	1.39	.01	.55**	-		
4. Academic Identified Regulation	5.88	.86	-.34**	.66**	.45**	-	
5. Academic Intrinsic Motivation	4.59	1.13	.04	.29*	.49**	.43**	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 4.9

Study 3: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Research Motivation for the Lab with No Warning Condition (n = 71)

Measure	Mean	SD	1	2	3	4	5
1. Research Amotivation	1.84	1.04	-				
2. Research External Regulation	5.19	1.79	-.08	-			
3. Research Introjected Regulation	2.48	1.44	.13	-.20	-		
4. Research Identified Regulation	4.63	1.49	-.17	-.34**	.25*	-	
5. Research Intrinsic Motivation	4.13	1.28	-.16	-.36**	.24	.60**	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 4.10

Study 3: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Research Motivation for the Lab with Warning Condition (n = 73)

Measure	Mean	SD	1	2	3	4	5
1. Research Amotivation	1.90	1.09	-				
2. Research External Regulation	5.67	1.52	-.04	-			
3. Research Introjected Regulation	2.55	1.57	.29*	-.03	-		
4. Research Identified Regulation	4.21	1.36	-.16	-.29*	.22	-	
5. Research Intrinsic Motivation	3.99	1.39	-.38**	-.24*	-.15	.52**	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 4.11

Study 3: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Research Motivation for the Internet with No Warning Condition (n = 66)

Measure	Mean	SD	1	2	3	4	5
1. Research Amotivation	1.77	.99	-				
2. Research External Regulation	5.38	2.01	.21	-			
3. Research Introjected Regulation	2.36	1.68	.10	.04	-		
4. Research Identified Regulation	4.39	1.48	-.23	-.43**	.31*	-	
5. Research Intrinsic Motivation	4.15	1.46	-.46**	-.57**	-.04	.57**	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 4.12

Study 3: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Research Motivation for the Internet with Warning Condition (n = 62)

Measure	Mean	SD	1	2	3	4	5
1. Research Amotivation	2.00	1.09	-				
2. Research External Regulation	4.94	1.92	.02	-			
3. Research Introjected Regulation	2.65	1.74	.32*	-.34**	-		
4. Research Identified Regulation	4.27	1.62	.07	-.43**	.29*	-	
5. Research Intrinsic Motivation	3.61	1.60	-.10	-.48**	.29*	.65**	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 4.13

Study 3: Frequency Distribution of Proactive and Reactive Insufficient Effort Responding Violations by Study Condition (N = 270)

	Lab with No Warning (n = 71)		Lab with Warning (n = 71)		Internet with No Warning (n = 66)		Internet with Warning (n = 60)	
Number of Violations	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	26	36.62%	33	45.21%	35	53.03%	29	46.77%
1	29	40.85%	21	28.77%	19	28.79%	17	27.42%
2	7	9.86%	8	10.96%	6	9.09%	6	9.68%
3	1	1.41%	4	5.48%	3	4.55%	3	4.84%
4	2	2.82%	2	2.74%	2	3.03%	1	1.61%
5	3	4.23%	1	1.37%	0	0%	2	3.23%
6	2	2.82%	1	1.37%	0	0%	0	0%
7	0	0%	1	1.37%	1	1.52%	0	0%
8	1	1.41%	0	0%	0	0%	2	3.23%

Table 4.14

Study 3: Frequency Distribution of Proactive Insufficient Effort Responding Violations by Study Condition (N = 270)

	Lab with No Warning (n = 71)		Lab with Warning (n = 71)		Internet with No Warning (n = 66)		Internet with Warning (n = 60)	
Number of Violations	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	50	70.42%	50	68.49%	51	77.27%	45	72.58%
1	12	16.90%	17	23.29%	12	18.18%	10	16.13%
2	6	8.45%	2	2.74%	2	3.03%	2	3.23%
3	2	2.82%	2	2.74%	0	0%	1	1.61%
4	1	1.41%	0	0%	1	1.52%	2	3.23%

Table 4.15

Study 3: Frequency Distribution of Reactive Insufficient Effort Responding Violations by Study Condition (N = 270)

	Lab with No Warning (n = 71)		Lab with Warning (n = 71)		Internet with No Warning (n = 66)		Internet with Warning (n = 60)	
Number of Violations	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	35	49.30%	45	61.64%	41	62.12%	34	54.84%
1	25	35.21%	12	16.44%	18	27.27%	17	27.42%
2	5	7.04%	8	10.96%	5	7.58%	4	6.45%
3	4	5.63%	4	5.48%	1	1.52%	2	3.23%
4	2	2.82%	2	2.74%	1	1.52%	3	4.84%

Table 4.16

Study 3: Means and Standard Deviations for Scores on Global Motivation, Academic Motivation, and Insufficient Effort Responding by Study Condition

	Lab with No Warning (n = 71)		Lab with Warning (n = 71)		Internet with No Warning (n = 66)		Internet with Warning (n = 60)	
Measure	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Global Amotivation	2.83	1.04	2.68	1.14	3.04	1.08	2.79	1.20
Global Controlled Motivation	3.57	1.29	3.70	1.02	3.86	1.28	3.82	1.08
Global Autonomous Motivation	4.94	0.95	4.93	0.87	5.13	0.86	4.97	1.03
Academic Amotivation	1.76	1.13	1.64	0.85	1.67	0.90	1.76	1.01
Academic Controlled Motivation	5.44	1.05	5.43	0.93	5.44	1.16	5.37	1.04
Academic Autonomous Motivation	5.46	0.87	5.36	0.73	5.33	0.93	5.23	0.84
Research Amotivation	1.84	1.04	1.90	1.09	1.77	0.99	2.00	1.09
Research Controlled Motivation	3.86	1.09	4.17	1.16	3.87	1.33	3.79	1.05
Research Autonomous Motivation	4.39	1.24	4.10	1.20	4.27	1.30	3.94	1.47

Insufficient Effort Responding (Overall)	1.07	1.55	1.06	1.47	0.83	1.27	1.13	1.77
Insufficient Effort Responding (Proactive)	0.40	0.79	0.38	0.68	0.30	0.68	0.42	0.91
Insufficient Effort Responding (Reactive)	0.67	0.99	0.68	1.07	0.53	0.83	0.72	1.08

Table 4.17

Study 3: Spearman's Rho Intercorrelations for Scores on Global Motivation, Academic Motivation, Research Motivation, and Insufficient Effort Responding for the Lab with No Warning Condition (n = 71)

		1	2	3	4	5	6	7	8	9	10	11
1	Global Amotivation											
2	Global Controlled Motivation	.59										
3	Global Autonomous Motivation	-.01	.32									
4	Academic Amotivation	.18	.09	-.42								
5	Academic Controlled Motivation	.15	.39	.30	-.27							
6	Academic Autonomous Motivation	-.02	.19	.63	-.59	.53						
7	Research Amotivation	.10	-.11	-.39	.52	-.31	-.37					
8	Research Controlled Motivation	-.02	.19	.22	-.13	.15	.34	-.15				
9	Research Autonomous Motivation	.28	.34	-.05	-.02	.21	.00	-.03	-.21			
10	Insufficient Effort Responding (Overall)	-.05	-.09	-.30	.17	-.20	-.25	.30	-.32	.01		
11	Insufficient Effort Responding (Proactive)	-.02	-.13	-.28	.21	-.34	-.24	.28	-.23	.04	.72	
12	Insufficient Effort Responding (Reactive)	.03	-.06	-.31	.09	-.09	-.22	.23	-.28	-.01	.82	.31

Note. * $p < .05$; ** $p < .01$.

Table 4.18

Study 3: Spearman's Rho Intercorrelations for Scores on Global Motivation, Academic Motivation, Research Motivation, and Insufficient Effort Responding for the Lab with Warning Condition (n = 71)

		1	2	3	4	5	6	7	8	9	10	11
1	Global Amotivation											
2	Global Controlled Motivation	.27										
3	Global Autonomous Motivation	.07	.31									
4	Academic Amotivation	.29	.02	-.21								
5	Academic Controlled Motivation	.19	.19	.18	.09							
6	Academic Autonomous Motivation	.25	.31	.37	-.15	.56						
7	Research Amotivation	.16	-.17	.05	.30	.07	-.04					
8	Research Controlled Motivation	-.01	-.02	.01	.03	.15	.21	-.24				
9	Research Autonomous Motivation	.10	.14	.00	.18	.05	.17	.18	-.16			
10	Insufficient Effort Responding (Overall)	-.01	.07	.00	.06	-.12	.00	.26	-.15	.08		
11	Insufficient Effort Responding (Proactive)	-.11	.11	.08	-.04	.05	.26	.15	-.08	.10	.62	
12	Insufficient Effort Responding (Reactive)	.06	.00	-.06	.18	-.24	-.23	.28	-.16	.08	.84	.18

Note. * $p < .05$; ** $p < .01$.

Table 4.19

Study 3: Spearman's Rho Intercorrelations for Scores on Global Motivation, Academic Motivation, Research Motivation, and Insufficient Effort Responding for the Internet with No Warning Condition (n = 66)

		1	2	3	4	5	6	7	8	9	10	11
1	Global Amotivation											
2	Global Controlled Motivation	.22										
3	Global Autonomous Motivation	-.19	.38									
4	Academic Amotivation	.32	.11	-.14								
5	Academic Controlled Motivation	.13	.43	.20	-.04							
6	Academic Autonomous Motivation	.05	.34	.33	-.35	.70						
7	Research Amotivation	.12	.14	-.15	.33	-.05	-.16					
8	Research Controlled Motivation	-.05	.02	.28	.03	.19	.30	-.37				
9	Research Autonomous Motivation	.23	.38	.12	-.04	.37	.35	.25	-.23			
10	Insufficient Effort Responding (Overall)	.10	.12	-.11	.10	-.02	-.05	.35	-.10	.01		
11	Insufficient Effort Responding (Proactive)	.06	.15	-.01	.08	-.03	.04	.27	-.04	-.01	.67	
12	Insufficient Effort Responding (Reactive)	.14	.09	-.10	.08	.03	-.07	.23	-.05	-.01	.88	.31

Note. * p < .05; ** p < .01.

Table 4.20

Study 3: Spearman's Rho Intercorrelations for Scores on Global Motivation, Academic Motivation, Research Motivation, and Insufficient Effort Responding for the Internet with Warning Condition (n = 60)

		1	2	3	4	5	6	7	8	9	10	11
1	Global Amotivation											
2	Global Controlled Motivation	.47										
3	Global Autonomous Motivation	-.10	.32									
4	Academic Amotivation	.15	.17	-.09								
5	Academic Controlled Motivation	.13	.20	.21	-.06							
6	Academic Autonomous Motivation	.02	.18	.52	-.21	.60						
7	Research Amotivation	.24	.23	.08	.50	-.02	-.05					
8	Research Controlled Motivation	.18	.16	.23	.01	.31	.44	-.04				
9	Research Autonomous Motivation	.35	.19	-.06	.17	-.16	-.22	.25	-.24			
10	Insufficient Effort Responding (Overall)	.09	.25	-.10	.26	.03	-.06	.20	.08	-.01		
11	Insufficient Effort Responding (Proactive)	.12	.33	-.04	.29	.03	-.01	.32	.04	.20	.72	
12	Insufficient Effort Responding (Reactive)	.01	.08	-.08	.19	.01	-.05	.15	.09	-.14	.87	.38

Note. * $p < .05$; ** $p < .01$

Table 4.21

Study 3: Path Coefficients and Model Summary for Indirect Effects of Global Amotivation on Insufficient Effort Responding (N = 263)

		Consequent										
		M (ACADEMIC AMOTIVATION)				M2 (RESEARCH AMOTIVATION)				Y (INSUFFICIENT EFFORT RESPONDING)		
Antecedent		Coeff.	*SE*	*p*		Coeff.	*SE*	*p*		Coeff.	*SE*	*p*
X (GLOBAL AMOTIVATION)	a_1	0.18 [.07, .29]	0.06	0.001	a_2	0.08 [-.03, .19]	0.06	.163	c'	0.05 [-.16, .26]	0.1	.627
M (ACADEMIC AMOTIVATION)					d_{21}	0.44 [.29, .58]	0.07	< .001	b_1	0.26 [.02, .51]	0.12	.036
M2 (RESEARCH AMOTIVATION)									b_2	0.53 [.30, .76]	0.12	< .001
Constant	i_M	1.19 [.87, 1.50]	0.16	< .001	i_M	0.90 [.52, 1.28]	0.19	< .001	i_M	-0.5 [-1.19, .19]	0.35	.155
		R^2 = .045				R^2 = .180				R^2 = .207		
		F(1, 261) = 10.57, p = .001				F(2, 260) = 18.84, p < .001				F(3, 259) = 9.77, p < .001		

Table 4.22

Study 3: Path Coefficients and Model Summary for Conditional Indirect Effect of Academic Amotivation (X) on Insufficient Effort Responding (Y) through Research Amotivation (M) by Location of Study (V) (N = 263)

		Consequent						
		M (RESEARCH AMOTIVATION)				Y (INSUFFICIENT EFFORT RESPONDING		
		b	*SE*	*p*		b	*SE*	*p*
X (ACADEMIC AMOTIVATION)	a	0.46 [.31, .61]	0.08	< .001	$c_{1'}$	0.04 [-.18, .25]	0.11	.751
M (RESEARCH AMOTIVATION)					b_{1i}	0.74 [.43, 1.06]	0.16	< .001
V (LOCATION)					$c_{2'}$	-0.17 [-.50, .17]	0.17	0.332
ACADEMIC AMOTIVATION x LOCATION					$c_{3'}$	0.55 [.08, 1.02]	0.24	.022
RESEARCH AMOTIVATION x LOCATION					$b_{2i'}$	-0.46 [-.87, -.05]	0.21	.028

Table 4.23

Study 3: Path Coefficients and Model Summary for Conditional Indirect Effect of Academic Amotivation (X) on Insufficient Effort Responding (Y) through Research Amotivation (M) by Warning Condition (V) (N = 263)

		Consequent						
		M (RESEARCH AMOTIVATION)				Y (INSUFFICIENT EFFORT RESPONDING)		
		b	*SE*	*p*		b	*SE*	*p*
X (ACADEMIC AMOTIVATION)	a	0.46 [.31, .61]	0.08	< .001	$c_{1'}$	0.09 [-.13, .32]	0.11	.411
M (RESEARCH AMOTIVATION)					b_{1i}	0.60 [.23, .96]	0.18	.001
V (WARNING)					$c_{2'}$	-0.04 [-.38, .31]	0.17	.836
ACADEMIC AMOTIVATION x LOCATION					$c_{3'}$	.44 [-.05, .92]	0.25	.077
RESEARCH AMOTIVATION x LOCATION					$b_{2i'}$	-.15 [-.61, .32]	0.27	.535

Table 4.24

Study 3: Path Coefficients and Model Summary for Indirect Effects of Global Controlled Motivation on Insufficient Effort Responding (N = 269)

	Consequent											
	M (ACADEMIC CONTROLLED MOTIVATION)				M2 (RESEARCH CONTROLLED MOTIVATION)				Y (INSUFFICIENT EFFORT RESPONDING)			
Antecedent		Coeff.	*SE*	*p*		Coeff.	*SE*	*p*		Coeff.	*SE*	*p*
X (GLOBAL CONTROLLED MOTIVATION)	a_1	0.30 [.20, .40]	0.05	< .001	a_2	0.25 [.12, .37]	0.06	< .001	c'	0.16 [-.03, .36]	0.1	.104
M (ACADEMIC CONTROLLED MOTIVATION)					d_{21}	0.04 [-.09, .18]	0.07	.535	b_1	-0.29 [-.50, -.08]	0.11	.008
M2 (RESEARCH CONTROLLED MOTIVATION)									b_2	0.03 [-.11, .18]	0.07	.639
Constant	i_M	4.31 [3.88, 4.74]	0.22	< . 001	i_M	2.79 [2.03, 3.54]	0.38	< .001	i_M	1.90 [.68, 3.12]	0.62	.002
		R^2 = .115				R^2 = .069				R^2 = .037		
		F(1, 267) = 32.97, p < .001				F(2, 266) = 9.36, p < .001				F(3, 265) = 2.70, p = .046		

Table 4.25

Study 3: Path Coefficients and Model Summary for Conditional Indirect Effect of Global Controlled Motivation (X) on Insufficient Effort Responding (Y) through Academic Controlled Motivation (M) by Location of Study (V) (N = 269)

		Consequent						
		M (ACADEMIC CONTROLLED MOTIVATION)				Y (INSUFFICIENT EFFORT RESPONDING)		
		b	*SE*	*p*		b	*SE*	*p*
X (GLOBAL CONTROLLED MOTIVATION)	a	0.30 [.20, .40]	0.05	< .001	$c_{1'}$	.05 [-.14, .24]	0.09	.588
M (ACADEMIC CONTROLLED MOTIVATION)					b_{1i}	-.39 [-.69, -.09]	0.15	.011
V (LOCATION)					$c_{2'}$	-.22 [-.58, .13]	0.18	.216
GLOBAL CONTROLLED MOTIVATION x LOCATION					$c_{3'}$	.27 [-.10, .64]	0.19	.153
ACADEMIC CONTROLLED MOTIVATION x LOCATION					$b_{2i'}$	.19 [-.23, .61]	0.21	.367

