School Engagement in Children:

Investigating the Impact of Body Image Issues

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A dissertation submitted to the University of Ottawa

in partial fulfillment of the requirements for the PhD in Clinical Psychology

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DISSERTATION ABSTRACT

Body image concerns emerge during childhood and may have implications for children's academic functioning. School engagement represents an especially important developmental process associated with children's academic adjustment and longer-term educational outcomes. Despite the potential relevance of these constructs to one another, relatively little is known about how body image and school engagement influence one another during late childhood, or whether these associations differ across children. The current dissertation's overarching objective was to advance understanding of how body image issues and school engagement co-develop during late childhood. Using longitudinal data from a sample of Canadian children aged 9–12 years, **Study 1** examined whether body dissatisfaction and weight perception were associated with changes in affective, behavioural, and cognitive school engagement over a 7-month period. In a sample of 1,070 children (M_{age} = 11.13 years; 55.0% female), integrated longitudinal path models revealed that body dissatisfaction predicted decreases in cognitive engagement, whereas weight perception did not predict changes in any dimension of school engagement. Conversely, lower behavioural and cognitive engagement predicted heavier weight perceptions, suggesting that associations between body image and school engagement may be reciprocal. Follow-up analyses indicated that these longitudinal associations differed by gender: body dissatisfaction predicted lower cognitive engagement among girls, whereas lower behavioural engagement predicted greater body dissatisfaction among boys. Building upon these findings, **Study 2** sought to examine whether children could be sorted into distinct profiles of body image difficulties and whether these profiles differed in their levels of school engagement. Using latent profile analysis, 948 children (M_{age} = 11.04 years) were sorted into profiles based on body image (i.e., body dissatisfaction, compulsive self-monitoring, body comparisons, and weight perception) assessed

at the beginning of the school year. Analyses identified three profiles characterized primarily by severity of body image difficulties: *Low* (65.9%), *Moderate* (21.4%), and *High* (12.7%) body image issues. The profiles differed in body dissatisfaction, compulsive self-monitoring, and body comparisons, whereas weight perception did not distinguish between profiles. Children in the *Low* profile demonstrated consistently greater affective, behavioural, and cognitive school engagement than children in the *Moderate* and/or *High* profiles at both time points, with minimal differences between the *Moderate* and *High* profiles, suggesting that even moderate elevations in body image difficulties may be associated with poorer school engagement.

Collectively, findings from the current dissertation suggest that body image and school engagement are interconnected during late childhood. They also emphasize the value of combining variable-centered and person-centered approaches to better understand these associations. Whereas variable-centered analyses identified specific longitudinal pathways that differed by gender, person-centered analyses revealed broader patterns of body image difficulties that were associated with poorer engagement across multiple domains and included both boys and girls. In all, these findings suggest that body image represents an important yet underrecognized correlate of children's school functioning. This highlights the potential value of identifying and addressing body image difficulties early in a child's development.

Keywords: Body image, body dissatisfaction, weight perception, school engagement

ACKNOWLEDGEMENTS

This work would not have been possible without the expertise, guidance, and mentorship of my research supervisor, Dr. Fanny-Alexandra Guimond. Fanny, your unwavering support and belief in my abilities have been a boon to my growth as a clinician and researcher. I am forever grateful to you for welcoming me into your lab and giving me the opportunity to train as a clinical psychologist.

I extend sincere thanks to my research collaborators, whose contributions made this research better, including Dr. Jonathan Smith, Dr. Isabelle Archambault, Dr. Marie-Claude Salvas, and Dr. Irene Vitoroulis. I extend special thanks to Dr. Jonathan Smith for his invaluable leadership in navigating school-based data collection during a global pandemic. I would also like to recognize the Social Sciences and Humanities Research Council of Canada for both supporting this research through an insight grant and supporting my graduate studies through a doctoral fellowship award.

I took my first undergraduate psychology course 15 years ago, and this dissertation is the culmination of a *long* journey—one that has been both enriching and arduous. I could not have undertaken this journey without the loving support of my family. Mom, thank you for sparking my interest in psychology so many years ago. To my siblings, Jenn, Tyler, and Kim, thank you for always being there throughout this very, very long period of being ‘almost done school’. Finally, my deepest thanks go to my wife, Laura. Thank you for your endless support and encouragement that helped me fulfill my dream of becoming a psychologist. I could not have done this without your unwavering love and belief in me. I am so grateful to have had you beside me through it all.

STATEMENT OF CO-AUTHORSHIP

Data for this dissertation were collected as part of a larger multi-site study led by Drs. Fanny-Alexandra Guimond (principal investigator), Isabelle Archambault, Marie-Claude Salvas, Jonathan Smith, and Irene Vitoroulis. The two articles that comprise this dissertation were prepared by myself under the supervision of my research supervisor, Dr. Fanny-Alexandra Guimond.

The first article (Chapter 2) was published online in July 2026 (accepted June 2026) in the *Journal of Early Adolescence* (MacGregor et al., 2026; DOI:10.1177/02724316261464205). Chapter 2 integrates minor modifications made to the published version of the article. As leading author, I conceptualized the research questions, prepared and cleaned the raw data, planned and performed the statistical analyses, and wrote the complete manuscript. All investigators listed above were included as co-authors due to their contributions to grant acquisition, data collection, overall study design, and/or manuscript revisions. Ms. Olivia Gardam, a doctoral candidate in clinical psychology, was also included as a co-author due to contributions towards preparing and cleaning raw data.

The second article (Chapter 3) will be submitted to *Body Image* in December 2026. As leading author, I prepared and cleaned the raw data, conceptualized the research questions, planned and performed the analyses, and wrote the complete manuscript. Co-authorship on this article was identical to the first, with all investigators included due to their contributions to grant acquisition, data collection, overall study design, and manuscript revisions. Ms. Gardam was again included due to contributions towards preparing and cleaning raw data.