Table 4.26

Study 3: Path Coefficients and Model Summary for Conditional Indirect Effect of Global Controlled Motivation (X) on Insufficient Effort Responding (Y) through Academic Controlled Motivation (M) by Warning (V) (N = 269)

		Consequent						
		M (ACADEMIC CONTROLLED MOTIVATION)				Y (INSUFFICIENT EFFORT RESPONDING)		
		b	*SE*	*p*		b	*SE*	*p*
X (GLOBAL CONTROLLED MOTIVATION)	a	0.30 [.20, .40]	0.05	< .001	$c_{1'}$	.06 [-.11, .24]	0.09	.480
M (ACADEMIC CONTROLLED MOTIVATION)					b_{1i}	-.28 [-.57, .01]	0.15	.056
V (WARNING)					$c_{2'}$	.03 [-.33, .39]	0.18	.874
GLOBAL CONTROLLED MOTIVATION x WARNING					$c_{3'}$	.27 [-.12, .66]	0.20	.177
ACADEMIC CONTROLLED MOTIVATION x WARNING					$b_{2i'}$	.02 [-.38, .43]	0.21	.906

Table 4.27

Study 3: Path Coefficients and Model Summary for Indirect Effects of Global Autonomous Motivation on Insufficient Effort Responding (N = 267)

	Consequent											
	M (ACADEMIC AUTONOMOUS MOTIVATION)				M2 (RESEARCH AUTONOMOUS MOTIVATION)				Y (INSUFFICIENT EFFORT RESPONDING)			
Antecedent		Coeff.	*SE*	*p*		Coeff.	*SE*	*p*		Coeff.	*SE*	*p*
X (GLOBAL AUTONOMOUS MOTIVATION)	a_1	0.39 [.29, .50]	0.05	< .001	a_2	0.06 [-.12, .26]	0.1	.491	c'	-0.16 [-.44, .12]	0.14	.272
M (ACADEMIC AUTONOMOUS MOTIVATION)					d_{21}	0.47 [.26, .68]	0.11	< .001	b_1	-0.17 [-.47, .14]	0.15	.275
M2 (RESEARCH AUTONOMOUS MOTIVATION)									b_2	-0.01 [-.18, .17]	0.09	.929
Constant	i_M	3.39 [2.87, 3.91]	0.26	< .001	i_M	1.35 [.29, 2.40]	0.54	.013	i_M	2.80 [1.21, 4.39]	0.81	< .001
		$R^2 = .188$				$R^2 = .106$				$R^2 = .025$		
		$F(1, 265) = 58.57, p < .001$				$F(2, 264) = 14.46, p < .001$				$F(3, 263) = 1.66, p = .176$		

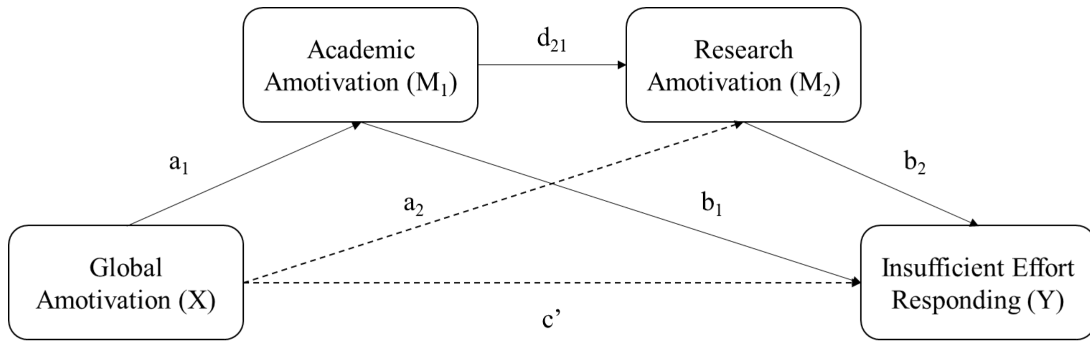

Figure 4.1. Study 3: Path diagram of direct and indirect effects of global amotivation on insufficient effort responding through academic then research amotivation. Statistically significant path effects are denoted by a solid line, whereas non-significant pathways are denoted by a dotted line.

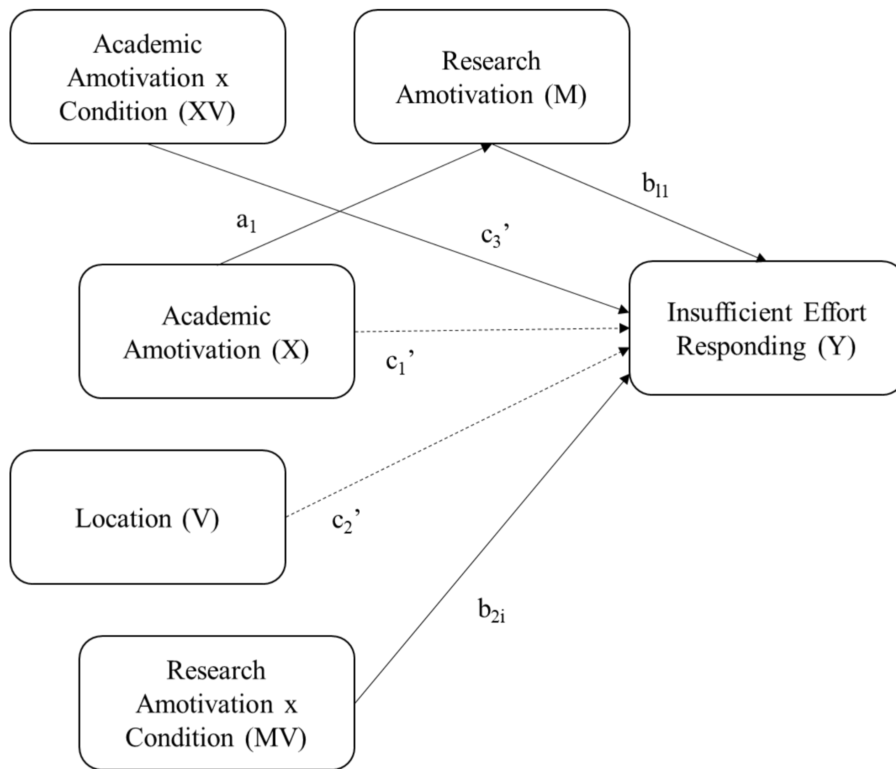

Figure 4.2. Study 3: Path diagram of conditional indirect effect of academic amotivation on insufficient effort responding through research amotivation by location. Statistically significant path effects are denoted by a solid line, whereas non-significant pathways are denoted by a dotted line.

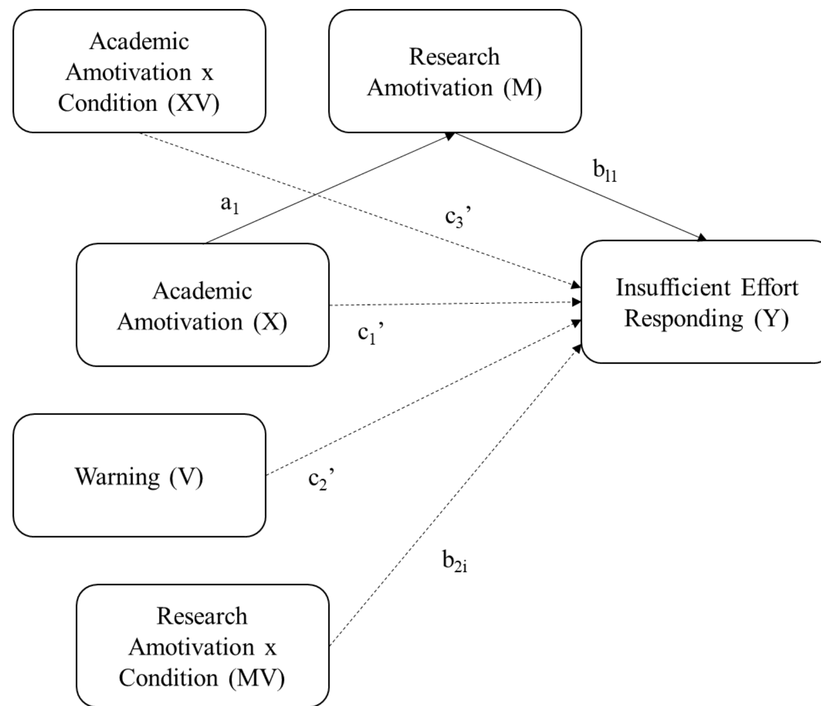

Figure 4.3. Study 3: Path diagram of conditional indirect effect of academic amotivation on insufficient effort responding through research amotivation by warning. Statistically significant path effects are denoted by a solid line, whereas non-significant pathways are denoted by a dotted line.

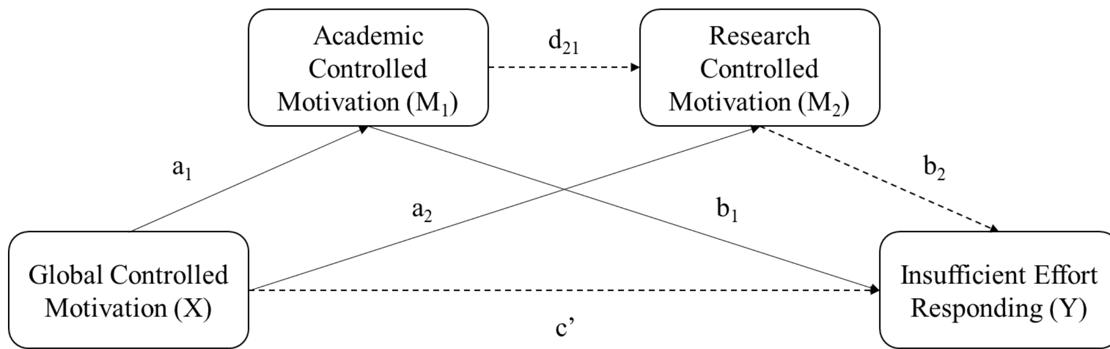

Figure 4.4. Study 3: Path diagram of direct and indirect effects of global controlled motivation on insufficient effort responding through academic then research controlled motivation. Statistically significant path effects are denoted by a solid line, whereas non-significant pathways are denoted by a dotted line.

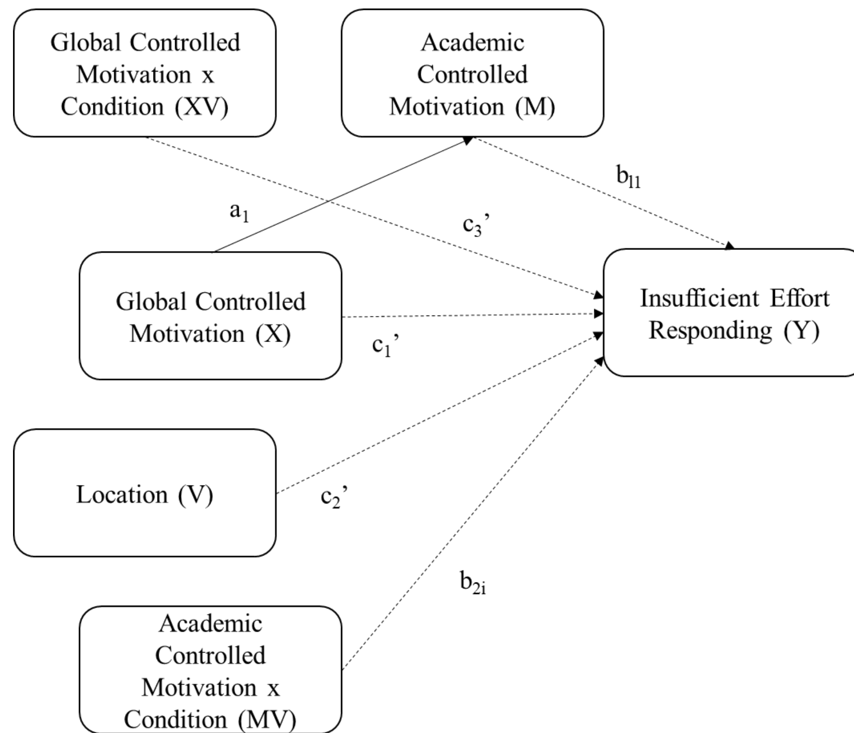

Figure 4.5. Study 3: Path diagram of conditional indirect effect of global controlled motivation on insufficient effort responding through academic controlled motivation by location. Statistically significant path effects are denoted by a solid line, whereas non-significant pathways are denoted by a dotted line.

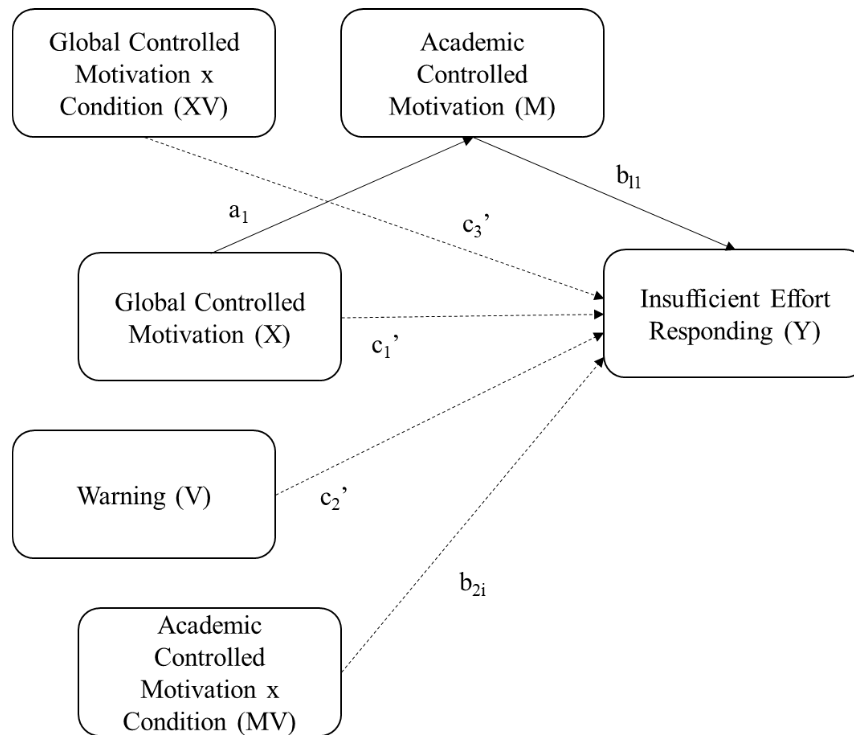

Figure 4.6. Study 3: Path diagram of conditional indirect effect of global controlled motivation on insufficient effort responding through academic controlled motivation by warning. Statistically significant path effects are denoted by a solid line, whereas non-significant pathways are denoted by a dotted line.

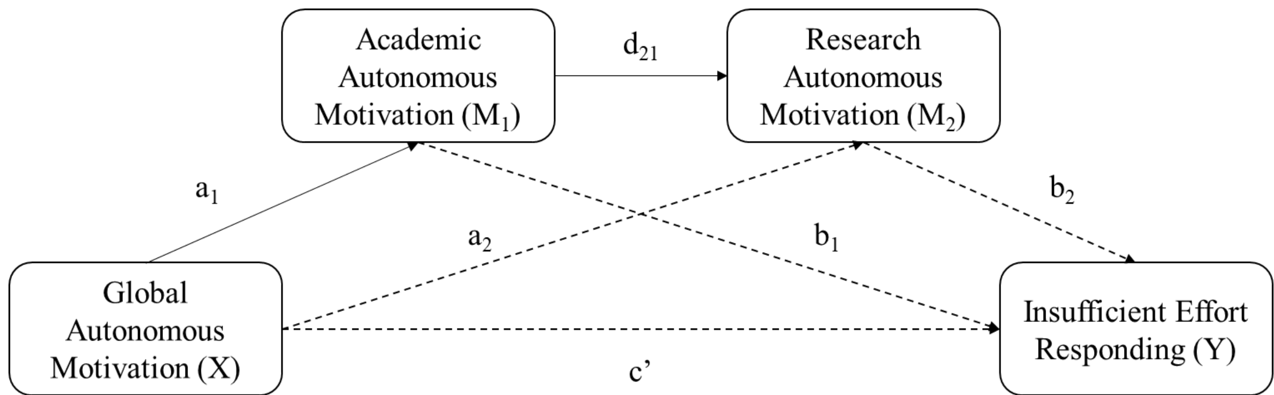

Figure 4.7. Study 3: Path diagram of direct and indirect effects of global autonomous motivation on insufficient effort responding through academic then research autonomous motivation. Statistically significant path effects are denoted by a solid line, whereas non-significant pathways are denoted by a dotted line.

CHAPTER FIVE

STUDY FOUR

The reasons for why students go to university, and participate in the Integrated System of Research Participation, appear to have a bearing on the degree to which participants are likely to be attentive during online and laboratory-based survey research. Although students can freely choose what type of research they would like to participate in based on study descriptions, students may nonetheless be limited in their selection based on availabilities and interest. Furthermore, students at the University of Ottawa may feel somewhat pressured to participate in research due to its mandatory nature. Although an alternative activity is available to students who do not wish to become participants (i.e., watching educational films), less than 2% of all research participation points granted come from this option (Anderson, 2013).