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CHAPTER I: GENERAL INTRODUCTION

Understanding School Engagement

An Integrative Model of School Engagement

School engagement is a three-dimensional construct comprised of affective, behavioural and cognitive engagement (Fredricks et al., 2004). *Affective engagement* concerns students' feelings and perceptions of school-related activities (Finn, 1989). This includes whether students enjoy being in class, their level of interest in class material, and whether they view education as useful. *Behavioural engagement* refers to students' conduct and disposition when performing school-related activities (McDermott et al., 2001). This can include attending class on time, being polite while in class, putting effort into classroom work, and participating in activities or discussions that occur in class. Lastly, *cognitive engagement* concerns students' use of self-regulation strategies to plan and monitor their learning (Ablard & Lipschultz, 1998). Students who are engaged cognitively might be more likely to revise their work and be proactive in trying to advance their understanding of class material.

While this three-dimensional model for school engagement is widely used in research, there exists considerable variation in how researchers operationally define each type of engagement. For instance, behavioural engagement may be measured as student punctuality and attendance in some studies (e.g., Sinclair et al., 2003), while being defined as how hard a student works in others (e.g., Lee, 2012). Moreover, affective and cognitive engagement seem to be routinely confused for one another, as some researchers classify children viewing school as useful as an indicator of cognitive engagement (Chiu et al., 2012), even though this is more representative of affective engagement (Fredricks et al., 2004). Whereas behavioural and cognitive engagement tend to remain stable across classes, children's *affective* school engagement can vary depending on whether they were specifically asked about French, math, or

science classes (Archambault & Vandenbossche-Makombo, 2014; Green et al., 2007). These findings suggest that measures of affective school engagement should specify subject matter in order to provide an accurate view of children's level of affective engagement in different classes.

Despite these inconsistencies in operational definitions, it is clear that school engagement is influenced by a range of individual, social, and contextual factors (Appleton et al., 2008; Fredricks et al., 2016). One useful framework for understanding these influences is self determination theory, which proposes that children are more likely to become actively engaged in their environments when their basic psychological needs for autonomy, competence, and relatedness are supported (Skinner et al., 2009). Importantly, when these needs are not met (i.e., students experience "need frustration"), adolescents have been shown to become more disengaged at school (Jang et al., 2016). In turn, this may further limit their opportunities to experience feelings of competence, develop supportive relationships, and participate meaningfully in their academic environment. Accordingly, it should come as no surprise that children who become disengaged at school are considered to be at risk of negative outcomes that extend beyond their academic functioning.

Outcomes Associated with School Engagement

The degree to which children are engaged at school predicts both short-term and long-term academic success (Ladd & Dinella, 2009; Pagani et al., 2012). Indeed, longitudinal studies show that students who follow rules (i.e., behavioural engagement), who are interested in class material (i.e., affective engagement), and who use effective strategies to track their learning (i.e., cognitive engagement) go on to show greater academic achievement and graduate from high school at a higher rate (Ladd & Dinella, 2009; Valiente et al., 2008).

However, school engagement is also associated with physical and mental health outcomes. For instance, students higher in affective school engagement tend to show *higher* levels of health promoting behaviours (e.g., healthy diet, adequate physical activity, safe sexual activity) and *lower* levels of health compromising behaviours (e.g., drug/alcohol use, inadequate physical activity, high-risk sexual activity; Carter et al., 2007). Children who are disengaged at school also tend to struggle with both externalized and internalized mental health problems. For instance, Olivier and colleagues (2020) found that elementary school students with greater global school engagement (i.e., a measure combining behavioural, affective, and cognitive engagement) were less likely to have externalizing problems (i.e., hyperactivity, inattention, opposition, and defiance) and internalizing problems (anxiety and depressive symptoms). Interestingly, children with poor behavioural engagement were especially at-risk to exhibit externalizing problems, whereas those with poorer cognitive engagement were especially likely to exhibit internalizing problems.

Predictors of School Engagement

School engagement begins to take shape as soon as children enter elementary school and can fluctuate as they progress through their schooling (Simons-Morton & Chen, 2009). This finding supports viewing school engagement as a developmental process, rather than as an outcome. In fact, specific academic and social experiences in as early as the first grade can predict eventual dropout in high school (Alexander et al., 1997; Finn, 1989). In other words, becoming disengaged at school can be a long and gradual process. Indeed, major consequences of disengagement may only appear later in adolescence (e.g., school dropout), but the seeds of disengagement appear to be planted much earlier in childhood. From this view, children's experiences in elementary school begin trajectories of either increasing or decreasing

engagement across subsequent years. Evidence suggests that these trajectories are exceedingly complex and are influenced by school, social, and individual factors.

First, school factors are important to consider in the context of children's school engagement. In the previous section, the effect of school engagement on school achievement was described. However, there is evidence that there are reciprocal effects between school achievement and school engagement. Specifically, a longitudinal study by Hughes and colleagues (2008) found that 1st grade children who performed better in math and reading were more behaviourally engaged in these areas three years later, as evidenced by greater effort, attention, persistence, and cooperative participation in their learning. However, children who were more behaviourally engaged in 1st grade also went on to have greater school achievement three years later. Hence, children who are engaged in their learning go on to do better in school, and children who do better in school go on to be more engaged in their learning.

Second, social factors, such as the quality of relationships students have with their teachers, also relates to their school engagement. Indeed, children who feel supported by their teacher are more likely to be engaged behaviourally (i.e., working despite difficulty and trying one's best) and emotionally (i.e., feeling a sense of belonging toward school) at school (Lee, 2012). Alternatively, children who argue with their teachers tend to be less engaged behaviourally (i.e., answering fewer questions and not listening attentively; Downer et al., 2007) and affectively (i.e., liking school less; Gest et al., 2005).

Third, there are also individual factors that predict school engagement. In terms of demographic factors, gender differences are significantly larger for school engagement than they are for school achievement (Hannover & Kessels, 2011). Girls are routinely found to be more behaviourally and emotionally engaged than boys (Lam et al., 2012; Meece et al., 2006; Wang et

al., 2011), though this also appears to depend on the subject matter being studied, with girls showing less emotional engagement in science, technology, mathematics, and engineering (STEM) subjects (Eccles, 2011; Huang, 2013). The factors driving these gender differences remain unclear, though some suggest that gender identity plays a role, such that girls perceive STEM subjects as "male" subjects, whereas boys tend to perceive putting effort into their schoolwork in general as counter to maintaining a "cool" and masculine image (Kessels et al., 2014). Regarding racial/ethnic differences in school engagement, the findings are mixed. For instance, African American students have been found to be both more and less behaviourally engaged than European American students (Johnson et al., 2001; Voelkl, 1997; Wang et al., 2011). However, more recent cross-sectional research suggests that African American students' poor behavioural and affective engagement can be explained by their perception of the school setting as racially unfair (i.e., the degree to which discrimination is ingrained; Griffin et al., 2020). Age is also an important demographic factor for school engagement, such that children tend to become more disengaged as they get older (Goñi et al., 2018; Lepper et al., 2005). Evidence suggests that this could be explained by younger children having greater perceived support from parents and teachers (Fernández-Zabala et al., 2015).

Other individual characteristics in children have also been identified as relevant to their school engagement. For instance, children with better social skills, such as being cooperative, empathetic, and self-regulated, are *more* likely to be engaged at school, whereas children who are physically aggressive towards their peers are *less* likely to be engaged at school (Perdue et al., 2009). Moreover, children who are victims of relational aggression (i.e., by negatively affecting their relationships with others and/or their sense of belonging) show higher rates of school avoidance (Garbarino & deLara, 2003) and poorer affective engagement when attending

school (Hawker & Boulton, 2000). In addition to these factors, researchers have more recently begun to consider how individual differences in weight- and body-related issues might also affect school engagement.

In a cross-sectional study, Finn and colleagues (2018) reported that adolescents deemed to be overweight based on their body mass index (i.e., BMI) had poorer academic achievement, and that this relationship was explained by poorer behavioural engagement. Specifically, adolescents with a higher BMI were less behaviourally engaged at school, as evidenced by paying less attention in class and participating less in classroom discussions. In turn, this lower engagement predicted poorer academic achievement. Moreover, a cross-sectional study by Lv and colleagues (2020) found that children with a higher BMI showed poorer academic achievement, but that this relationship was mediated by the degree to which they were accepted by their peers. In other words, overweight children were less accepted by their peers, and this lower peer acceptance predicted poorer performance at school. Though this study did not explicitly measure school engagement, peer acceptance is positively correlated with both affective engagement (i.e., sense of belonging at school; Furrer & Skinner, 2003) and behavioural engagement (i.e., following rules, participating actively; Berndt & Keefe, 1995; Ladd, 1990). While the studies discussed above have established associations between weight-status and school engagement, a negative body image (and its associated negative mental and emotional impacts) may also be an especially relevant predictor of school engagement.

Understanding Body Image Issues

Definitions and Prevalence of Body Image Issues Among Children

Body image is typically conceptualized as a multidimensional construct encompassing perceptual (i.e., a mental representation of your body), attitudinal (e.g., how satisfied you are

with your body), and behavioural components (e.g., comparing your body to others, disordered eating/exercise; Cash & Smolak, 2011). The commonly used terms of "body image issues" or "body image concerns" are used to describe difficulties across one or more of these dimensions.

Broadly speaking, signs of body image issues begin to appear in middle childhood and tend to both worsen and diversify with age. For instance, cross-sectional research by Anschutz and colleagues (2009) found evidence that Dutch girls as young as 7-years-old show signs of thin ideal internalisation (i.e., accepting or overvaluing the notion that being thin is ideal), which was associated with greater body dissatisfaction and restrained eating. Complementing these quantitative findings, qualitative research utilizing interviews and focus groups with a sample of Australian children suggests that social comparisons are already occurring in middle childhood, with girls endorsing comparisons that are more appearance-related and boys endorsing more athleticism/functionality-related comparisons (Tatangelo & Ricciardelli, 2017). This link between social comparison and body dissatisfaction is further supported by an extensive meta-analysis of 156 studies by Myers and Crowther (2009), which suggests that social comparisons reliably predict greater body dissatisfaction, and that these effects tend to be stronger in girls and older samples. This also aligns with a narrative review of cross-sectional evidence which suggests that, as children approach early adolescence (i.e., 10-14 years), body weight and shape dissatisfaction is more prevalent and severe (Ricciardelli & McCabe, 2001).

Despite being prevalent in both boys and girls, the nature of body image issues experienced by children tends to vary based on gender. Indeed, one of the most replicated findings in the body image literature is that girls report a greater drive for thinness and are more preoccupied with their weight than are boys—both of which are attitudinal aspects of body image (Phares et al., 2004; You & Shin, 2020). On the other hand, boys tend to report a greater

drive for muscularity than girls (Wang et al., 2019). Despite these gender-level differences, it is worth noting that around 50% of children aged 7-12 want to be thinner, regardless of gender (Vaquero et al., 2013). Similarly, a study by Heidelberger and Smith (2018) found that a drive for muscularity was comparably endorsed by 10-year-old boys (62%) and girls (50%). Though there are well-documented gender differences in terms of types and rates of body dissatisfaction, recent trends show that these differences are shrinking (Holland and Tiggemann, 2016). Moreover, recent evidence shows that boys who have mothers with a high drive for thinness are more likely to experience body dissatisfaction between 9 and 11 years-old, suggesting that women may be passing their body image issues down to their sons (Solano-Pinto et al., 2021).

Collectively, the literature suggests that body image concerns emerge during middle childhood and become increasingly common across development. However, much of the available evidence remains cross-sectional and focuses on isolated components of body image, particularly body dissatisfaction or weight-related concerns. Consequently, less is known about how different dimensions of body image develop together over time or how they relate to children's functioning in other important developmental contexts.

Outcomes Associated with Body Image Issues

Children with body image issues go on to experience a range of negative short- and long-term outcomes. Perhaps the most notable of these outcomes is the development of disordered eating behaviours and attitudes (Davison et al., 2003; Smolak & Levine, 2015). Indeed, girls as young as 7 years-old who are dissatisfied with their body can begin to express concerns over their weight, exhibit binging and purging symptoms, and become overly pre-occupied with food (i.e., feeling guilty after eating; Evans et al., 2013). Moreover, in a longitudinal study that followed girls from the age of 5 to 9 years old, Davison and colleagues (2003) discovered that

girls high in weight concerns or body dissatisfaction across the ages of 5 to 7 years went on to display a range of concerning characteristics by the age of 9 years—all independent of their weight status. This included higher dietary restraint, more maladaptive eating attitudes, and a greater likelihood of dieting. Despite these gender-specific findings, other longitudinal evidence suggests that boys and girls share similar risk of developing disordered eating attitudes when they experience poor body satisfaction between the ages of 6 to 14 years (Gardner et al., 2000; Parkinson et al., 2012).