During the creation of the ISPR, the student experience was taken into consideration, and its value as a learning tool has since been examined. Several studies have been conducted to examine students' perceptions of the ISPR (Rocchi, Beaudry, Anderson, & Pelletier, 2016; Sharp and Pelletier, 2007b), indicating that participation is seen as favourable when compared to other mandatory activities, such as completing assignments. Furthermore, research participation was found to promote critical thinking of psychological research that otherwise may not have developed without first-hand experience as a participant.

Students who volunteer to participate through the ISPR experience the research protocol first-hand, which can help cement their knowledge of content learned in class such as the importance of informed consent, standardized procedures, and debriefings. Students may further become inspired by their participation in a study, whether by learning more about the research

process, themselves, or a specific area of interest related to the study. This could promote greater interest in Psychology and help breed a new generation of researchers.

Therefore, researchers themselves could act as ambassadors of research within the department of psychology to stimulate interest in students. By doing so, students could perceive inherent value in the task of research participation itself and become either more internally motivated or less amotivated toward research participation instead of not really understanding why they are participating. In order to do so, researchers could engage in behaviours that help satisfy the needs for autonomy when introducing research tasks, in order to facilitate the integration of research participation among participants into their sense of selves.

According to self-determination theory (SDT; Deci & Ryan, 2000), individuals can engage in different interaction styles that can either support or frustrate a person's sense of autonomy. An autonomy supportive interaction style is one that supports growth and development, and nurtures inner motivational resources. On the other hand, a controlling interaction style is one that impedes on a person's sense of autonomy, and hinders the integration of experiences, by prescribing how an individual should think, feel, and/or act.

Within the context of education, autonomy supportive behaviours have been researched extensively in regard to teaching. Autonomy supportive teaching styles can be characterized into six different behaviours, which include: perspective taking, vitalizing inner motivational resources, providing rationale, acknowledging and accepting students' expressions of negative affect, use of non-pressuring language, and displaying patience (Reeve, 2016). Taken together, these behaviours can be used to support student's autonomous motivation toward their studies, and their autonomy need satisfaction. Furthermore, these behaviours also help align teachers

with their students, forming dialectical relationships between the parties that help inform each others' motivational resources.

Students appear to benefit from teachers who engage in an autonomy supportive teaching style during classroom instruction. For example, previous research suggests that when randomly assigned, students who receive autonomy support from their teachers experience higher quality motivation (i.e., autonomous motivation), more positive classroom functioning, and greater academic achievement. Furthermore, previous research suggests that autonomy supportive behaviours can lead to increases in student engagement (Reeve, Jang, Carrell, Jeon, & Barch, 2004). Whereas engagement is reflective of a person's active involvement and interest in a task, disengagement reflects their level of passivity or distractedness. Reeve and colleagues (2004) found that the more teachers engaged in autonomy supportive instruction, the more engaged their students became in terms of their behavioural intensity and emotional quality. Therefore, it appears that an autonomy supportive interaction style can be used to increase students' motivation for a task, and therefore students may experience greater task engagement. An autonomy supportive interaction style may especially be pertinent when introducing students to an important, but otherwise boring task, to increase their level of subjective engagement that may not otherwise inherently exist.

Given previous research on autonomy supportive teaching styles within education, it stands to reason that researchers could also use this technique to increase students' willingness to participate in research, and their understanding of why participation is important. Specifically, researchers who engage in autonomy supportive behaviours may increase student engagement for their study. This could decrease the likelihood that students disengage from the study and engage in behaviours representing insufficient effort responding (IER). Although professor's

who engage in autonomy supportive teaching styles may already engage their students in classroom material, participation in research may be too far removed to benefit from such behaviours. Therefore, it may be prudent for researchers themselves to show autonomy support to the participants they recruit to engage them in the research process.

Researchers conducting survey research are often limited in their interactions with participants, given that a majority of surveys are conducted online, and limited to no face-to-face contact is established. Therefore, researchers may need to rely on other methods of priming an autonomy supportive environment prior to participants completing a survey. One such method may be in the phrasing of how studies are introduced to participants. Focusing on the six behaviours that Reeve (2016) has identified, perspective taking, providing rationale, acknowledging and accepting students' expressions of negative affect, and using non-pressuring language may be the most accessible to researchers conducting online research. Specifically, given the lack of contact, knowing what inner motivational resources to nurture could prove difficult. Furthermore, due to the nature of a self-paced online study, displaying patience is not possible. Nonetheless, four behaviours may be targeted by researchers that can help facilitate students' motivation toward research participation.

Purpose

The overall purpose of this study was to examine if introducing an online survey study in an autonomy supportive manner would decrease IER among undergraduate volunteer participants. Specifically, this study examined whether an autonomy supportive condition (over a control) would moderate the mediated positive relationship between academic motivation and IER through research motivation. The introduction of the study was designed to enact four out of the six autonomy supportive behaviours: perspective taking, providing rationale, acknowledging

negative affect, and using non-pressuring language. This autonomy supportive message framing was used at the onset of the study in the hopes that students are generally attentive when they first begin a study.

Hypotheses

Hypothesis 1: Less academic amotivation and controlled motivation will be reported in the autonomy supportive condition than the control condition.

Hypothesis 2: Greater academic autonomous motivation will be reported in the autonomy supportive condition compared to the control condition.

Hypothesis 3: Less amotivation and controlled motivation toward research will be reported in the autonomy supportive condition than the control condition

Hypothesis 4: Greater autonomous motivation for research will be reported in the autonomy supportive condition than the control condition.

Hypothesis 5: Participants in the autonomy supportive condition will engage in less proactive and reactive IER than those in the control condition.

Hypothesis 6: The positive relationship between academic amotivation and IER will be explained by correspondingly higher research amotivation. This effect will be moderated by experimental condition, such that in the autonomy supportive condition, the positive relationship between academic/research amotivation and IER will be negated.

Hypothesis 7: The positive relationship between academic controlled motivation and IER will be mediated by correspondingly higher research controlled motivation. Furthermore, experimental condition will moderate this relationship, such that this relationship will not exist for participants in the autonomy supportive condition.

Hypothesis 8: The negative relationship between academic autonomous motivation and IER will be explained by correspondingly higher levels of research autonomous motivation. In addition, the negative relationship between academic/research autonomous motivation and IER was expected to increase in the autonomy supportive condition.

Method

Participants and Procedures

169 students from the University of Ottawa (n_{female} = 133; n_{male} = 36) were recruited through the ISPR to participate in this online study. Participants were aged between 17 and 29 (*M* = 19.47; *SD* = 1.95). The majority, or 58% (*n* = 98) of the participants recruited in this study were Caucasian. In addition, of those who reported their student status, 96% (*n* = 162) were attending the University of Ottawa full-time and 60% (*n* = 101) were in their first year of university. Due to the nature of this study, students were ostensibly invited to participate in an online study examining the relationship between Facebook and well-being. The study was advertised to take participants 30 minutes to complete, and participants received one participation point in exchange for their time. Participants were able to complete the study online, at a time and place of their own choosing, provided that it was prior to the study deadline.

Participants completed the survey and were randomly assigned to their experimental condition using Qualtrics. After the informed consent process, participants were thanked for participating in the study. The message the participants received was dependent on their study condition. Specifically, participants in the autonomy supportive condition received the following message: “Thank you for your decision to support and be part of the University of Ottawa’s research community! Participating in this research is important as it helps us understand how common social media platforms, such as Facebook, may be impacting our psychological health.

By choosing to participate in this study, you will experience the research process first-hand, while also learning about how your own behaviours on Facebook may be influencing your well-being." On another survey page, the message continued as: "We understand that answering survey questions may sometimes be tedious, and that items may seem repetitive to you. However, all the questions in the survey are important as they improve the validity of the study and help us build a better understanding of people's experiences. Please take as much time as you need to focus on and understand the content of the questions that are being asked, and how you think they relate to you and your personal experience with Facebook use. The more you answer truthfully, the more useful your information will be to help us understand your experiences on Facebook and how your experiences impact you."

In contrast, in the neutral condition, participants received the following message: "Thank you for participating in our research study. Participating in this research will help inform how common social media platforms, such as Facebook, may be impacting users' psychological health. By participating in this study, you will experience the research process first-hand, and help us understand how behaviours on Facebook may be influencing user's well-being." On another page, the message continued as: "Although questions may seem repetitive to you, all the questions in the survey are important and help us understand people's experiences. Therefore, we ask that you focus on the content of the questions that are being asked, and how you think they relate to you and your experience with Facebook use. The more participants answer truthfully, the more useful the information provided will help us understand how experiences on Facebook impacts well-being."

In comparison to the neutral message, the autonomy supportive message aimed to be more personalized, used non-pressuring language, and provided stronger rationale for paying

attention over the course of the study, while acknowledging the participants' perspective and potential negative affect that may be experienced from answering survey items. After exposure to the manipulation, participants continued to fill out survey items on motivation for research participation, academic motivation, subjective and eudaimonic well-being, Facebook use, personality, and life goals.

Measures

Substantive Measures. Although participants completed a myriad of measures online, only two measures were of interest in this study. First, as discussed in Chapter 4, participants completed a 6-item measure of motivation towards research participation. Each item corresponded to the six regulation subtypes ranging from intrinsic motivation to amotivation. A research autonomous motivation variable was created by averaging the scores from the identified and intrinsic items. In addition, a research controlled motivation variable was created by averaging the scores from the external and introjected items. Descriptive statistics and intercorrelations between research regulation subtypes by experimental condition are shown in Tables 5.1-5.2. Furthermore, participants completed the Academic Motivation Scale (AMS; Vallerand, Pelletier, Blais, Briere, Senecal, & Vallieres, 1992), a measure of students' motivation towards attending University. The AMS separates intrinsic motivation into three different subtypes: to know, to accomplish, and to experience stimulation. Furthermore, this scale also measures identified, introjected, and external regulation, as well as amotivation. Similar to research motivation, a score was created for academic autonomous motivation by averaging scores from intrinsic and identified items ($\alpha = .92$). Furthermore, an academic controlled motivation composite was formed by averaging scores from the external and introjected subscales ($\alpha = .86$). Finally, an academic amotivation composite was formed by averaging the

three items assessing amotivation (α = .90). Descriptive statistics and intercorrelations between Academic regulation subtypes by experimental condition are shown in Tables 5.3-5.4. The items related to assessing motivation toward research and the AMS were presented near the beginning of each study in the hopes that students are likely to feel more engaged and answer the items attentively.

Insufficient Effort Responding Indices. Indicators of IER were consistent with those used in Study 3 and included proactive and reactive measures. Specifically, for proactive measures, the shortened infrequency scale (Huang, Bowling, Liu, & Li, 2015) was used, in which three highly improbable items are used to screen for IER. Participants who agree to these highly improbably items (i.e., “I have never used a computer before), were coded (1) as engaging in IER. Otherwise they were coded as (0), if they did not endorse the improbable statement. A forced-response option was also used as a proactive measure of IER, in which participants were instructed to “Select response option five” for that item (Huang et al., 2012). Participants who responded anything but response option five was coded as engaging in IER (1). Otherwise, if they responded as instructed, respondents were coded as attentive on this measure (0). In addition, one item was purposefully left blank on this survey at the end of the second survey page. Participants who provided a response on this blank item were coded (1) as engaging IER. If the respondent did not respond to the blank item, they were coded as attentive (0).

For reactive measures, the response time and long-string approach were used to measure IER across all survey pages. For the response time approach (Huang et al., 2012), participants who spent less than two seconds per item response were coded as engaging in IER (1) for each page, whereas participants who spent greater than two seconds per item was coded as attentive

(0) for each survey page. Therefore, participants could receive up to a maximum of five points toward their IER score on from response time.

The long-string approach was also used to measure IER (Costa & McCrae, 2008) across all pages, up to a maximum of five points. Participants who responded to a multidimensional scale with the same response option representing a quarter of items on a page or more were coded as inattentive (1), whereas those who varied their response option more often were coded as attentive (0).

Results

An overall IER index score was formed by summing the number of identified violations using the proactive and reactive methods discussed above. Table 5.5 shows a frequency distribution of overall IER violations that were identified among participants by study condition. Overall IER scores ranged between 0 and 15 in this study. In addition to the overall IER measure, IER indices were also formed for just the proactive and reactive measures. The frequency distribution of proactive IER measures by study condition is shown in Table 5.6. Proactive IER scores ranged between 0 and 4. In addition, the frequency distribution of reactive IER measures by study condition is displayed in Table 5.7. Reactive scores ranged between 0 and 11. Table 5.8 presents the descriptive statistics for this study by condition. In addition, Table 5.9 and Table 5.10 show intercorrelations between study variables by the Control and Autonomy Support conditions respectively.

Control versus Autonomy-Supportive Condition

A series of independent samples t-tests were conducted to examine mean differences in motivation and IER scores between the control and autonomy supportive experimental conditions. The overall results of these analyses revealed that there were no mean differences on

academic amotivation, $t(167) = 0.38$, $p = .707$, academic controlled motivation, $t(167) = 0.49$, $p = .628$, nor academic autonomous motivation, $t(167) = -0.15$, $p = .878$, between study conditions. Furthermore, there were no statistically significant mean differences on research amotivation, $t(167) = -0.63$, $p = .529$, nor controlled motivation for research, $t(167) = 1.19$, $p = .238$ based on study condition. However, contrary to our expectations, a statistically significant mean difference was found for autonomous motivation for research, $t(167) = 2.14$, $p = .034$, between the control ($M = 3.94$; $SD = 1.34$) and autonomy supportive conditions ($M = 3.51$; $SD = 1.25$). Finally, no statistically significant mean differences were found between study conditions on the overall IER index, $t(167) = 0.16$, $p = .874$, proactive measures of IER, $t(167) = 0.75$, $p = .455$, nor reactive measures of IER, $t(167) = -0.18$, $p = .856$.

Three moderated mediation analyses were conducted to examine the conditional indirect effect of academic motivation on IER. Academic motivation served as the independent variable, with research motivation serving as a mediator. The experimental condition (autonomy supportive versus control) served as the moderator in the model, with the control condition assigned as the reference group (0). The type of motivation examined changed across each moderated mediation (i.e., amotivation, controlled motivation, autonomous motivation).

In order to examine moderated mediation, an indirect effect needs to be established between academic motivation and IER through research motivation. Following, it is examined whether the direct and indirect effects on IER change as a function of the moderating variable, in this case, the experimental condition.

Amotivation

The results of the mediation analysis evaluating whether research amotivation would mediate the relationship between academic amotivation and IER is shown in Table 5.11, and a

path diagram is shown in Figure 5.1. Initially, academic amotivation had a statistically significant positive relationship with IER, *b* = .77, $p < .001$. After accounting for research amotivation, academic amotivation retained a statistically significant direct effect on IER, *b* = .63, $p < .001$. Furthermore, there was a statistically significant indirect effect, *indirect* = .14, *SE* = .07, 95% *CI* [.03, .30] through research amotivation. The relative indirect effect, $P_M = .1223$, indicated that 12.23% of the total effect of academic amotivation on IER is mediated by research amotivation.

The conditional indirect effect (see Figure 5.2) of academic amotivation on IER through research amotivation by experimental condition was estimated using ordinary least squares regression with bootstrapping procedures. The independent variable and mediator were mean-centered before analysis. The moderator was coded as (0) for the control condition and (1) for the autonomy supportive condition. The moderated mediation analysis was conducted in PROCESS v3 (model 15) macro in SPSS (Hayes, 2017).

Table 5.12 shows the results of the moderated mediation analyses evaluating whether research amotivation would mediate the relationship between academic amotivation and IER. A statistically significant interaction term was found between research amotivation and the moderator, *b* = -.69, *p* = .013. Figure 5.3 displays the interaction between research amotivation and IER across levels of the moderator. Results indicated that in the control condition, research amotivation and IER were positively related, *b* = .86, $p < .001$. However, in the autonomy supportive condition, this relationship was no longer statistically significant, *b* = .17, *p* = .224. Furthermore, the indirect effect of academic amotivation on IER through research amotivation, was only statistically significant in the control condition, *indirect* = .30, *SE* = .13, 95% *CI* [.07, .58]. The indirect effect was not statistically significant in the autonomy supportive condition,

indirect = .06, *SE* = .05, 95% *CI* [-.04, .17]. The index of moderated mediation, which examines the differences between the conditional indirect effects, as well as the direct effects), was statistically significant, *index* = -.24, *SE* = .13, 95% *CI* [-.54, -.03]. This index indicated that moderated mediation was found. In other words, experimental condition moderated the relationship between academic amotivation and IER through research amotivation.

Controlled Motivation

The results of the mediation analysis (see Figure 5.4) evaluating whether research-controlled motivation would mediate the relationship between academic controlled motivation and IER is shown in Table 5.13. Initially, academic controlled motivation did not have a statistically significant relationship with IER, *b* = -.17, *p* = 313. Likewise, after accounting for research controlled motivation, academic controlled motivation did not have a statistically significant direct effect on IER, *b* = -.26, *p* = .141. Furthermore, the indirect effect was not statistically significant, *indirect* = .09, *SE* = .07, 95% *CI* [-.03, .24].

Autonomous Motivation

The results of the mediation analysis (see Figure 5.5) evaluating whether research autonomous motivation would mediate the relationship between academic autonomous motivation and IER is shown in Table 5.14. Initially, academic autonomous motivation did not have a statistically significant relationship with IER, *b* = -.13, *p* = .518. In addition, after accounting for research autonomous motivation as a mediator, academic autonomous motivation did not have a statistically significant direct effect, *b* = -.08, *p* = .702. Furthermore, the indirect effect was also not statistically significant, *indirect* = -.05, *SE* = .08, 95% *CI* [-.20, .13].

Discussion

Extending the findings of the previous chapters, this study aimed to determine whether framing the introduction of an online study in an autonomy supportive manner would reduce IER among undergraduate volunteer research participants recruited through the University of Ottawa's Integrated System of Participation in Research. Specifically, it was examined whether the experimental condition would moderate the relationship between academic motivation and IER through research motivation, across varying motivational qualities.

Consistent with findings described in previous chapters, academic amotivation was found to be positively related to IER through research amotivation. That is, a student who lacks intentionality in going to school tended to complete the online survey with less care and/or effort, because they do not understand why they are participating in a study or how it was useful to them. On the other hand, controlled and autonomous forms of motivation did not predict IER at either the broader contextual (i.e., academic), or situational (i.e., research) levels.

Of importance in this study, it was further examined if interventions can be used to reduce IER among survey participants. Findings from this study suggest that the autonomy supportive intervention strategy did not reduce overall levels of IER in comparison to the control group as hypothesized. However, autonomy supportive framing, in respect to how the study is introduced to a student, appeared to negate the positive relationship between research amotivation and IER. Specifically, it was found that for participants in the autonomy supportive condition, participants' research amotivation was not associated with IER, as was the case in the control condition. Furthermore, the positive relationship between academic amotivation and IER through research amotivation was also not significant in the autonomy supportive condition. The results of this study suggest that the implementation of autonomy supportive intervention may

contribute to the reduction of IER through a stepwise process through amotivation, rather than having a direct effect on IER.

Whereas amotivation is characterized with a lack of intentionality and not fully understanding why one is engaging in a behaviour, participants who experience autonomy supportive framing may find meaning in their engagement with a research task. Specifically, an autonomy supportive script, even when not delivered face-to-face, can help facilitate engagement and understanding of why participation in a study is important by engaging in perspective taking and providing a rationale to participants while acknowledging their negative affect and using non-pressuring language.

Understanding the benefit of using an autonomy supportive intervention in reducing IER may be best approached from the viewpoint of a multidimensional taxonomy of amotivation. Legault, Green-Demers, and Pelletier (2006) propose that academic amotivation can be separated into four dimensions representing ability beliefs, effort beliefs, characteristics of the task, and value placed on the task. Regarding IER, it is possible that the latter two dimensions may be of particular importance. Students who experience amotivation toward their education may not place value in participating in research activities as part of their learning experience. Furthermore, amotivation may ensue when the task at hand is experienced as boring and void of interest to the student, as is the case of some survey studies due its repetitive nature. However, an autonomy supportive intervention, such as the one used in this study, can be used to address the lack of inherent value or interest in the task. Specifically, by engaging participants in a non-pressuring manner, providing participants with the reasons for participation and why it is important, and outlining that they are a part of a larger research community, students may be

more able to identify why they are participating in the study for their own reasons, or able to internalize the reasons that are given to them.

The current study represents the first to use a motivation-based intervention strategy to reduce IER among undergraduate research participants. Additional research will be needed in the future to examine how autonomy supportive framing should be delivered. For example, in this study, an autonomy support was only primed once at the beginning of the study. However, it would be important to determine if studies of a longer length would need to be bolstered by framing at different points of the study. Furthermore, this study used four of six behaviours identified as comprising of autonomy supportive behaviour. For logistical reasons, it may be of interest to researchers to examine which of the four behaviours are crucial to use during an intervention, to reduce potential for participant fatigue, especially when autonomy supportive messages are given at multiple points throughout the study.

Although this study was the first to examine using autonomy support as a potential intervention strategy to decrease IER, it is not without its limitations. For instance, a manipulation check was not used in this study, therefore it is unknown whether the autonomy supportive behaviors were perceived differently from the control condition. Furthermore, it is unknown whether or not the autonomy supportive condition influenced participants' quality of motivation, as motivation was only assessed after the intervention, and not beforehand.

Notably, intervention strategies were not used to target the remaining two psychological needs proposed by SDT (Deci & Ryan, 2000), competence and relatedness. Indeed, it has been commonly criticized that competence and relatedness needs are rarely experimentally manipulated within SDT research (Sheldon & Filak, 2008), and this represents a limitation of this study. Although it may be expected that maintained performance on an easy, yet potentially

uninteresting task, such as thoughtfully completing a survey, would best be targeted using autonomy support, more research is needed to examine the role of competence and relatedness. Future research should consider manipulating each need individually in order to examine additive or interactive effects of the three needs on IER as a potential prevention strategy to reduce careless responding among undergraduate participants.

In sum, the overall goal of this study was to identify a strategy to reduce IER among undergraduate research participants based on a motivational approach. Results of this study indicated that an autonomy supportive approach, whereby there is a focus on providing the participant with rationale, using perspective-taking and non-pressuring language, as well as acknowledging negative feelings, may be used in order to counteract the negative effects that academic and research amotivation may have on participant behaviours in survey research.

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Table 5.1

Study 4: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Research Motivation for the Control Condition (n = 84)

Measure	Mean	SD	1	2	3	4	5
1. Research Amotivation	2.18	1.44	-				
2. Research External Regulation	5.52	1.87	.11	-			
3. Research Introjected Regulation	2.80	1.73	.40**	.05	-		
4. Research Identified Regulation	4.19	1.47	-.08	-.20	.29**	-	
5. Research Intrinsic Motivation	3.66	1.43	-.06	-.34**	.21	.70**	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 5.2

Study 4: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Research Motivation for the Autonomy Support Condition (n = 85)

Measure	Mean	SD	1	2	3	4	5
1. Research Amotivation	2.32	1.42	-				
2. Research External Regulation	5.41	1.79	.19	-			
3. Research Introjected Regulation	2.43	1.53	.05	.10	-		
4. Research Identified Regulation	3.86	1.42	-.13	-.12	.27*	-	
5. Research Intrinsic Motivation	3.16	1.33	-.25*	-.23*	.26*	.66**	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 5.3

Study 4: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Academic Motivation for the Control Condition (n = 84)

Measure	Mean	SD	1	2	3	4	5
1. Academic Amotivation	1.96	1.40	-				
2. Academic External Regulation	5.48	1.19	.02	-			
3. Academic Introjected Regulation	4.68	1.49	.11	.46**	-		
4. Academic Identified Regulation	5.70	1.02	-.24*	.66**	.41**	-	
5. Academic Intrinsic Motivation	4.21	1.31	.03	.43**	.72**	.48**	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 5.4

Study 4: Descriptive Statistics and Intercorrelations between Regulation Subtypes of Academic Motivation for the Autonomy Support Condition (n = 85)

Measure	Mean	SD	1	2	3	4	5
1. Academic Amotivation	1.89	1.19	-				
2. Academic External Regulation	5.42	1.28	-.11	-			
3. Academic Introjected Regulation	4.53	1.45	-.03	.42**	-		
4. Academic Identified Regulation	5.63	1.06	-.46**	.64**	.38**	-	
5. Academic Intrinsic Motivation	4.32	1.13	-.14	.24*	.57**	.50**	-

Note. * = Correlation is statistically significant at $p < .05$ level (2-tailed). ** = Correlation is statistically significant at the $p < .01$ level (2-tailed).

Table 5.5

Study 4: Frequency Distribution of Proactive and Reactive Insufficient Effort Responding Violations by Study Condition (N = 169)

	Control Condition (n = 84)		Autonomy Support Condition (n = 85)	
Number of Violations	Frequency	Percent	Frequency	Percent
0	1	1.19%	5	5.88%
1	5	5.95%	12	14.12%
2	12	14.29%	20	23.53%
3	21	25.00%	20	23.53%
4	19	22.62%	13	15.29%
5	8	9.52%	4	4.71%
6	6	7.14%	5	5.88%
7	5	5.95%	1	1.18%
8	0	0%	5	5.88%
9	2	2.38%	0	0%
10	1	1.19%	1	1.18%
11	2	2.38%	3	3.53%
12	0	0%	0	0%
13	0	0%	1	1.18%
14	1	1.19%	0	0%
15	1	1.19%	0	0%

Table 5.6

Study 4: Frequency Distribution of Proactive Insufficient Effort Responding Violations by Study Condition (N = 169)

	Control Condition (n = 84)		Autonomy Support Condition (n = 85)	
Number of Violations	Frequency	Percent	Frequency	Percent
0	46	54.76%	44	51.76%
1	21	25.00%	32	37.65%
2	9	10.71%	4	4.71%
3	5	5.95%	3	3.53%
4	3	3.57%	2	2.35%

Table 5.7

Study 4: Frequency Distribution of Reactive Insufficient Effort Responding Violations by Study Condition (N = 169)

	Control Condition (n = 84)		Autonomy Support Condition (n = 85)	
Number of Violations	Frequency	Percent	Frequency	Percent
0	1	1.19%	1	1.18%
1	9	10.71%	5	5.88%
2	18	21.43%	18	21.18%
3	21	25.00%	28	32.94%
4	16	19.05%	14	16.47%
5	8	9.52%	7	8.24%
6	6	7.14%	6	7.06%
7	1	1.19%	3	3.53%
8	2	2.38%	1	1.18%
9	0	0%	1	1.18%
10	1	1.19%	1	1.18%
11	1	1.19%	0	0%

Table 5.8

Study 4: Means and Standard Deviations for Scores on General Motivation, Academic Motivation, and Insufficient Effort Responding by Study Condition (N = 169)

	Control Condition (n = 84)		Autonomy Support Condition (n = 85)	
Measure	Mean	Standard Deviation	Mean	Standard Deviation
Academic Amotivation	1.96	1.40	1.89	1.19
Academic Controlled Motivation	5.08	1.15	4.98	1.15
Academic Autonomous Motivation	4.95	1.00	4.97	0.95
Research Amotivation	2.18	1.44	2.32	1.42
Research Controlled Motivation	4.16	1.31	3.93	1.23
Research Autonomous Motivation	3.94	1.35	3.51	1.25
Insufficient Effort Responding (Overall)	4.26	2.70	4.20	2.35
Insufficient Effort Responding (Proactive)	0.79	1.09	0.67	0.90
Insufficient Effort Responding (Reactive)	3.48	1.98	3.53	1.82

Table 5.9

Study 4: Spearman's Rho Intercorrelations for Scores on Academic Motivation, Research Motivation, and Insufficient Effort Responding for Control Condition (n = 84)

		1	2	3	4	5	6	7	8
1	Academic Amotivation								
2	Academic Controlled Motivation	.01							
3	Academic Autonomous Motivation	-.17	.75						
4	Research Amotivation	.40	.08	.01					
5	Research Controlled Motivation	.14	.30	.33	-.14				
6	Research Autonomous Motivation	.17	.31	.31	.32	.04			
7	Insufficient Effort Responding (Overall)	.19	-.09	.02	.38	-.09	.10		
8	Insufficient Effort Responding (Proactive)	.17	-.08	-.04	.39	-.09	.07	.57	
9	Insufficient Effort Responding (Reactive)	.17	-.08	.02	.30	-.06	.09	.91	.24

Note. * p < .05; ** p < .01.

Table 5.10

Study 4: Spearman's Rho Intercorrelations for Scores on Academic Motivation, Research Motivation, and Insufficient Effort Responding for Autonomy Support Condition (n = 85)

		1	2	3	4	5	6	7	8
1	Academic Amotivation								
2	Academic Controlled Motivation	-.15							
3	Academic Autonomous Motivation	-.31	.67						
4	Research Amotivation	.12	.19	.03					
5	Research Controlled Motivation	.09	.13	.29	-.13				
6	Research Autonomous Motivation	.20	.19	.08	.17	.09			
7	Insufficient Effort Responding (Overall)	.29	-.09	-.14	.14	-.16	.00		
8	Insufficient Effort Responding (Proactive)	.20	-.05	-.21	.13	-.14	-.14	.54	
9	Insufficient Effort Responding (Reactive)	.27	-.08	-.09	.11	-.14	.08	.92	.22

Note. * p < .05; ** p < .01.

Table 5.11

Study 4: Path Coefficients and Model Summary for Indirect Effect of Academic Amotivation on Insufficient Effort Responding (N = 169)

		Consequent						
		M (RESEARCH AMOTIVATION)				Y (INSUFFICENT EFFORT RESPONDING)		
Antecedent		Coeff.	*SE*	*p*		Coeff.	*SE*	*p*
X (ACADEMIC AMOTIVATION)	a	0.34 [.18, .50]	0.08	< .001	c'	0.63 [.35, .91]	0.14	< .001
M (RESEARCH AMOTIVATION)					b	0.41 [.16, .67]	0.13	< .001
Constant	i_M	1.59 [1.12, 1.96]	0.19	< .001	i_Y	2.09 [1.36, 2.83]	0.37	< .001
		$R^2 = .097$				$R^2 = .205$		
		F(1, 167) = 17.85, p < .001				F(12, 166) = 21.46, p < .001		

Table 5.12

Study 4: Path Coefficients and Model Summary for Conditional Indirect Effect of Academic Amotivation on Insufficient Effort Responding through Research Amotivation by Study Condition (N = 169)

		Consequent						
		M (RESEARCH AMOTIVATION)				Y (INSUFFICIENT EFFORT RESPONDING		
		b	*SE*	*p*		b	*SE*	*p*
X (ACADEMIC AMOTIVATION)	a	0.34 [.14, .55]	0.10	.001	$c_{1'}$	0.19 [-.27, .65]	0.23	.425
M (RESEARCH AMOTIVATION)					b_{1i}	0.86 [.39, 1.32]	0.24	< .001
CONDITION					$c_{2'}$	-.09 [-.77, .59]	0.35	.792
ACADEMIC AMOTIVATION x CONDITION					$c_{3'}$	0.75 [-.04, 1.53]	0.40	.064
RESEARCH AMOTIVATION x CONDITION					b_{2i} '	-0.69 [-1.23, -.15]	0.27	.013

Table 5.13

Study 4: Path Coefficients and Model Summary for Conditional Indirect Effect of Academic Controlled Motivation on Insufficient Effort Responding through Research Controlled Motivation by Study Condition (N = 169)

		Consequent						
		M (RESEARCH CONTROLLED MOTIVATION)				Y (INSUFFICENT EFFORT RESPONDING)		
Antecedent		Coeff.	*SE*	*p*		Coeff.	*SE*	*p*
X (ACADEMIC CONTROLLED MOTIVATION)	a	0.33 [.17, .49]	0.08	< .001	c'	-0.26 [-.61, .09]	0.18	.141
M (RESEARCH CONTROLLED MOTIVATION)					b	0.27 [-.04, .59]	0.16	.088
Constant	i_M	4.44 [2.56, 6.32]	0.95	< .001	i_Y	4.44 [2.56, 6.31]	0.95	< .001
		$R^2 = .088$				$R^2 = .023$		
		$F(1, 167) = 16.06, p < .001$				$F(2, 166) = 1.99, p = .140$		

Table 5.14

Study 4: Path Coefficients and Model Summary for Conditional Indirect Effect of Academic Autonomous Motivation on Insufficient Effort Responding through Research Autonomous Motivation by Study Condition (N = 169)

		Consequent						
		M (RESEARCH AUTONOMOUS MOTIVATION)				Y (INSUFFICENT EFFORT RESPONDING)		
Antecedent		Coeff.	*SE*	*p*		Coeff.	*SE*	*p*
X (ACADEMIC AUTONOMOUS MOTIVATION)	a	0.39 [.19, .59]	0.1	< .001	c'	-0.08 [-.49, .33]	0.21	.702
M (RESEARCH AUTONOMOUS MOTIVATION)					b	-0.13 [-.43, .18]	0.15	.415
Constant	i_M	1.79 [.79, 2.79]	0.51	< .001	i_Y	5.10 [3.02, 7.18]	1.05	< .001
		$R^2 = .083$				$R^2 = .007$		
		$F(1, 167) = 15.16, p < .001$				$F(2, 166) = 0.54, p = .518$		

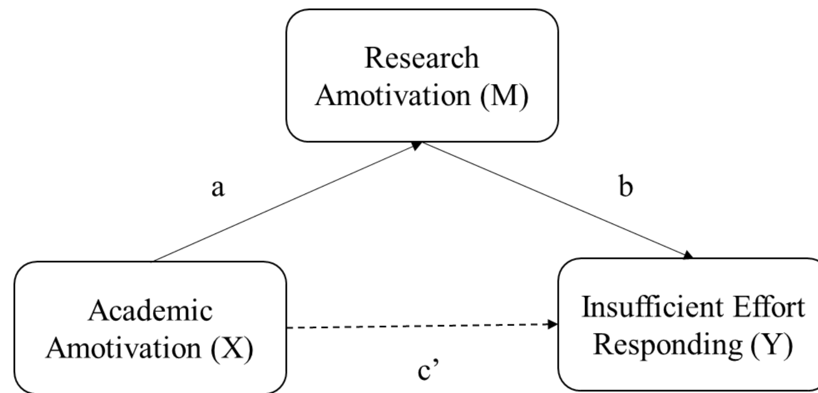

Figure 5.1. Study 4: Path diagram of academic amotivation on insufficient effort responding through research amotivation. Statistically significant path effects are denoted by a solid line, whereas non-significant pathways are denoted by a dotted line.