In addition to the emergence of disordered eating attitudes in the short-term, body dissatisfaction is also associated with other problems later in adulthood. Indeed, adults with body image concerns are more likely to have an eating disorder diagnosis (Wertheim et al., 2009) and abuse alcohol (Holzhauer et al., 2016). Alternatively, adults who appreciate their body tend to report higher levels of life satisfaction, happiness, and optimism (Dalley & Vidal, 2013; Swami et al., 2015; Tylka & Kroon Van Diest, 2013). This finding extends to other forms of wellbeing as well, such as psychological wellbeing (feelings of autonomy) and social wellbeing (sense of contributing to society; Swami et al., 2018).

With regard to their impact on academic outcomes, body image issues are understudied. To our knowledge, only one cross-sectional study by Florin and colleagues (2011) has linked perceived weight status, a perceptual dimension of body image, to academic performance in adolescents. Specifically, students labeled as overweight or obese based on their BMI were more likely to report poorer grades, even after controlling for demographics, depression symptoms, screen time, and physical activity. However, students who *perceived* themselves as overweight or obese were *even more likely* to have poorer grades after adjusting for these same variables. These findings suggest that the mental representations students have of their bodies are more

relevant than their actual weight status with regard to their academic performance. Though school *engagement* was not measured in this study, the broader literature suggests that body image issues could be impacting school performance via decreases in school engagement.

The Potential Role of Body Image Issues in Children's School Engagement

Apparent Overlap in Psychosocial Processes Involved

Body image issues influence children in ways that are possibly directly relevant to the ways they engage at school. For instance, being dissatisfied with one's body is related to feeling distressed about your body being evaluated by others (Hart et al., 1989). This distress is associated with poor school attendance, which may be due to students avoiding situations where they may be judged by their peers (Cox et al., 2011). Moreover, even if these children attend class, they may not actively participate in order to avoid drawing attention to themselves (Bernstein et al., 2008). Longitudinal research also shows that body dissatisfaction has been shown to cause explicit rumination about negative evaluations by peers (Vannucci & Ohannessian, 2018). This could suggest that being dissatisfied with one's body might lead to decreased cognitive engagement while at school, as children may be preoccupied with negative thoughts about what peers think of their body, rather than focusing their attentional resources on learning. In sum, it is possible that disengaging from school could be a protective strategy that children use to help reduce the likelihood of negative peer evaluations of their body.

These hypothesized links between body image and school engagement are best explained by self-objectification theory, which posits that individuals learn through various means (i.e., media, comments about appearance, sexualization, weight-related teasing) that their physical appearance is highly valued by others (Fredrickson & Roberts, 1997). Crucially, the internalization of this belief is thought to encourage individuals to constantly monitor and

evaluate themselves as if they were being observed by others (i.e., self-objectifying themselves), which has been associated with a range of body image issues, including body dissatisfaction and body shame (see Saunders et al., 2024). These chronic self-objectifying tendencies have indeed been linked to lower grades and standardized test scores in adolescent girls (McKenney & Bigler, 2016), suggesting that they may be monopolizing finite cognitive resources that are required for demanding tasks, such as schoolwork. While early research on self-objectification theory focused primarily on women (i.e., Fredrickson & Roberts, 1997), it is worth noting that modern empirical studies have shown that self-objectification also occurs in men, albeit to a lesser degree, as reflected in a recent meta-analysis (Guo et al., 2025).

Existing Research and Areas for Growth

Despite these potential explanations for a link between body image and school engagement, research has instead focused on how children's *weight* relates to their level of engagement at school. In fact, even this research is limited, as only one cross-sectional study has demonstrated that adolescents labeled as overweight based on their BMI were more likely to demonstrate decreased behavioural school engagement (i.e., classroom participation; Finn et al., 2018). This study also had several noteworthy limitations, such as only addressing a single component of school engagement (i.e., behavioural) and only considering students' weight rather than their body image. This last point is especially problematic, as objective weight and body image differ in important ways. For instance, adolescents who are underweight or at a normal weight may perceive themselves as obese (may represent up to 50% of girls), whereas overweight adolescents may view their weight as acceptable and approve of their body (may represent up to 25% of adolescents; Mikkilä et al., 2003). This discrepancy between weight and the perceptual and affective dimensions of body image is also seen in younger children, as the

weight of 4–6-year-old children is not a significant predictor of the extent of their thin ideal internalization (Musher-Eizenman et al., 2003). Though cross-sectional studies have established that heavier weight status is associated with poorer school performance (Lv et al., 2020, Finn et al., 2018), there is also evidence that adolescents who *perceive* themselves as overweight are more likely to perform worse at school, regardless of their actual weight (Florin et al., 2011). These findings suggest that, especially in younger children, body image may be a more relevant predictor of academic achievement than weight status. However, as stated previously, research linking body image to school *engagement* is practically nonexistent.

Given this gap in the literature, my research supervisor (i.e., Dr. Fanny-Alexandra Guimond) and her colleague investigated whether body image dissatisfaction led to decreases in school engagement in a sample of children aged 8-10 years. This is an important age group to study, as this is when body image issues typically begin to emerge (Dion et al., 2016). Using a short-term (two months) longitudinal design, they found that body dissatisfaction predicted decreases in behavioural school engagement (Guimond & Laursen, 2022). In other words, children who felt negatively about their body at the first time point participated less in classroom activities two months later. Despite these novel findings, this study had noteworthy limitations. First, the study was relatively short-term, which limits our understanding of whether body dissatisfaction leads to long-term negative effects on school engagement. Moreover, the study did not use comprehensive measures of body image or school engagement. For instance, behavioural engagement (i.e., classroom participation; Fredricks et al., 2004) was measured, whereas children's affective and cognitive engagement were not. The measure of body image was also unidimensional, as it included children's body satisfaction, but not their body perception (i.e., whether they view themselves as over/underweight) or body-focused behaviours

(e.g., self-monitoring behaviours, body comparisons). Given these limitations, further study of these effects was warranted to develop our understanding of how body image affects children's school engagement and other school-related outcomes.