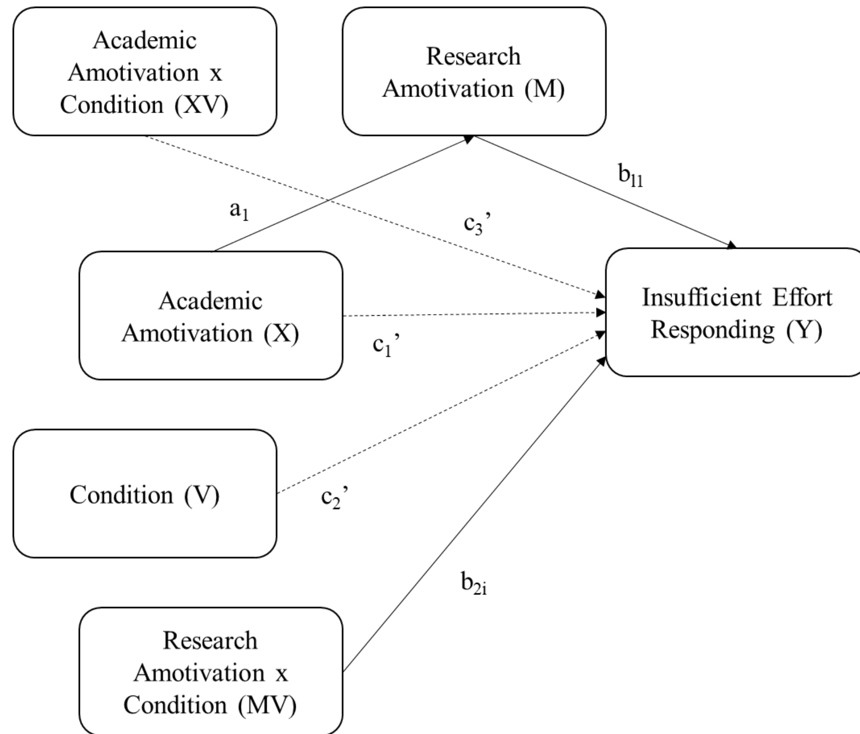

Figure 5.2. Study 4: Path diagram of conditional indirect effect of academic amotivation on insufficient effort responding through research amotivation by study condition. Statistically significant path effects are denoted by a solid line, whereas non-significant pathways are denoted by a dotted line.

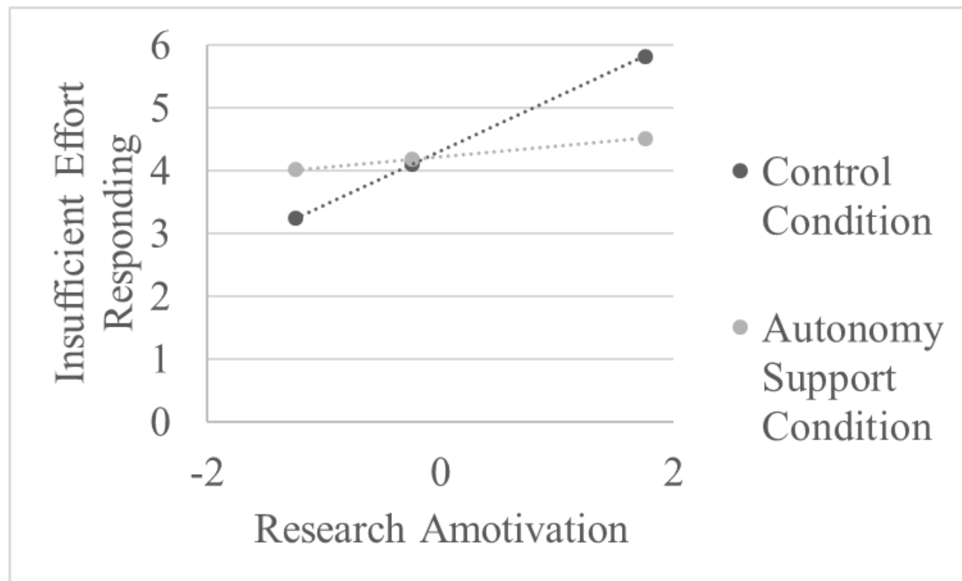

Figure 5.3. Study 4: Interaction between research amotivation and insufficient effort responding by experimental condition.

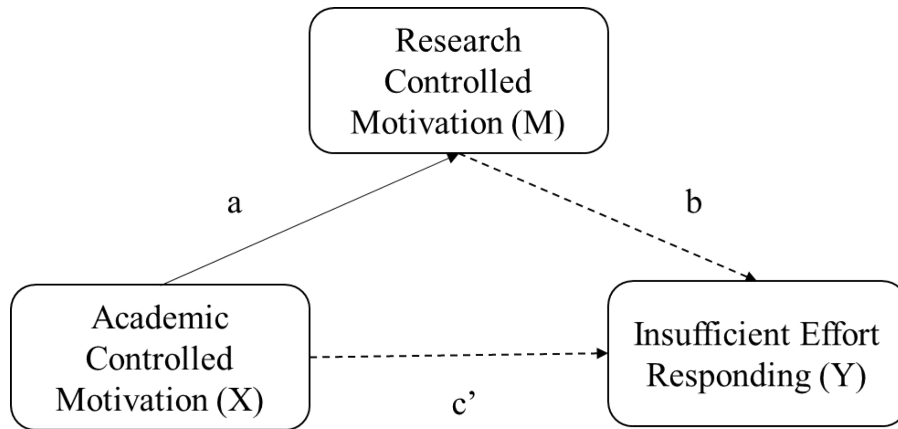

Figure 5.4. Study 4: Path diagram of academic controlled motivation on insufficient effort responding through research controlled motivation. Statistically significant path effects are denoted by a solid line, whereas non-significant pathways are denoted by a dotted line.

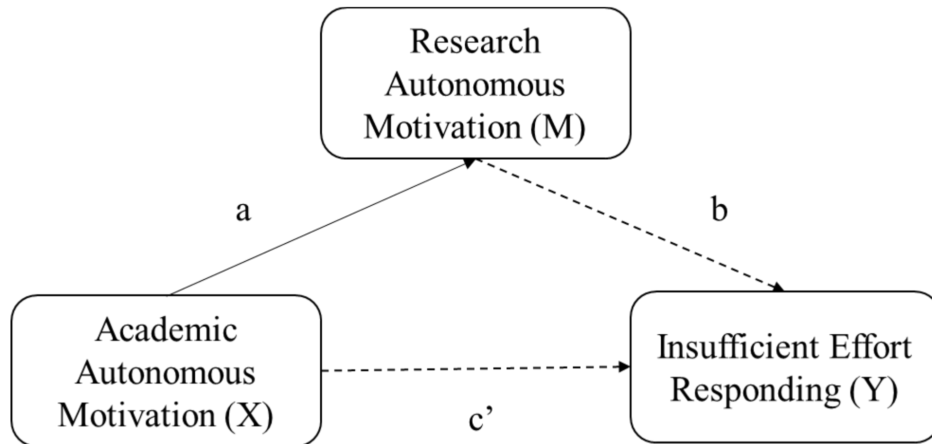

Figure 5.5. Study 4: Path diagram of academic autonomous motivation on insufficient effort responding through research autonomous motivation. Statistically significant path effects are denoted by a solid line, whereas non-significant pathways are denoted by a dotted line.

CHAPTER SIX

GENERAL DISCUSSION

The primary purpose of this dissertation was to examine the prevalence and correlates of insufficient effort responding (IER) in survey research within undergraduate participants recruited through the University of Ottawa's Integrated System for Participation in Research (ISPR) pool. A further goal of this dissertation was to explore potential intervention strategies that can be used to mitigate the negative effects of IER among undergraduate participants. The findings of the four studies examining these goals will be discussed below. The limitations of each study will also be outlined, and directions for future research will be proposed. Following, the implications of IER on the validity of survey research conducted through university research participation pools will be discussed.

Advances in psychological research has been facilitated by the creation of undergraduate research participation pools within the university setting, such as the University of Ottawa's ISPR. Such participation pools allow researchers at university institutions access to a continuously changing cohort of potential participants, while minimizing the resources needed to recruit participants. In turn, students are given the opportunity to experience how research is conducted first-hand and are commonly given compensation in the form of research participation points that are used to either augment or fulfill part of their course grade.

Due to this largely symbiotic relationship between researchers and undergraduate students, undergraduate students tend to form a large proportion of samples used for psychological research (Arnett, 2008; Sharpe and Poets, 2017). However, the use of undergraduate students as participants within the field of Psychology has been criticized as not being representative of the general population. For example, researchers have found that similar

recruitment methods to undergraduate research participation pools, such as online crowdsourcing services, can be used to recruit more diverse samples in terms of age, socioeconomic status, and ethnicity (Buhrmester, Kwang, & Gosling, 2011). However, crowdsourced participants recruited through open participation pools such as Amazon's MTurk, may also have their own biases and be limited in how representative they are of the general population as well (Chandler, Mueller, & Paolacci, 2014). Furthermore, participating in research gives students an experiential learning experience that could not otherwise be provided (Elliot, Rice, Tramfimow, Madson, & Hipshur, 2010). Therefore, university psychological research participation pools continue to be used despite the introduction of crowdsourced platforms for participant recruitment.

Psychology research participation pools are also not without their own limitations besides the representativeness of its samples. For example, students are sometimes not as willing to participate as some researchers might hope. Although each university sets its own rules and regulations for how their undergraduate research participation pool is governed, students often feel that it is necessary to participate in research in order to optimize their final course grade through participation credits (Flagel, Best, & Hunter, 2007). Consequently, students may feel coerced into participating in research even though a secondary option is often available to students in lieu of research participation. For example, students at the University of Ottawa have the option of watching short videos describing human behavior or various research methods and then filling out a questionnaire on the video as an alternative.

Even though most students see the value of participating in research and prefer the experiential learning experience versus listening to a classroom lecture (Elliot, Rice, Tramfimow, Madson, & Hipshur, 2010), students also report diminishing returns, such that the perceived benefits of participation decreases as the number of hours of participation increases (Miles,

Cromer, & Narayan, 2015). Therefore, there may be a limit to how much undergraduate students care about their contribution to research and may eventually feel coerced or poorly motivated to participate. The perception of coercion may especially be evident when students are required to gain participation credits for multiple courses in the same semester (Cromer, Reynolds, & Johnson, 2013).

The potential coercive nature of using undergraduate research participation pools can be problematic given that participants may lack the motivation to attend to the research at hand and consequently provide data that is disingenuous. Echoing this sentiment, Ramsey, Thompson, McKenzie, and Rosenbaum (2016) warned that the “weakest link in psychological research may be the quality of the data provided by participants, many of whom are undergraduates “coerced” into participation as one way to satisfy class research requirements” (p. 359). Participants may particularly be susceptible to providing data of questionable quality when the study is conducted unsupervised and while data is collected anonymously, such as when participants are invited to complete an online survey outside a controlled laboratory environment.

Through a series of four studies, this dissertation aimed to examine the prevalence, correlates, and potential mitigators of IER among undergraduate research participants recruited through the University of Ottawa’s ISPR from a motivational perspective. The aim of Study 1 was to establish that IER occurs among undergraduate students at the University of Ottawa when completing an online survey. Furthermore, this study aimed not only to identify the rate of IER, but also to examine if gender, time of semester, and general motivation was related with IER. This study also identified whether students who engage in IER are as likely to complete their required participation credits, or if they tend to self-select themselves out of the research experience. The aim of Study 2 was to provide evidence that the relationship between general

motivation and IER was partially explained by domain-level academic motivation. Study 3 introduced the possibility of using intervention strategies to deter IER among university students. Specifically, this study examined if warning participants against IER would be sufficient in deterring careless responding. In addition, this study also examined whether completing a study in a more controlled environment (i.e., in a laboratory) would be conducive to having participants engage in less behaviors that were consistent with IER. Lastly, Study 4 examined the feasibility of using an intervention strategy grounded in self-determination theory (SDT), that used autonomy supportive message-framing to decrease amotivation in order to reduce IER among undergraduate volunteer participants.

Prevalence of IER

Overall, the series of studies indicate that there is reason for significant concern regarding the prevalence of IER among participants recruited through the University of Ottawa's ISPR with regards to survey research. Although students can freely choose the type and topic of research studies they participate in, participants may nonetheless have their level of effort wane throughout the course of completing a survey study (Meade & Craig, 2012). The rate of problematic IER, defined as 4 or more violations, ranged from 7.70% to 55.10% across the four conducted studies. Previous research suggests that IER at a rate of 10-15% is enough to alter the substantive results of the study (Clark, Gioronda, & Young, 2003). Participants who engage in IER generate additional statistical noise or error which can contribute to inflated error variance and reduce internal consistency estimates among measures. Furthermore, the presence of insufficient effort responses can attenuate (Schmitt & Stults, 1985; Woods, 2006) or inflate correlations between substantive measures (Huang et al., 2015). To that end, IER can lead to both Type I and Type II error, depending on how the IER is manifested in participants' responses

(Huang et al., 2014). Because IER is not generally captured in normal data cleaning procedures (e.g., outlier analysis), the findings in this dissertation raise concerns regarding the validity of results gathered from undergraduate research participants from the University of Ottawa's ISPR, and the need to identify correlates of IER and how its effects on data quality can be mitigated to improve the trustworthiness of the conclusions drawn from survey research conducted through university undergraduate research participation pools.

Correlates of IER

IER and the Quality of Motivation

The overall goal of Studies 1 to 4 was to establish a relationship between the quality of motivation and IER from a SDT perspective. Quality of motivation was observed at the general, domain, and situational/behavior-based levels across the studies to understand the relationship between quality of motivation and IER at varying levels of generality (Vallerand, 1997). Results from Study 1 were the first to provide evidence that there is a nuanced relationship between the quality of motivation and IER among undergraduate students participating in an internet-based study. Specifically, general amotivation was found to be positively related to IER among surveyed participants. Study 2 introduced motivation at the domain level to the model. Results from this study extended findings from Study 1 and provided evidence that the positive relationship between general amotivation and IER was explained by its positive relationship with academic amotivation. Study 3 provided evidence that the positive association between general amotivation and IER was explained because of corresponding increases in academic, and then research amotivation. Lastly, Study 4 provided additional evidence regarding the positive relationship between academic amotivation and IER through research amotivation. Findings

from the four studies conducted suggest that amotivation plays a role in IER among undergraduate participants.

According to SDT (Deci & Ryan, 1985; 2002), amotivation is defined as a unidimensional construct that represents an absence of motivation. Amotivation is experienced as a lack of agency or control of outcome due to the perception that the source of regulation is not under the control of the individual. Therefore, individuals who experience amotivation toward an activity experience a lack of meaning towards the behavior as the outcome and behavior are perceived to be disconnected.

However, more recent conceptualizations of amotivation within SDT have proposed a multidimensional approach (Legault, Green-Demers, & Pelletier, 2006; Pelletier, Dion, Tuson, & Green-Demers, 1999). That is, , Legault and colleagues propose that students may lack motivation toward school for different reasons.

A multidimensional approach to academic amotivation within SDT proposes four dimensions: ability beliefs, effort beliefs, characteristics of the task, and value placed on the task. Ability beliefs refer to a student's self-perceived competency to perform an academic task. Lack of ability beliefs therefore contributes to a student's experience of amotivation because they do not believe that their behavior has an impact on the outcome, which is consistent with the learned helplessness conceptualization of amotivation. Effort beliefs refer to the desire and capacity of students to exert energy in order to perform a behavior. A lack of effort beliefs leads to the experience of amotivation because students do not believe that they have the ability to exert or sustain levels of effort to obtain a desired outcome. Characteristics of the task refers to how the task is perceived by the student. For instance, students may experience amotivation because they do not perceive the experience of the academic task as interesting or engaging. Finally, value

placed on the task itself refers to how important the task is perceived to be to the student. When students do not perceive the academic task to be important to them, they may experience academic amotivation.