At the time of writing, it is crucial to note that research on body image, weight, and school outcomes had consisted almost exclusively of cross-sectional studies. Excluding the recent study by Guimond and Laursen (2022), no other researchers had established temporal precedence in the relationship between body image issues and school engagement. Therefore, by conducting studies that utilized comprehensive measures of these constructs and employed long-term longitudinal designs to establish temporal precedence, this represented a significant contribution to the literature on both children's school engagement and body image. Moreover, longitudinal studies that made use of both variable-centered and person-centered analyses (distinct, yet complementary, analytic approaches) would offer a more in-depth view of how children's body image issues influence their school engagement.

Variable-centered vs. Person-centered Approaches

Variable-centered approaches in research, such as linear regression analyses, place analytical focus on individual variables of study and the relationships among them. They are designed to examine how mean ratings on variables co-vary across entire samples of, what are assumed to be, homogenous participants (Bámaca-Colbert & Gayles, 2010; Hamza & Willoughby, 2014). Most research on children's school engagement follows this variable-centered approach (e.g., Guimond & Laursen, 2022), as means derived from a sample of children on variables of interest (e.g., gender, social factors, school engagement) are compared to one another. Specifically, variable-centered approaches have helped establish that specific factors can be linked to differences in school engagement, such as disruptive behaviours being associated

with poorer behavioural engagement (Perdue et al., 2009). While this has led to a clearer view of how school engagement relates to various factors, variable-centered analyses tell us little about how students at different levels of engagement compare *to each other* on these factors. This is largely because one of the primary assumptions made in variable-centered analysis is that samples of participants are homogenous (i.e., students are similar to one another). In other words, variable-centered analyses do not allow us to identify *subgroups* of students that may exhibit distinct difficulties and/or strengths. Ultimately, this prevents us from accurately representing the diversity of student phenotypes that exist within school-aged children.

To this end, person-centered approaches are used to identify groups of individuals with similarities within what is viewed as a heterogeneous sample, and to classify them into more homogenous subgroups based on their shared characteristics (Muthén & Muthén, 2007). Person-centered approaches thus place focus on the individual as an organized and multidimensional entity, as opposed to placing focus on individual study variables. Such approaches have been recommended for use in developmental research, as they facilitate the description of traits that make children distinct, rather than just an abstract entity (a statistically defined "average child"; Berlin et al., 2014; Lau & Roeser, 2008). Ultimately, a person-centered approach allows us to understand the profiles of strengths and vulnerabilities seen in subgroups of students, which allows for more meaningful interventions to be designed to address their specific needs.

It is important to note that variable-centered and person-centered approaches do not oppose, but rather complement, one another. In the context of school engagement and body image issues, both approaches have potential to advance our understanding of how children differ on these factors. A variable-centered approach would allow us to assess the *overall* contribution of body image issues to children's school engagement. Additionally, a person-

centered approach would facilitate the identification of subgroups of children showing distinct body image development profiles, and how these children differ in terms of their school engagement. Ultimately, integrating both variable- and person-centered approaches can lead to a more complete understanding of the processes and patterns underlying children's development (Laursen & Hoff, 2006).

The Current Studies

The primary objective of the current dissertation is to further our understanding of the risk posed by body image issues to children's school engagement in late childhood (i.e., 9-12-years-old). This objective was addressed through longitudinal research that is presented as two complementary studies. The first study (Study 1) made use of group-based, variable-centered approaches, and the second study (Study 2) utilized more individualized, person-centered approaches. Together, these studies elucidate how children's body image relates to their school engagement.

Specifically, Study 1 built on existing variable-centered findings that have linked body image issues and school engagement in children (Guimond & Laursen, 2022). By surveying children at two time points (beginning and end of a school year), we investigated whether body image issues were associated with, and predicted declines in, school engagement. Importantly, Study 1 involved collecting data on multiple dimensions of school engagement (affective, behavioural, and cognitive) and body image (attitudes and perceptions) to best understand how these constructs relate to one another. This study also considered other variables that are known risk factors for poor school engagement (e.g., age, prosocial behaviours, externalized behaviour problems) by controlling for them when assessing the relationship between body image and school engagement. Building upon these findings, Study 2 involved deriving more individualized

representations of the body image issues experienced in children by identifying whether distinct body image profiles emerged from a range of body image variables (e.g., body image satisfaction, weight perception, body comparisons, and compulsive self-monitoring). Crucially, we examined whether body image profiles predict differential outcomes in children's school engagement over time.

CHAPTER II: STUDY 1

Body Image and School Engagement in Early Adolescence:

Longitudinal Gender Differences

Based on the article published in 2026 in the *Journal of Early Adolescence*:

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DOI: 10.1177/02724316261464205

Abstract

Body image concerns may contribute to school disengagement during late childhood, but this has not been well investigated. This study examined longitudinal associations between different dimensions of body image (body dissatisfaction and weight perception) and school engagement (affective, behavioural, and cognitive) in a sample of 9- to 12-year-old Canadian children (N = 1,070) over 7 months. Results indicated that children's body dissatisfaction predicted decreases in cognitive engagement only. Also, lower levels of all types of school engagement predicted increases in body dissatisfaction and/or weight perception—suggesting bidirectional influences. Gender analyses indicated that body dissatisfaction predicted lower cognitive engagement among girls only, whereas lower behavioural engagement predicted increased body dissatisfaction among boys only. These findings suggest that body image and school engagement influence one another in gender-specific ways, highlighting the potential value of tailoring early prevention and intervention efforts in these areas to the distinct developmental needs of boys and girls.

Keywords: body image, school engagement, gender differences, elementary school

Introduction

Body image concerns emerge earlier in development than was once thought, with many children beginning to form stable opinions about their appearance by middle childhood (Tatangelo et al., 2016). Although body image research has traditionally focused on adolescence and eating-related outcomes, growing evidence suggests that body dissatisfaction may also have broader implications for children's psychosocial and academic functioning. Moreover, during late childhood and early adolescence, school engagement becomes increasingly important for academic adjustment, mental health, and long-term educational outcomes (Fredricks et al., 2004; Pagani et al., 2012). Despite the developmental relevance of both constructs, relatively little is known about whether body image concerns contribute to changes in children's engagement at school over time. Therefore, the current study examined the longitudinal associations between children's body image and school engagement, as well as whether these associations differed by gender.