Regarding IER among undergraduate research participants, the value of investigating amotivation as a correlate is evident in that it reflects at least two of the four dimensions in the multidimensional approach. For example, despite having a choice of studies, students may perceive survey research to be uninteresting. Interest in the task may also wane as participants spend cumulative time participating in research. This is aligned with findings that suggest the IER is more likely to occur near the end of the survey when compared to the beginning of the survey (Meade & Craig, 2005), and the possibility of participation fatigue across the semester when participation credits are needed for multiple classes (Cromer, Reynolds, & Johnson, 2013). In addition, participants may also experience amotivation toward the task because they feel that participating in research is unimportant to them. For these students, participating in research may be experienced as a hoop that they need to jump through in order to obtain course credit rather than a learning experience unto itself. The separation of participating in research as a purposeful learning activity versus another task that one just has to go through can have implications for how students perceive the research experience. That is, students who see it as meaningless and uninteresting will likely engage in IER, as indicated in the results of this program of research. A multidimensional approach to amotivation in the understanding of how it may contribute to IER among undergraduate students may help inform what interventions can be used to prevent students from disengaging in research and providing careless responses. For example, strategies that influence how the task is perceived in terms of value and interest can reduce academic amotivation among participants, and therefore reduce IER among undergraduate participants.

However, limited research has examined how various aspects of amotivation within the multidimensional approach influence student engagement in an academic activity.

Intervention Strategies for the Mitigation of the Effects of IER

Study 3 attempted to replicate previous findings that suggested that providing students with a warning message would be sufficient to deter IER in a 300-item questionnaire (Huang, Curran, Kenney, Poposki, & Deshon, 2012). However, results of Study 3 did not replicate previous findings. Notably, participants in Huang and colleagues' study were told that they would lose their participation credit if they were identified as insufficient effort responders, whereas the methodology used in Study 3 did not include this threat. The tangible threat of losing participation credit therefore appears to be an effective means of deterring IER within an undergraduate sample. However, this method of deterrence would need to be further vetted from an ethical standpoint by the University of Ottawa's Office of Research Ethics and Integrity, and may contradict the general ethical guidelines set out by the University.

From a SDT perspective, providing a warning message to participants would constitute simulating a controlling environment. In such an environment, it would be assumed that students in the control condition would experience greater controlled motivation. However, results from the series of studies discussed in this dissertation found that controlled motivation was unrelated to IER. Furthermore, the previous study associated the warning message with negative punishment (the removal of the participation credit), which may introduce a difference in motivational dynamics. Study 3 chose not to replicate this aspect of the manipulation in the University of Ottawa sample as it was judged to be likely unethical to trick participants into believing that they may be losing participation credit.

Study 3 also examined differences in IER depending on whether the study was completed in the lab or online. Contrary to what may have been intuitive, the location in which participants completed the survey did not appear to influence the prevalence of IER in this sample. It is notable that previous research suggests that when left to their own devices, individuals will multi-task within their cognitive limit (Zwarun & Hall, 2014).

Although the prevalence of IER was compared between the online and lab condition, it is notable that in the laboratory condition, a researcher was not physically in the room to supervise the administration of the test. Therefore, it is unknown whether participants would be deterred further from engaging in IER if an experimenter was present throughout the course of the survey administration. In addition to this, to avoid self-selection bias, participants were initially recruited for a lab-based study and then were randomly selected to participate in the study online after first signing up. Participants in the internet condition were therefore given the opportunity to choose between completing the study online or in the lab.

The provision of choice may have been experienced as autonomy supportive, which could have indirectly influenced the findings of this study. Therefore, future research is needed to examine differences in IER between online and lab administrations (with and without an experimenter present) after accounting for the provision of choice.

In addition, researchers may wish to ask participants where they are completing their online study in terms of their physical location (e.g., school, at home). Students who complete the study in an environment that triggers their student schema, such as in a computer lab, may be less likely to engage in IER. In contrast, students who complete the study in their personal home environment may tend to let their attention drift away from the academic task. In particular, students who have their student schema engaged while completing an online survey may put in

more effort and focus on the task at hand. Students who complete the study in a more relaxed environment, such as at home, may simply perceive the task as something that they need to complete without triggering a student schema, and therefore may be more susceptible to distraction and insufficient effort.

Study 4 was the first study to examine the plausibility of using an intervention strategy based on SDT to reduce IER. Specifically, autonomy supportive message framing was used to examine whether it can be used to deter IER among survey participants. Results from this study suggest that the positive relationship between academic and task amotivation and IER was nullified in participants who received autonomy supportive message framing. Interestingly, these results did not indicate that there were statistically significant differences in amotivation between the experimental and control group as might be expected, nor were there statistically significant differences in the rates of IER between conditions. In other words, the autonomy supportive messaging did not change self-reported levels of motivation. Nonetheless, it appeared that the manipulation did change the nature of the relationship between amotivation and IER. Given that autonomy supportive manipulations have caused changes in motivational quality in past research (Steingut, Patall, & Trimble, 2017), this finding needs further exploration in the future to determine the stability and validity of this intervention.

Hierarchical Model of Intrinsic and Extrinsic Motivation

The results from Studies 2, 3, and 4 partially support the hierarchical model of intrinsic and extrinsic motivation (HMIEM; Vallerand, 1997). Across these studies, amotivation at lower levels of generality were positively correlated to higher-order levels of amotivation. For example, general amotivation was positively associated with academic amotivation. Furthermore, academic amotivation was positively related to amotivation towards research. The

relationship between motivation at different levels of generality may inform how interventions can be made at different through a bottom-up or top-down approach. For example, while Study 4 focused on influencing motivation at the behavioural level through autonomy supportive messaging, interventions by professors supporting the needs of students at the academic level may affect the likelihood that participants will later be willing to engage in focused task behaviours. One of the limitations of this study is that analyses were conducted from a top-down approach. That is, we sought to understand how general motivation influenced domain specific academic motivation, and then task-specific research motivation. However, future research is needed to look at this through a bottom-up approach, whereby research motivation influences student engagement in academia overall, and further to their life in general. It is plausible that students who become more engaged in research are willing to put forth more effort in school in order to pursue their interests. Furthermore, participating in research may open the doors to areas of interest in which they wish to pursue through further education.

Re-examination of Autonomous and Controlled Forms of Motivation

Self-determination research within the academic context has largely focused on autonomous and controlled forms of academic motivation. For example, autonomous academic motivation has been shown to be related to positive academic outcome such as greater conceptual understanding, active information processing, and greater cognitive flexibility (Grolnick & Ryan, 1987); better academic performance and self-concept (Deci, Vallerand, Pelletier, & Ryan, 1991; Reeve, Bolt, & Cai, 1999). In contrast, controlled academic motivation has been associated with negative consequences, such as dropping out of school (e.g., Vallerand, Fortier, & Guay,1997). However, limited research has examined the role of academic

amotivation in influencing positive and negative academic outcomes, such as engagement in out-of-classroom learning opportunities, like those provided by participation in research.

Interestingly, autonomous and controlled motivation did not in themselves predict IER at the different levels of generality However, one of the limitations of this research was that it took a variable-centered approach to analyzing motivation instead of creating a person-centered approach using motivational profiles. Ratelle, Guay, Vallerand, Larose, and Senécal (2007) found three unique motivational profiles among college students. The three motivational profiles included (a) students with high levels of autonomous motivation, but low levels of controlled motivation and amotivation, (b) students with high levels of both controlled and autonomous motivation, but low amotivation, and (c) students with low to moderate levels of all motivational components. The results of their study relating to academic performance showed that both the high autonomy group, and the high autonomy and controlled motivation group were similar in terms of outcome performance. However, they found that academic persistence was more strongly associated with those high in autonomous motivation compared to both.

Students engaging in research participation in order to meet the course requirements may participate in research for reasons that contain both autonomous and controlled reasons. On one hand, students may genuinely be interested in participating in research or the subject matter that the study addresses. Furthermore, they may be curious about the methodologies being used or how concepts in research methods are implemented in practice. On the other hand, students may simultaneously feel forced to participate in research or risk losing out on course credit. They may also feel pressured by their professors to engage in research therefore lack the inner motivational resources to engage when they do participate. Therefore, students may not engage in research solely out of autonomous or controlled reasons, but both.

Amotivation to Controlled and Autonomous Forms of Motivation: Resources for Internalization

When tasks are uninteresting and seemingly unimportant to students, facilitation of the internalization process is needed in order to support behavioral engagement and growth. Internalization, according to SDT, is a natural process by which an external demand is integrated into one's sense of self. That is, under ideal conditions, in which the psychological needs of autonomy, competence, and relatedness are met, individuals have a natural tendency to internalize behaviors, and to pursue them in an autonomous way. However, two conditions need to be met in order for students to internalize reasons for engaging in a school-related learning activity (Vansteenkiste et al., 2018). That is, students both need to see the value and importance of the learning activity, and have their psychological needs fulfilled.

Students are typically able to identify the value of tasks themselves, however, sometimes students may need to be supported in finding reasons why a task is personally important and valuable to them, especially when the task at hand is seemingly boring. When students are asked to perform an uninteresting task, teachers and/or researchers can facilitate an internalization process by explaining why the task has value and is meaningful to the student in a manner congruent with the students' needs.

Students may be in the best position to internalize new and novel behaviors, even though they are uninteresting, if their needs are supported rather than frustrated by their social environment. The three psychological needs proposed by SDT are autonomy, relatedness, and competence. In order to reach their human potential, and to undergo the internalization process. Individuals require all three needs to be nurtured. As it pertains to a learning activity, competence refers to feeling effective and competent to engage in the learning activity.

Relatedness refers to experiencing a sense of connectedness with the individual introducing the learning task. Finally, autonomy refers to experiencing a sense of personal volition when engaging in the activity. Previous research suggests that different needs are needed for fostering different regulation types, with competence and relatedness needed to initially enact behavior for external and introjected reasons. However, autonomy is needed in order to develop regulation-types consistent with autonomous motivation.

In Study 4, an autonomy supportive condition was used to encourage an internalization process in order to reduce IER among undergraduate students. As discussed in Chapter 5, autonomy supportive behaviors are consistent with a group of behaviors that focus on supporting another's sense of volition, whether the activity is interesting or not to the participant. For students who are high in amotivation, or experiencing a lack of connection between behavior and outcome, autonomy supportive behaviors may help facilitate this connection by providing a meaningful rationale to participants for engaging in the behavior.

In a meta-analysis conducted by Steingut, Patall, and Trimble (2017), they found that providing a rationale promoted greater engagement, performance, autonomy, and task value when compared to a control group across 23 experimental studies. Therefore, in order to reduce IER among undergraduate students, researchers should provide meaningful rationales for participating in research and encourage participants to identify their own reasons for participating in research as a source of self-motivation. That way, students are more likely to internalize the value of participating in research and perceive a connection between their behavior and actions in the research context. With this, it is hoped that students will engage in less IER as they see the value in the task and are therefore more likely to have a higher degree of engagement while participating in the research task.

An autonomy supportive environment can be created not only by researchers, but by the professors that teach classes in psychology as well. In addition, universities or colleges that support an autonomy supportive environment may also see benefits in the quality of data from their research participants. For example, universities that support a feeling of community among students and can have smaller class sizes may influence how their research participants regard research from a top-down perspective. Students who feel like they are a part of the university and identify with the school may be better motivated to support researchers in providing higher quality data. Universities may also differ in the importance they place on research and how that value is disseminated to their students. Students who participate from universities where research is promoted and valued are likely to provide data that is more trustworthy than those who come from institutions that do not promote the value of research to their students. To that end, there may be differences in IER between student populations. In universities where IER is low, the identification of insufficient effort responders remains prudent. However, in universities where insufficient effort is high, there is a need to examine the utility of providing an autonomy supportive environment to increase the quality of engagement among volunteer undergraduate research participants.

Limitations

Although the series of studies discussed provide novel insight into our understanding of IER, it is not without their limitations. A major limitation of the Studies 2, 3, and 4 was that the substantive study was the same for all participants. That is, all participants responded to the same baseline study items regarding the relationship between Facebook and well-being. Although some of the methodological factors were manipulated, such as using a warning message or assigning where the study was completed, some factors, such as the topic of the study, number of

items and the corresponding general length of time, remained the same. Therefore, there is limited knowledge of how certain study characteristics influence the prevalence of IER, and its interaction with motivation. For example, the prevalence of IER may differ depending on if it is a short or long study. Furthermore, depending on the length, whether the study is conducted in the lab or online may influence how careless respondents are over the course of the study. In addition, the topic of the study itself may have been a source of interest for participants, which may have been a protective factor against IER. In addition to these considerations, further research is also needed to determine the best placement of IER measures to accurately capture whether participants are providing responses of insufficient effort.

In order to screen for problematic respondents, researchers are encouraged to include proactive and reactive measures in their survey design to help capture these participants. Results from Study 3 suggest that a one-item question at the end of the survey may be used to ask participants to self-identify whether their results can be considered valid in regards to how much attention they paid to items while completing the study. Reactive measures for IER may also be used with minimal interference with the flow of the study design, as measures (e.g., response time) can be integrated without participants' knowledge. However, relying solely on reactive measures may not capture all presentations of IER (Dunn, Heggestad, Shanock, and Theilgard, 2016), and responses could be misidentified as representing insufficient effort. For example, participants who become distracted during internet survey administration can linger on survey pages for longer than needed for them to fill out the items . Therefore, a response time method which focuses only on identifying participants who complete the survey page in an unlikely short amount of time does not capture participants at the other end of the time continuum. This was not considered in the current set of studies and represents a limitation of the reaction time measure of

IER. Although there can be discrepancies in how long participants take to read and process information in order to understand and complete the survey, participants who are within the extreme range of either being too fast or too slow should be identified as potentially engaging in IER in the future.

Reactive measures such as the longstring approach may also warrant examination depending on the structure of the survey, especially when the survey employs scales that are not multidimensional in nature. Furthermore, establishing a cut-off of how many responses in a row need to be consecutively chosen to be used as a measure of IER may depend on the study itself. For example, for surveys with fewer response options available to the participant, it is reasonable for participants to select the same response option multiple times in a row. However, if the survey had a wide range of response options, and is in reference to a multidimensional scale, it is unlikely that a participant who is paying attention would respond using the same response option many times in a row. Therefore, determining an appropriate cut-off for researchers to use with regards to the longstring approach appears not to be definitive. That is, researchers will need to use their own judgment and experience in determining what cut-off is appropriate given the design of their study, including whether multidimensional scales are used, and the number of response options available to participants.

Analyses of the results of the four studies were limited to a variable-oriented approach. This approach was deemed appropriate for a preliminary examination of whether quality of motivation plays a role in IER. Given the current findings in support the positive relationship between amotivation and IER, further research may wish to take a more nuanced view of motivation and focus on a person-centered approach (Ratelle, Guay, Vallerand, Larose, & Senecal, 2007). That is, given that participants may hold both autonomous and controlled reasons

for participating in research simultaneously, it would be important to understand how both of these may influence IER. That is, IER might be the result of a combination of motives, rather than a focus on one (i.e., amotivation). By examining the motivational profile of participants, researchers may get a more nuanced view of how motivation influences IER among this sample of respondents.

Furthermore, statistical analyses (i.e., regression and mediation) were conducted with the understanding that assumptions underlying the statistical method were not violated. However, due to the nature of IER, the assumption that the residuals of the dependent variable were normally distributed was not met in each of the four studies. Although scores on IER could have been transformed to align better with a normal distribution, such a transformation obfuscates meaning in the data by changing the unit of measurement and would have made the results harder to interpret. As would have been predicted, the distribution of IER residuals formed a positively-skewed distribution. Given that the IER scores represented real-life data, it was determined that data analyses that treated the scores as an untransformed continuous variable would produce the most meaning out of the results. However, given that the assumption of having a normally distributed error terms of the dependent variable was violated, future research may wish to transform these variables using a log transformation to closer align the error terms to a normal distribution.

Another limitation of the findings of this dissertation is that the research is correlational in nature and prevents drawing conclusions regarding causality. As with the employment of any survey research, IER may exist at problematic levels, and can change the substantive conclusions drawn from a study. The substantive measures used in the studies described in this dissertation are no exception. Specifically, even though substantive measures were placed at the beginning of

the survey, with the hope that students are more likely to be attuned to survey items and responses at the start of the survey (Meade & Craig, 2012), this may still not necessarily be the case. Therefore, it is plausible that data used to capture motivation at various levels of specificity may be marred by IER. Therefore, results will need to be replicated in more samples to provide evidence of the stability of the positive relationship between amotivation and IER among volunteer undergraduate students.

Despite these limitations, the series of studies explored in this dissertation provide a much needed examination of IER from a theoretical perspective that can shed light on what is associated with IER within the undergraduate research participation pool, and ways in which the prevalence can be suppressed to increase data quality in the future. However, more research is needed to address some of the concerns that this current dissertation raises regarding the prevalence of IER and how it can be reduced among undergraduate volunteer participants.

Directions for Future Research

Although undergraduate students are often provided with variety of research options within the ISPR, students may nonetheless find them uninteresting. In Studies 2, 3, and 4, students were recruited for a study on Facebook use and well-being. Given the popularity of using Facebook as a social media platform, it was assumed that most participants in this study were at least somewhat interested in the subject matter and found it personally relevant to them. However, many survey studies examine topics that may be less interesting and relevant to undergraduate students, yet researchers rely on their data to study the proposed phenomenon. To that end, future research will need to examine how personal interest in the research subject influences the likelihood that participants provide careless responses, or if personal interest serves as a protective factor against IER. In addition, it would be important to examine how long

this protective factor lasts throughout the lifetime of a study, given the length of the study and the way items are presented to participants.

The results of Study 4 shed light on the potential complex nature of IER within the undergraduate student sample at the University of Ottawa. Although an autonomy supportive intervention strategy moderated the relationship between research amotivation and IER, it did not appear to have an overall effect on IER. Previous studies have supported the use of autonomy support interventions to increase engagement in learning activities, including in uninteresting tasks (Jang, 2008; Joussement, Koestner, Lekes, & Houlfort, 2004, Reeve, Jang, Hardre, & Omura, 2002). Although in practice students are able to chose which studies they participate in, and are therefore able to select studies that are more personally interesting to them, students may nonetheless find the experience of answering survey questions to be a boring and uninteresting. Therefore, providing a rationale in an autonomy supportive manner was expected to increase engagement and reduce IER. Notably, however, the task of completing an online survey may require more energy and time than what previous studies have operationally defined as an uninteresting task.

Jang (2008) noted in his findings that although providing a rationale in an autonomy supportive manner increased engagement compared to a control group where no rationale was given, the level of observed engagement on the uninteresting activity decreased over time. In his study, participants worked on an uninteresting task that lasted 20 minutes after receiving an autonomy supportive rationale for the task or no rationale. Participants' level of engagement was measured by two external raters at the beginning of the task, and at the end of the task. Results indicated that in comparison to the control group, participants who were provided with an autonomy supportive rationale displayed higher levels of engagement both during the beginning

of the uninteresting task and at the end. Notably, however, participants who were provided with an autonomy supportive rationale still experienced a significant drop in engagement from the beginning of the study to the end. Therefore, although autonomy support appears to facilitate engagement, its effects on engagement may diminish over time.

The effects of an autonomy supportive intervention on IER over time was not examined in this dissertation, although it may explain why no differences were found between study conditions in Study 4. Specifically, given the length of the base survey, the positive effects of the intervention strategy may have waned over time. Therefore, if the base survey was shorter, or if autonomy support was bolstered part way through the survey, the findings of this study may have differed.

Perhaps a stronger medium for message framing may influence its desired effectiveness on reducing IER. One medium may to provide an audio or audio/visual format of conveying this information to participants. Such methods may influence participants sense of connectedness with the study and may otherwise add a more personal touch than reading written words on a screen (Pfau, Holbert, Zubric, Pasha, & Lin, 2000). Therefore, future research should explore what medium is best to transmit autonomy supportive message framing in the hopes that it will further reduce and prevent IER among undergraduate participants. In addition, autonomy support may be used in conjunction with other behavioural and goal setting strategies, such as implementation intentions, to maintain sustained effort and engagement in the task at hand, even if the task is experienced as uninteresting.

In addition to framing messages in an autonomy supportive manner, the message could also be used to direct participants toward different types of goals. According to previous research, priming specific types of goals can influence the motivational resources one uses to

engage in a situational context (Vansteenkiste, Lens, Soenens, & Van Den Broeck, 2008). Extending the application of SDT, goals can be primed to either focus on the intrinsic reward of the activity (i.e., a focus on the research activity as a learning opportunity), or on an extrinsic reward (i.e., a focus on gaining course credit through research participation). Intrinsic goals have been shown to promote autonomous motivation toward activities, whereas extrinsic goals have been shown to promote greater controlled motivation. Therefore, by combining autonomy supportive messaging with goal framing, participants may have the greatest opportunity to be optimally motivated toward participating in research, and hence, provide high quality data.

In addition to influencing the quality of motivational resources, students may also benefit from strategies on how they can best maintain their focus throughout their research participation. Previous research suggests that once one is motivated to act, they can become more aware of messages that suggest how to maintain and direct their goal-directed behavior. One such way would be to form implementation intentions (Gollwitzer, 1993) whereby individuals engage in a behavior under certain conditions (i.e., the who, what, where, and when of behavior). Such motivational strategies can be extremely useful, especially when studies are conducted over time, or require multiple points of contact with the research study, such as in longitudinal or daily diary studies. By implementing strategies that not only promote high quality motivation for participation, but also support how motivational resources are allocated, participants have the greatest likelihood of being engaged and integrated in the research process.

Research on IER is still growing and much research is still needed to determine best practices. In relation to how research on IER is conducted, it would be prudent for researchers to first examine how this construct is best measured. Thus far, it appears that incorporating both proactive and reactive measures is best to measure this construct (Curran, 2016). Results from

the four studies discussed above showed no differentiation in motivation types between IER captured using either the proactive or reactive measures. However, as these measures may capture different insufficient effort response styles, it would be prudent to explore what predictors may be uniquely associated with proactive and reactive measures.

Although research has begun to examine if proactive measures influence the substantive validity of the survey when incorporated (Breitsohl & Steidelmuller, 2018), it is still unknown what the optimal number of proactive measures is, where they should be located within the survey, and if these variables should change depending on the length of the survey. Given the prevalence of IER and its implications in reducing data quality overall, researchers will need to continue to give further attention to how this phenomenon is measured in a systematic way.

IER poses a risk to the conclusions that researchers draw upon when interpreting data provided by volunteer undergraduate research participants. Although research participation pools continue to provide both a great resource for researchers, and a learning opportunity for students, there are ways in which research participation pools can be better implemented to facilitate the acquisition of higher quality data and greater knowledge transfer. Once a plausible means of reducing IER has been empirically supported amongst diverse samples and research studies, it would be important to create an educational resource that facilitates this knowledge transfer to reduce all IER across not only research conducted in academic settings, but to other external stakeholders as well that use survey methodology to obtain information from participants. By doing so, the integrity of survey research will be upheld as best as possible given the demands of ongoing research pressures to obtain the most information possible using the least amount of resources while maintaining high data quality and integrity.

Research on IER is still within its nascent stage and there is much to be explored on this topic that impacts the scientific rigor of conclusions drawn from psychological survey research conducted using undergraduate participants. Early work on IER focused on determining how best to measure the construct and how it negatively influences data quality. However, in more recent works, researchers have treated IER as more than a methodological nuisance, and interest on this topic has evolved to treat it as a substantive variable of interest in its own right. It would be prudent for research on IER to continuously evolve, to uphold the scientific rigor of psychology as a discipline based in strong research methodology.

Although many studies have examined how IER can diminish the validity of findings, less research has been conducted to examine what predicts this phenomenon among undergraduate participants. Therefore, the series of studies discussed herein focused on identifying predictors of IER, and also what preventive measures may be used to reduce IER within an undergraduate research participation pool. One limitation is that this dissertation focuses only on samples drawn from the University of Ottawa's ISPR, however, it would be important to examine if the results of the studies conducted generalizes to other institutions as well. For example, it would be of interest to researchers to examine what organizational or logistical factors may influence the rate of IER, such as having a mandatory or optional research component as part of one's grade, or how research is valued at an institutional level. By researching IER within different samples and settings, it is hoped that the quality of conclusions drawn from survey research are more reliable and valid.

Overall, the series of four studies examined herein provide evidence that IER is a common problem within survey research conducted through the University of Ottawa's ISPR when administered in both online and lab contexts. This is problematic given that the prevalence

of IER examined in these studies is sufficient to lead researchers to commit Type I and Type II errors. Furthermore, typical data cleaning procedures do not identify those who engage in IER; therefore, researchers need to take care in identifying problematic responders through reactive or proactive measures. The lack of motivation that students experience at the general, academic, and research-specific levels appears to play a role in whether they engage in IER and necessitates a further examination of amotivation as a multi-dimensional construct to understand why participants lack motivation towards research.

Specifically, in this series of studies, amotivation, or the lack of intention characterized by a dissociation between behavior and outcome, is positively related to IER through a top-down lens. Although it may be tempting for researchers to exclude those high in amotivation from their research, this would further limit the representativeness of the sample to the general population. Already, critics of using undergraduate participants comment that this sample is restrictive, and the further isolation to only those students who have high quality motivation would further reduce the representativeness of this commonly used sample. Instead, researchers would benefit by developing intervention strategies that can increase academic and research specific task motivation as a means to reduce the negative effects of amotivation on IER. Interventions designed to target amotivation would do well to first examine which reasons for amotivation (i.e., ability beliefs, effort beliefs, characteristics of the task, value placed on the task) are related to greater IER (Legault, Green-Demers, and Pelletier, 2006).

As noted above, one such strategy may be to provide participants with an autonomy supportive message explaining why the study is important, to them and the larger research community, identifying negative feelings that they may experience, and to acknowledge that the task itself could be experienced as negative while highlighting the educational value of the task.

Such strategies would help to reduce the prevalence of IER among undergraduate psychology students with minimal effort and time from the experimenter. Meanwhile, students may benefit from such autonomy supportive messaging by becoming more behaviorally and cognitively engaged at the task at hand and provide higher quality data as a consequence. Students who are engaged may also gain more educational value for participating in the research task and may consequently be more willing to participate in research in the future.

Although the use of volunteer undergraduate research participants has declined over the years as evidenced by the number of articles published using this sample in top-tiered journal (Sharpe & Poets, 2017), undergraduate research participants remain a valuable resource to researchers at universities that have established research participation pools. Furthermore, participating in research represents an experiential undergraduate learning opportunity that can help students understand course content and the research process that defines how psychology has evolved as a social science. There is therefore much to be gained by keeping undergraduate research participation pools within universities. However, these research pools need to be managed in a way that supports both researchers and students alike. On one hand, researchers need to rely on undergraduate participants to provide high quality data that is free of bias, and error due to inattentive responding. On the other hand, students need to derive a valuable learning experience through their research participation in order to maintain interest in future studies.

In both cases, both researcher and participant needs should be considered in order to produce optimal results out of using and being a part of the research participation pool. This notion is aligned with SDT's foundation of being a dialectical model in which the interaction

between person and social environment influences an individuals' natural tendencies towards growth and fulfillment.

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Appendix A

Pre-Screen Questionnaire for Study 1

INSTRUCTIONS: Listed below are questions for this section of the prescreen. Please provide a response for every question. If you feel uncomfortable with a question, you can decline to answer and this is considered a response by the system. Once a section is completed, you can move on to the next one.

Indicate your level of agreement with each of the following statements, which corresponds generally to the reasons why you do different things.

In general, I do things...

Not agree at all 1	Very slightly agree 2	Slightly agree 3	Moderately agree 4	Mostly agree 5	Strongly agree 6	Very strongly agree 7

... in order to help myself become the person I aim to be
... because I like making interesting discoveries
... because I want to be viewed more positively by certain people
... because I choose them as means to attain my objectives
... for the pleasure of acquiring new knowledge
... because otherwise I would feel guilty for not doing them
... because by doing them I am living in line with my deepest principles
... although it does not make a difference whether I do them or not
... for the pleasant sensations I feel while I am doing them
... in order to show others what I am capable of
... because I chose them in order to attain what I desire
... because I would beat myself up for not doing them
... even though I do not have a good reason for doing them
... in order to attain prestige
... even though I believe they are not worth the
... because I would feel bad if I do not do them
... because by doing them I am fully expressing my deepest values
... because they reflect what I value the most in life

What was the first language that you learned and still speak?
French
English
Other

Please indicate your gender
Male
Female

Please indicate your age in years (e.g. 21)

Some studies may require that you be at least 18 years old.
Yes, I am at least 18 years old.
No, I am younger than 18 years old.

What is the level of your academic training at the University of Ottawa?
Freshman (1st year)
Junior (2nd year)
Sophomore (3rd year)
Senior (4th year)
Other

How would you describe your grade point average?
A+ (90-100)
A (85-89)
A- (80-84)
B+ (75-79)
B (70-74)
C+ (66-69)
C (60-65)
D (50-54)
F (0-49)

How do you describe yourself in terms of your cultural background?
Aboriginal (native)
Asian
Caucasian (white)
Hispanic (latino)
African-American (black)
Arabic
Other

Listed below are 11 statements concerning personal characteristics and traits. Read each item and rate the extent to which you agree.

Not at all agree 1	Very slightly agree 2	Slightly agree 3	Moderately agree 4	Strongly agree 5	Very strongly agree 6	Totally agree 7

One of my goals is to be perfect in everything I do
Anything that I do that is less than excellent will be seen as poor work by those around me
I do whatever is possible to be as perfect as I can
I feel that people are demanding too much of me
I aim for perfection when I set goals for myself
Even if they don’t let me know, people are upset when I fail at a task
I set very high standards for myself
My family expects me to be perfect
I must always be successful at school, at work or in sports
People expect nothing less than perfection from me
It is very important for me to succeed perfectly in everything I do

Indicate your level of agreement with each of the following statements, which corresponds generally to how you feel.

Not at all agree 1	Very slightly agree 2	Slightly agree 3	Moderately agree 4	Strongly agree 5	Very strongly agree 6	Totally agree 7

I really like the people I interact with.
Often, I do not feel very competent.
I feel pressured.
I feel that I am good at what I do.
I feel free to express my ideas and opinions.
People around me care about me.
I feel a sense of accomplishment from what I do.
I feel like I can pretty much be myself in my daily interactions.
There are not too many people that I am close to.

Are you a talkative person?
No
Yes

Are you rather lively?

No
Yes

Can you usually let yourself go and enjoy yourself at a lively party?
No
Yes

Do you enjoy meeting new people?
No
Yes

Do you tend to keep in the background on social occasions?
No
Yes

Do you like going out a lot?
No
Yes

Do you have many friends?
No
Yes

Do you usually take the initiative in making new friends?
No
Yes

Are you mostly quiet when you are with other people?
No
Yes

Do you like mixing with people?
No
Yes

Please choose the option that best describes your life in general.

1 People are putting pressure on me to be perfect and I don't personally decide to aim for perfection.
2 People are putting pressure on me to be perfect and I personally decide to aim for perfection.
3 I am the one who personally decides to aim for perfection.
4 People are not expecting me to be perfect and I do not strive to attain perfection.

WHY ARE YOU DOING THINGS FOR THE ENVIRONMENT? Please indicate the degree to which the proposed reasons correspond to your reasons for doing things for the environment.

Does not correspond at all 1	2	3	Corresponds moderately 4	5	6	Corresponds exactly 7

For the pleasure I experience while I am mastering new ways of helping the environment.
Honestly, I don't know; I truly have the impression that I'm wasting my time doing things for the environment.
For the pleasure I experience when I find new ways to improve the quality of the environment.
Because it is a reasonable thing to do to help the environment.
Because I like the feeling I have when I do things for the environment.
I don't really know; I can't see what I'm getting out of it.
I think I'd regret not doing something for the environment.
I wonder why I'm doing things for the environment; the situation is simply not improving. For the pleasure I get from contributing to the environment.
Because it's a sensible thing to do in order to improve the environment.
Because it's a way I've chosen to contribute to a better environment.
Because other people will be upset if I don't.
For the recognition I get from others.
Because I would feel bad if I didn't do anything for the environment.
Because taking care of the environment is an integral part of my life.
Because my friends insist that I do it.
Because it seems to me that taking care of myself and taking care of the environment are inseparable.
Because I would feel guilty if I didn't.
Because being environmentally-conscious has become a fundamental part of who I am.
Because it's part of the way I've chosen to live my life.
Because I would feel ashamed of myself if I was doing nothing to help the environment.
Because I think it's a good idea to do something about the environment.
To avoid being criticized.
I don't know; I can't see how my efforts to be environmentally-conscious are helping the environmental situation.
Please select 6 in response to this item.

Please indicate to what extent you agree with the following statements about government environmental strategies. When doing so please focus on Canadian programs and policies.

Do not agree 1	2	3	Somewhat agree 4	5	6	Completely agree 7

I feel I have a choice to use the strategies provided by the government in order to help the environment.
I think the government puts a lot of pressure on people to adopt environmentally-conscious behaviors.
I think the government is sincerely preoccupied with the condition of my environment.
The government provides me with constructive feedback when I participate in environmental programs (recycling, etc.).
I feel that the government is trying to force me to adopt environmental behaviors.
I think that the government creates programs to preserve the environment because it is sincerely concerned with Canadian's future well-being.
When I involve myself in environmental programs, I receive helpful feedback on my ecological behaviors.
I feel that the government is trying to force me to adopt environmental behaviors.
I believe the government really has the public's interest at heart when it comes to environmental issues.
The programs established by the government provide me with helpful feedback which enables me to improve my environmental behaviors.
I feel the government wants to make me feel guilty when I do nothing for the environment.
The government gives me the freedom to make my own decisions in regards to the environment.
I think the government doesn't worry enough about the interests of the Canadian's where the environment is concerned.
I can easily obtain the information I need in order to properly perform environmental behaviors.
I feel I have the choice to participate to the environmental programs established by the government.

Please indicate to what extent you agree with the following statements.

Strongly disagree 1	Disagree 2	Slightly disagree 3	Neither agree nor disagree 4	Slightly agree 5	Agree 6	Strongly agree 7

I don't feel that I have the competence to do these things for the environment.
Because I don't think that the present programs are really going to help the environmental situation.
I'm not doing these things for the environment because I can't seem to try hard enough.