Body Image as a Potential Risk Factor for School Disengagement

School engagement is typically defined using the integrative model proposed by Fredricks and colleagues (2004). In this model, school engagement consists of three components: *affective* (e.g., valuing school, enjoying school), *behavioural* (e.g., paying attention, following rules), and *cognitive* (e.g., using effective strategies to plan and monitor learning). The extent to which children are engaged at school predicts short-term and long-term academic success (Pagani et al., 2012), as well as health promoting behaviours (e.g., balanced diet, adequate physical activity; Carter et al., 2007). Alternatively, children who are less engaged at school tend to struggle with both externalized (e.g., hyperactivity, opposition, defiance) and internalized problems (e.g., anxiety and depression; Olivier et al., 2020). Importantly, the process of

becoming disengaged at school is best viewed as a long and gradual one, with certain adverse academic and social experiences, in as early as the first grade, predicting eventual high school dropout (Finn, 1989). In other words, children's experiences in elementary school appear to set them on subsequent school engagement trajectories.

Body image is a multi-dimensional construct comprised of a perceptual component as well as an affective component (Cash & Smolak, 2011). The perceptual component consists of a mental representation of your body that can be accurate or inaccurate (e.g., "I think I am fat"), whereas the affective component refers to your satisfaction with these perceptions (e.g., "I hate that I am fat"). Most children begin forming opinions about their body around the age of 7 or 8 years through comparisons to others (Tatangelo et al., 2016). When these opinions are negative, they tend to involve a distorted perception of their body (e.g., believing they are overweight when they are not) and/or being dissatisfied with their body. In cases where children develop a negative opinion about their body, this can be accompanied by unrealistic expectations for how their body should look (Myers & Crowther, 2009) as well as the development of maladaptive eating behaviors (Davison et al., 2003).

Despite being two distinct constructs, school engagement and body image both broadly impact children's feelings, thoughts and behaviours. With that said, mechanisms linking body image and school engagement are likely indirect and multifaceted. Children who are dissatisfied with their bodies may become increasingly preoccupied with their appearance, engage in social comparison, or worry about being negatively evaluated by peers. These appearance-related concerns may tax cognitive resources needed for learning and self-regulation or contribute to avoidance-oriented coping strategies in school contexts (e.g., minimizing participation or avoiding attention from peers). In some cases, these processes may be amplified by experiences

such as weight- or body-related teasing (Puhl & Luedicke, 2012). This perspective is generally consistent with self-objectification theory, which suggests that habitual monitoring of one's appearance can interfere with cognitive functioning by diverting limited attentional resources (Fredrickson & Roberts, 1997; Winn & Cornelius, 2020). Importantly, body image concerns likely interact with other salient domains of functioning, such as academic self-concept, peer belonging, and social competence. Thus, body dissatisfaction may function as a psychosocial risk factor that increases vulnerability to disengagement under certain conditions.

Despite the potential interplay between these variables, cross-sectional studies examining the links between body image and school engagement have been scarce, as most research has instead focused on how students with a heavier *weight status* (i.e., high body mass index; BMI) tend to show poorer behavioural engagement and achievement (e.g., Lv et al., 2020). A common interpretation of this association is that students avoid attending or participating in class due to weight-based bullying and stigma (Finn et al., 2018). While this interpretation is plausible, it ignores the fact that many students experience body dissatisfaction who are not actually overweight (van den Berg et al., 2010). In fact, the link between BMI and school achievement has been shown to be better explained by a student's weight *perception* (i.e., whether they *view* themselves as overweight, rather than *being* overweight; Florin et al., 2011).

To our knowledge, the only study that has investigated longitudinal associations between body image and school engagement was conducted by Guimond and Laursen (2022). Specifically, they investigated whether children's body dissatisfaction could predict changes in school engagement over an eight-week period. Results indicated that greater body dissatisfaction predicted lower behavioural engagement (i.e., referred to as "academic" engagement) eight weeks later, and that these associations were strongest among children with emotional problems

and children who felt rejected by their peers. Importantly, the link between body dissatisfaction and behavioural engagement still emerged after controlling for variables known to be associated with school engagement, such as school achievement, popularity, and disruptiveness. These findings serve as further evidence that body image may exert an influence on school engagement.

Creating Integrated Models for Predicting School Engagement

The study by Guimond and Laursen (2022) was the first, to our knowledge, to establish temporal precedence in the relationship between body image and school engagement (i.e., that body dissatisfaction predicts subsequent decreases in behavioral school engagement). However, their measures of both school engagement and body image were unidimensional. Specifically, only *behavioural* engagement and body *dissatisfaction* were measured. By including measures of *affective* and *cognitive* engagement, as well as body *perception*, we stand to obtain a more thorough understanding of the longitudinal associations between these constructs.

While body perception can be measured in relation to various aspects of one's appearance (e.g., weight, hair), *weight* perception (i.e., whether you view your weight as normal, overweight, or underweight) is a commonly measured perceptual component in children (Wang et al., 2018) and has been linked to body dissatisfaction (Dion et al., 2016) and school-related outcomes (Florin et al., 2011). These factors make it a worthwhile addition to a study designed to investigate the associations between body image and school engagement in children. Moreover, although children's behavioural and cognitive engagement levels tend to be stable across classes, their affective engagement can vary between class subject (e.g., languages, math; Archambault & Vandenbossche-Makombo, 2014), suggesting that a measure of affective engagement should be subject-specific.

Gender and Control Considerations

A potentially important predictor of the development of children's body image and school engagement is gender. One of the most replicated findings in the body image literature is that girls report a greater drive for thinness and are more preoccupied with their weight than boys. Alternatively, boys tend to report a greater drive for muscularity than girls (Wang et al., 2019). However, these findings typically stem from adolescent or adult samples, and gender differences in rates of child body dissatisfaction appear to be shrinking in recent years (Liu et al., 2019). Regarding school engagement, girls are routinely found to be more affectively and behaviourally engaged than boys (Lam et al., 2012). However, this appears to depend on the subject matter being studied, with girls showing lower affective engagement in science, technology, mathematics, and engineering (STEM) subjects (Prieto-Rodriguez et al., 2020). Despite these gender differences, the presence of body image issues should theoretically lead to similarly negative impacts on school engagement for both boys and girls.

Moreover, there are several negative predictors of school engagement aside from body image. For instance, children with externalized behavioural issues (e.g., aggressive towards peers, impulsive in class) and those exhibiting fewer prosocial behaviours (e.g., poor social skills, uncooperative, unempathetic) are less likely to be engaged at school (Perdue et al., 2009). Also, school engagement tends to decrease with age, such that children become more disengaged as they get older (Goñi et al., 2018). Together, these variables are known risk factors for children to become disengaged at school. By controlling for them, we could examine whether the impact of body image on school engagement exists above and beyond the impact of these other factors.

The Current Study

The current study aimed to examine longitudinal associations between body image and school engagement in pre-adolescent children. Our first objective was to investigate the longitudinal associations between body dissatisfaction and weight perception with the three types of school engagement. We hypothesized that children who were more dissatisfied with their body or who perceived themselves as heavier at the start of the school year would show decreases in affective, behavioural, and cognitive engagement by the end of the school year, even after accounting for children's age, prosocial behaviour, and externalized behavioural problems. As a secondary objective, we examined whether these longitudinal associations differed by gender. Given evidence that gender differences in body dissatisfaction emerge in nuanced ways during childhood and early adolescence, we treated the moderating role of gender as an exploratory research question rather than advancing a directional hypothesis.

Method

Participants

Our initial sample consisted of 1,400 elementary school students from 9 to 12 years old. After excluding participants who disclosed a diagnosis of a mental disorder or learning disability, our final sample included 1,070 students. In Fall 2021, these participants were recruited from 47 French public schools in semi-urban areas of Montreal, Canada. We collected data at two time points: which included near the beginning (Time 1) and end (Time 2) of the school year. Specifically, our Time 1 data collection occurred between November-December 2021 (n = 1,070 students; boys = 472, girls = 588, not specified = 10; M_{age} = 11.13 years), and our Time 2 data collection occurred between May-June 2022 (n = 707 students; boys = 317, girls = 382, not

specified = 8; M_{age} = 11.09 years). Mean age was calculated at each time point using age at Time 1, which was calculated based on participants' self-reported birth date and testing date.

Participants were 78.9% White and 21.1% identified as racialized (2.5% Black, 2.3% Latinx, 1.4% Indigenous, 1.4% West Asian, 1.3% East/Southeast Asian, and 12.2% other). Only 6.5% of children were born outside of Canada. French was the majority language spoken at home (98.6%), followed by English (1.4%). Some children also specified that they spoke other languages at home (5.8%). Most children reported that their mother (77.3%) and father (58.9%) had at least a college or a bachelor's degree and were employed (93.6% and 96.5%, respectively). As children might be unaware of their household annual income, the Family Affluence Scale (FAS; Boyce et al., 2006) was used to calculate an index of family wealth. The FAS is moderately associated to parental earned income and has been shown to distinguish between low- and high-income households (Corell et al., 2021). Scores are calculated by summing the number of cars, computers, tablets, and cellphones owned, as well as whether the child has their own bedroom. Results suggested that our sample was homogenous in terms of family affluence and consisted of children from relatively high-income households (M_{total} = 14.33, *SD* = 1.70, range 9-18). Almost all children reported that their family had at least one car (99.9%), a computer (98.1%), a tablet (87.3%), a cellphone (100%), and that they had their own bedroom (89.6%).

Procedure

This study was approved by the research ethics board at the University of Ottawa and at the University of Sherbrooke and was part of a larger longitudinal study on student academic adjustment and outcomes. We initially contacted school boards in the province of Quebec, Canada to seek permission to recruit from schools in their respective districts. If we received

approval, our request was then forwarded to principals of those schools within each district. If school principals approved our request, we then contacted teachers in those schools about our research project. Finally, if teachers approved of our study, we began our informed consent process with children, their parents, and their teacher. Parents and teachers provided their consent, whereas assent was obtained from all children who participated.

Upon obtaining consent and assent, data collection dates were scheduled with teachers at the various schools. Data collection took place virtually, as surveys at both time points were completed by children on tablets during class time. Surveys took approximately 30 to 45 minutes to complete. All measures were administered in French at both time points.

Measures

Body Dissatisfaction

Children's body dissatisfaction was assessed using the 9-item body image concerns subscale (i.e., "I like clothes that hide my body", "I spend a lot of time thinking about some defects of my physical appearance", "I think my life would change significantly if I could correct some of my physical defects", "I feel I am laughed at because of my appearance", "I am dissatisfied with my appearance", "My physical appearance is disappointing compared to my ideal image", "I can't stand the idea of living with the appearance I have", "I am ashamed of my body") from the Body Uneasiness Test (BUT; Cuzzolaro et al., 2006). This scale was used to assess the affective and evaluative component of body image. Items used a 6-point Likert scale ranging from 1 (*never*) to 6 (*always*). Item scores were averaged to create mean scores for each participant (M_{T1} = 2.16, SD = 1.01; M_{T2} = 2.24, SD = 1.14).

The BUT was initially validated using a large adolescent sample (N = 3,273) and has demonstrated satisfactory internal consistency (i.e., $\alpha > .70$), as well as strong test-retest

reliability in healthy controls (i.e., one week interval, $r = .83$) and concurrent reliability (i.e., correlates significantly with other related measures, such as the Eating Disorder Inventory-2 and the Eating Assessment Tool-26; Cuzzolaro et al., 2006). The reliability assessed in our sample demonstrated excellent internal consistency at both time points ($\alpha = .91$-$.93$).

Weight Perception

Children's weight perception was assessed using a single self-report item ("How do you perceive your weight? I think I am…"; Uccula & Nuvoli, 2017). This item was included to assess the perceptual component of body image (i.e., how children perceive their weight), rather than the extent to which they feel positively or negatively about that perception. The item was initially validated in Italian by Monaci and Nuvoli (2002) and was scored on a 5-point scale ranging from 1 (*very slim*) to 5 (*very heavy*). Item responses were used in our models at both time points ($M_{T1} = 2.75$, $SD = .55$; $M_{T2} = 2.77$, $SD = .55$).