Because I'm not able to make wise choices concerning the environment.
Because I have the impression that what little I could do for the environment would not have any impact on a larger scale.
I don't have what it takes to do these things.
I simply don't believe that the existing programs will be successful in improving our environmental situation.
I don't do these things for the environment because I just can't seem to make the effort to change my habits.
The magnitude of the ecological disaster is such that it is not likely that my behaviors will have any impact on the situation.
Because I feel that the environmental programs aren't effective.
I know that environmental programs exist, but I don't seem to have the ability to apply them.
I think the environmental programs that have been developed are inadequate; they aren't really solving the problems.
I feel overwhelmed by the gravity of ecological problems and I have the feeling there is nothing I can do.
Because I can't seem to find it in me to make the necessary sacrifices.
Because doing these things for the environment takes time; I can't make the effort to use my time effectively.
The environmental problems are considerable, and I don't think I'd be able to change anything about it.

What are your feelings about school?

Not at all agree 1	2	3	Moderately agree 4	5	6	Completely agree 7

I look forward to going to school
I like being in school.
School is interesting.
I wish I didn't have to go to school.
There are many things about school I don't like.
I enjoy school activities.
I learn a lot at school.
I feel bad at school.

Life Satisfaction

Below are five statements that you may agree or disagree with. Using the 1-7 scale below, indicate your agreement with each item. Please be open and honest in your responding.

Strongly disagree 1	Disagree 2	Slightly disagree 3	Neither agree nor disagree 4	Slightly agree 5	Agree 6	Strongly agree 7

In most ways my life is close to my ideal
The conditions of my life are excellent
I am satisfied with my life
So far I have gotten the important things I want in life
If I could live my life over, I would change almost nothing

Appendix B

Typical ISPR Recruitment Description for Studies 2, 3, 4, 5

Study Name: Facebook Use and Well-Being

Description: The purpose of this study is to examine how individuals use Facebook and whether or not it is related to well-being. This is a 30 minute laboratory study. You will be asked to fill out a variety of online questionnaires related to your Facebook use and well-being.

Prescreen Restrictions: Questionnaire is in English only
Duration: 30 minutes
Points: 1 Point

Researcher: Susanna Cheung and Dr. Luc Pelletier
Office:
Phone:
Email:

Appendix C

Typical Consent form for Studies 2 to 4

The purpose of an informed consent form is to ensure that you understand the purpose of this study and the nature of your involvement. It must provide adequate information for you to decide whether or not you wish to participate.

Invitation to Participate: I am invited to participate in the above mentioned study conducted by Susanna Cheung of the Human Motivation Research Laboratory, under the supervision of Dr. Luc Pelletier.

Purpose of the Study: The purpose of this study is to examine whether Facebook use is associated with well-being outcomes.

Participation: This study will consist of a single session lasting up to 30 minutes. During my participation, I will be asked to fill out a variety of questionnaires that will ask me about my Facebook use, personality, motivation, and well-being. In exchange for participating in this study, I will receive 0.5 participation points.

Potential Risks: There are no foreseeable psychological, physical, social, or economic risks associated with my participation in this study.

Voluntary Participation: I understand my participation is voluntary and I may withdraw from the study at any time without any negative consequences. Furthermore, I will still be awarded 0.5 participation points. If I choose to withdraw, all data gathered will excluded from analyses. I may skip survey items that I do not feel comfortable answering.

Confidentiality and anonymity: My information will be kept strictly confidential. My name will never be directly associated with the results. Only the researchers of this study will have access to the collected data. The researchers will use my information for research purposes only and will not disclose any personal information. Data will be securely stored in the Human Motivation Research Lab for 5 years after the publication of results.

Any questions I might have about my rights as a research participant may be addressed to Protocol Officer for Ethics in Research, 550 Cumberland St., Room 154, (613) 562-5387 or by email at ethics@uottawa.ca

For more information about this research I can contact:

Susanna Cheung, principal investigator, School of Psychology, Faculty of Social Sciences, University of Ottawa

Dr. Luc Pelletier, faculty supervisor, School of Psychology, Faculty of Social Sciences, University of Ottawa

I have read the above description of the study and understand the conditions of my involvement.

If you consent to participating in this study, please click on "I agree to participate in this study".

Appendix D

Typical Facebook and Well-Being Survey for Studies 2 to 4

Using the scale below, indicate to what extent each of the following items presently corresponds to one of the reasons why you go to University

Does not correspond to me at all 1	Corresponds a little 2	3	Corresponds moderately 4	5	Corresponds a lot 6	Corresponds completely 7

Because with only a high-school degree I would not find a high-paying job later on.

Because I experience pleasure and satisfaction while learning new things.

Because I think that a university education will help me better prepare for the career I have chosen.

For the intense feelings I experience when I am communicating my own ideas to others.

Honestly, I don't know; I really feel that I am wasting my time in school.

For the pleasure I experience while surpassing myself in my studies.

To prove to myself that I am capable of completing my University degree.

In order to obtain a more prestigious job later on.

For the pleasure I experience when I discover new things never seen before.

Because eventually it will enable me to enter the job market in a field that I like.

For the pleasure that I experience when I read interesting authors.

I once had good reasons for going to university; however, now I wonder whether I should continue.

For the pleasure that I experience while I am surpassing myself in one of my personal accomplishments.

Because of the fact that when I succeed in university I feel important.

Because I want to have "the good life" later on.

For the pleasure that I experience in broadening my knowledge about subjects which appeal to me.

Because this will help me make a better choice regarding my career orientation.

For the pleasure that I experience when I feel completely absorbed by what certain authors have written.

I can't see why I go to university and frankly, I couldn't care less.

For the satisfaction I feel when I am in the process of accomplishing difficult academic activities.

To show myself that I am an intelligent person.

In order to have a better salary later on.

Because my studies allow me to continue to learn about many things that interest me.

Because I believe that a few additional years of education will improve my competence as a worker.

I don't know; I can't understand what I am doing in school.

Because university allows me to experience a personal satisfaction in my quest for excellence in my studies.

Because I want to show myself that I can succeed in my studies.

Because with only a high-school degree I would not find a high-paying job later on.

Because I experience pleasure and satisfaction while learning new things.

Because I think that a university education will help me better prepare for the career I have chosen.

For the intense feelings I experience when I am communicating my own ideas to others.

Honestly, I don't know; I really feel that I am wasting my time in school.

For the pleasure I experience while surpassing myself in my studies.

To prove to myself that I am capable of completing my University degree.

In order to obtain a more prestigious job later on.

This scale consists of a number of words that describe different feelings and emotions. Read each item and then list the number from the scale below next to each word. Indicate to what extent you feel this way right now, that is, *at the present moment*.

1 = Very slightly or not at all	2 = A little	3 = Moderately	4 = Quite a bit	5 = Extremely

Interested

Distressed

Excited

Upset

Strong

Guilty

Scared

Hostile

Enthusiastic

Proud

Irritable

Alert

Ashamed

Inspired

Nervous

Determined

Attentive

Jittery

Active

Afraid

Please respond to each of the following statements indicating the degree to which the statement is true for you in general in your life.

None at all true for me 1	2	3	4	5	6	Very true for me 7

I feel alive and vital.

I don't feel very energetic.

Sometimes I feel so alive I just want to burst.

I have energy and spirit.

I look forward to each new day.

I nearly always feel alert and awake.

I feel energized.

This questionnaire contains a series of statements that refer to how you may feel things have been going in your life. Read each statement and decide the extent to which you agree or disagree with it. Try to respond to each statement according to your own feelings about how things are actually going, rather than how you might wish them to be. Please use the following scale when responding to each statement.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

I find I get intensely involved in many of the things I do each day.

I believe I have discovered who I really am.

I think it would be ideal if things came easily to me in my life.

My life is centered around a set of core beliefs that give meaning to my life.

It is more important that I really enjoy what I do than that other people are impressed by it.

I believe I know what my best potentials are and I try to develop them whenever possible.

Other people usually know better what would be good for me to do than I know myself.

I feel best when I'm doing something worth investing a great deal of effort in.

I eat cement occasionally

I can say that I have found my purpose in life.

If I did not find what I was doing rewarding for me, I do not think I could continue doing it.

As yet, I've not figured out what to do with my life.

I can't understand why some people want to work so hard on the things that they do.

I believe it is important to know how what I'm doing fits with purposes worth pursuing.

I can teleport across time and space

I usually know what I should do because some actions just feel right to me.

When I engage in activities that involve my best potentials, I have this sense of really being alive.

I am confused about what my talents really are.

I find a lot of the things I do are personally expressive for me.

It is important to me that I feel fulfilled by the activities that I engage in.

I have never used a computer

If something is really difficult, it probably isn't worth doing.

I find it hard to get really invested in the things that I do.

I believe I know what I was meant to do in life.

Please read each of the following items carefully and indicate the degree to which each of the following reasons are true for why you use Facebook.

Not true for me 1	2	Sometimes true for me 3	4	Very true for me 5

It’s important to me to use Facebook regularly

I don’t see why I should use Facebook

I use Facebook because it’s fun

I feel guilty when I don’t use Facebook

I use Facebook because it is consistent with my life goals

I use Facebook because other people say I should

I value the benefits of Facebook use

I can’t see why I should bother using Facebook

I enjoy my Facebook sessions

I feel ashamed when I miss a Facebook session

I consider Facebook a part of my identity

I take part in Facebook use because my friends/family/partner say I should

I think it is important to make the effort to use Facebook regularly

I don’t see the point in Facebook use

I find Facebook use a pleasurable activity

I feel like a failure when I haven’t used Facebook in awhile

I consider Facebook a fundamental part of who I am

I use Facebook because others will not be pleased with me if I don’t

I get restless if I don’t use Facebook regularly

I think Facebook use is a waste of time

I get pleasure and satisfaction from Facebook use

I would feel bad about myself if I was not making time to use Facebook

I consider Facebook consistent with my values

I feel under pressure from my family/friends to use Facebook

FB_FRIENDS **Approximately how many TOTAL Facebook friends do you have?**

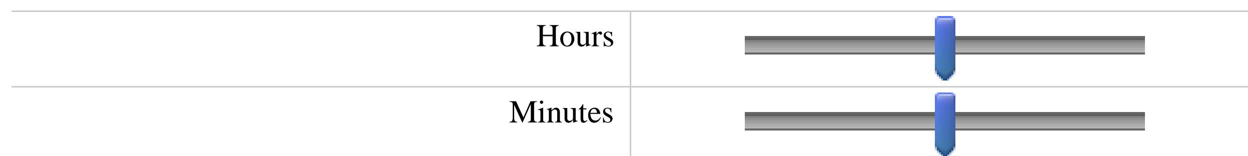
____

FB_DAYS **In general...**

0 1 2 4 5 6 7

FB_FREQ **In the past week, on average, approximately how much time PER DAY have you spent actively using Facebook?**

0 60



Please tell us a little about you Facebook use

	Never	Sometimes	About half the time	Most of the time	Extremely Often
How often do you use Facebook while in class?					
How often do you use Facebook messenger as a way to communicate with friends?					
How often do you post status updates?					
How often do you comment on someone else's post?					
How often do you like or react to someone else's post?					

Please indicate your level of agreement to the following items about Facebook.

	Strongly disagree 1	2	3	4	Strongly agree 5
Facebook is part of my everyday activity					
I am proud to tell people I'm on Facebook					
Facebook has become part of my daily routine					
I feel out of touch when I haven't logged onto Facebook for awhile					
I feel I am part of the Facebook community					
I would be sorry if Facebook shuts down					

Everyone has long-term goals or aspirations. These are the things that individuals hope to accomplish over the course of their lives. In this section you will find a number of life goals. Please use the following scale in answering the question, how important is this goal for you?

Not at all 1	2	3	Moderately 4	5	6	Very 7

To be a very wealthy person.
To grow and learn new things.
To have my name known by many people.
To have good friends that I can count on.
To successfully hide the signs of aging.
To work for the betterment of society.
To be physically healthy.
To have many expensive possessions.
At the end of my life, to be able to look back on my life as meaningful and complete.
To be admired by many people.
To share my life with someone I love.
To have people comment often how attractive I look.
To assist people who need it, asking nothing in return.
To feel good about my level of physical fitness.
To be financially successful.
To choose what I do, instead of being pushed along by life.
To be famous.
To have committed, intimate relationships.
To keep up with fashions in hair and clothing.
To work to make the world a better place.
To keep myself healthy and well.
To be rich.
To know and accept who I really am.
To have my name appear frequently in the media.
To feel that there are people who really love me, and whom I love.
To achieve the "look" I've been after.
To select five for this item.
To help others improve their lives.
To be relatively free from sickness.
To have enough money to buy everything I want.
To gain increasing insight into why I do the things I do.

To be admired by lots of different people.
To have deep enduring relationships.
To have an image that others find appealing.
To help people in need.
To have a physically healthy lifestyle.

I have paid no attention to this survey so far (remember, your response is anonymous!)

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

Appendix E

Typical Debriefing Form for Studies 2 to 4

Université d'Ottawa | University of Ottawa

École de psychologie | School of Psychology

Facebook Use and Well-Being

Thank you for participating in this research study on Facebook use and well-being.

What are we trying to learn in this research?

Previous research on the relationship between Facebook use and well-being has been inconsistent. Whereas some studies have pointed to the benefits of Facebook use, others have suggested that it could in fact have negative consequences to well-being. One key determinant of whether Facebook use is associated with well-being is whether individuals use Facebook actively, as a way to communicate with others, or passively, as a way to gather social information. Active Facebook use has been found to be associated with positive outcomes, such as lower levels of loneliness, whereas passive Facebook use has been found to be associated to negative outcomes, such as lower levels of belonging. This study aims to examine whether motivation for Facebook use may predict active versus passive Facebook use, and if this is associated to one's well-being.

Why is this important to scientists or the general public?

This research will help us understand why some individuals use Facebook actively versus passively. Furthermore, it will help us understand the mechanisms by which Facebook use is associated with well-being.

What are our hypotheses and predictions?

It is hypothesized that the quality of our motivation matters, such that individuals who use Facebook due to reasons stemming from within will use Facebook actively in order to communicate, and for social bonds with others. In contrast, it is expected that individuals who use Facebook because they feel like they have to, or because they would be missing out, will tend to use Facebook passively as a source of social information.

What if I have questions later?

Any questions you might have about your rights as a research participant may be addressed to the Protocol Officer for Ethics in Research, 550 Cumberland St., Room 154, (613) 562-5387 or by email at ethics@uottawa.ca.

For more information about this research, you can contact:

Susanna Cheung, principal investigator, School of Psychology, Faculty of Social Sciences, University of Ottawa

Dr. Luc Pelletier, faculty supervisor, School of Psychology, Faculty of Social Sciences, University of Ottawa

Appendix F

Motivation towards Research Participation Scale for Studies 3 and 4

Before we begin, we are interested in learning why students participate in the ISPR. Please indicate to what extent each of the following statements correspond to the reasons why you participate in research.

Does not correspond at all	Corresponds very little	Corresponds a little	Corresponds moderately	Corresponds strongly	Corresponds very strongly	Corresponds entirely

I find these activities enjoyable – they are interesting and stimulating

Honestly, I don't know; I feel that I am wasting my time participating in research

Because I really believe that it is important to participate in research

Because I would feel guilty if I didn't – I feel that I ought to do it

Because, interesting or not, I feel free to commit myself to something that I value that could help me achieve future goals

Because somebody else wants me to or because I'll get participation points if I do

Appendix G

Invitation to Study Online for Study 3

Hi [Participant's First Name],

Thank you for signing up for "Facebook and Well-Being (Lab)". You have been selected to participate in an online version of this study. If you agree, I will send you a link to complete the survey online. This means that you will NOT need to come to the lab to complete the survey. The survey is the same, and **you will still be awarded 1 participation credit toward an in-person lab study**. Please let me know if you would like the online option. If you do, I will send you the link to the online survey on [date of original time slot] at [time] (the time of your original lab session).

Susanna

Appendix H

Experimental Manipulation for Study 4

Autonomy Support Condition

Thank you for your decision to support and be part of the University of Ottawa's research community! Participating in this research is important as it helps us understand how common social media platforms, such as Facebook, may be impacting our psychological health.

By choosing to participate in this study, you will experience the research process first-hand, while also learning about how your own behaviours on Facebook may be influencing your well-being.

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We understand that answering survey questions may sometimes be tedious, and that items may seem repetitive to you. However, all the questions in the survey are important as they improve the validity of the study, and help us build a better understanding of people's experiences. Please take as much time as you need to focus on and understand the content of the questions that are being asked, and how you think they relate to you and your personal experience with Facebook use. The more you answer truthfully, the more useful your information will be to help us understand your experiences on Facebook and how your experiences impact you.

Control Condition

Thank you for participating in our research study. Participating in this research will help inform how common social media platforms, such as Facebook, may be impacting users' psychological health.

By participating in this study, you will experience the research process first-hand, and help us understand how behaviours on Facebook may be influencing user's well-being.

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Although questions may seem repetitive to you, all the questions in the survey are important and help us understand people's experiences. Therefore, we ask that you focus on the content of the questions that are being asked, and how you think they relate to you and your experience with Facebook use.

The more participants answer truthfully, the more useful the information provided will help us understand how experiences on Facebook impacts well-being.