School Engagement

Children's school engagement was assessed using child self-report on the 18-item Classroom Engagement Scale (CES; Archambault et al., 2014), which consists of four subscales: affective engagement in French, and affective engagement in math, behavioural engagement, and cognitive engagement. The *affective French* and *affective math engagement* subscales contain three items each that assess students' feelings and perceptions of French and math class respectively (i.e., French: "I find reading and writing activities boring", "Reading and writing activities are interesting", "I like reading and writing"; Math: "I find math activities boring", "What we are learning in math is interesting", and "I like math"). The *behavioural engagement* subscale contains six items that assess students' conduct and participation in the French and math class (i.e., "I always do my best in math/French, even when the work doesn't count on my report

card", "I always follow my teacher's instructions during math/French activities", and "I listen carefully to the explanations of my teacher during math/French activities"). Finally, the *cognitive engagement* subscale contains six items and assesses students' use of strategies to plan and monitor their learning in French and math class (i.e., "I read over my math answers to make sure I did not make mistakes", "When I don't understand a math question, I read it again and try to understand", "When I make a mistake in math, I try to figure out what I don't understand", "When I don't understand a word, I look it up in the dictionary", "When I make a mistake when reading or writing, I try to figure out what I don't understand", and "When I finish my French work, I read it over to make sure I did not make any mistakes").

For all subscales, items are answered using a 5-point Likert-type scale ranging from 1 (*not at all* or *never*) to 5 (*a lot* or *always*). Mean scores were computed at each time point for each engagement subscale, including affective French (M_{T1} = 3.85, SD = 1.12; M_{T2} = 3.73, SD = 1.14), affective math (M_{T1} = 4.27, SD = 1.03; M_{T2} = 4.05, SD = 1.14), behavioural (M_{T1} = 5.19, SD = .78; M_{T2} = 5.05, SD = .85), and cognitive (M_{T1} = 4.72, SD = .94; M_{T2} = 4.53, SD = .96). A validation study conducted by Archambault and colleagues (2014) with elementary school students (i.e., Grade 3-6; M_{Age} = 9.78 years) demonstrated that the predictive validity of the CES appears to be strong, as evidenced by moderate correlations with subsequent school achievement in math and reading. Moreover, the authors reported that each subscale shows adequate internal consistency (i.e., α = .72 – .86) and structural equation modelling findings support this four-factor structure for school engagement. In our sample, the internal consistency of the CES subscales was strong at both time points (affective French: α = .80-.83; affective math: α = .81-.87; behavioural: α = .87-.88; cognitive: α = .84-.85).

Sociodemographic and Control Variables

Age and Gender. Children completed a short questionnaire designed to collect information on their age and gender. For gender, children were asked if they identified as a boy, a girl, or as another gender (in which case they were asked to specify).

Prosocial Behaviour. Children's prosocial behaviour was assessed using the 5-item prosocial qualities subscale from the Strengths and Difficulties Questionnaire (SDQ), which is a screening questionnaire designed to assess positive and negative aspects of child behaviour that has been widely validated for use with children aged 3-16 years (Goodman, 1997). This subscale assesses behaviour that promotes social acceptance and friendship (i.e., "I try to be nice to other people. I care about their feelings", "I usually share with others", "I am helpful if someone is hurt or feeling unwell", "I often volunteer to help others", "I am kind to younger children"). All items were scored using a three-point scale (i.e., 0 = *not true*, 1 = *somewhat true*, 2 = *certainly true*), and a mean score was calculated at Time 1 (M_{T1} = 2.69, *SD* = .33). Though the SDQ can be completed by parents or teachers on behalf of children (Goodman & Goodman, 2012), the responses of 8–13-year-old children correlate moderately with the responses of their teachers (*r* = .28; Muris et al., 2004). Moreover, when using self-reports of children aged 7-11, the prosocial qualities subscale has shown adequate internal consistency (α = .71) and acceptable test-retest reliability (*r* = .69) over a two-week period (Mellor, 2004). In our sample, the prosocial behaviour subscale demonstrated adequate internal consistency at Time 1 (α = .78).

Externalized Behavioural Problems. Children's externalizing behavioural problems were assessed using the 10-item externalized problems subscale from the SDQ. This subscale assesses conduct, hyperactivity, and inattention problems that children may experience (i.e., "I am restless, I cannot stay still for long", "I get very angry and lose my temper", "I am constantly fidgeting or squirming", "I fight a lot. I can make other people do what I want", "I am often

accused of lying or cheating", "I take things that are not mine from home, school, or elsewhere", "I usually do as I am told", "I am easily distracted. I find it difficult to concentrate", "I think before I do things", and "I finish the work I am doing. My attention is good"). All items were scored using a three-point scale (i.e., 0 = *not true*, 1 = *somewhat true*, 2 = *certainly true*) and mean scores were calculated (M_{T1} = 1.46, *SD* = .33). In samples of children aged 7-11, the externalized problems subscale has shown adequate internal consistency (α = .72) and strong test-retest reliability (*r* = .79) over a two-week period (Mellor, 2004). In our sample, the externalizing behavioural problems subscale demonstrated adequate internal consistency at Time 1 (α = .76).

Plan of Analysis

As preliminary analyses, bivariate associations between Time 1 and Time 2 study variables were conducted. These analyses were conducted using generalized estimating equations (GEE), due to some children being in the same class, which violated the assumption of data independence (i.e., children in the same class/school may be more similar than those who are not). To examine concurrent and longitudinal associations between body dissatisfaction, weight perception, and school engagement, path analyses were conducted in a structural equation modeling framework using Mplus (version 8.2), and the COMPLEX function was applied to address potential classroom-level differences in school engagement due to the nested nature of our data.

Our first objective was to investigate the longitudinal associations between body dissatisfaction and weight perception with school engagement. To do so, we created four models—one for each type of school engagement that we measured (i.e., affective French, and affective math, behavioural, and cognitive). Each model included body dissatisfaction, weight

perception, and school engagement at both Time 1 and Time 2, as well as three control variables at Time 1 (i.e., age, prosocial behaviours, and externalized behaviour problems). Including each construct at both time points allowed us to estimate autoregressive paths (i.e., stability effects) and cross-lagged paths, such that significant longitudinal associations were interpreted as predicting change in the outcome variable over time after accounting for its prior level. Moreover, by including control variables at Time 1, any significant longitudinal associations between body dissatisfaction, weight perception, and school engagement were interpreted as above and beyond the effects of these other variables.

As a secondary objective, we examined whether the longitudinal associations between body dissatisfaction, weight perception, and each type of school engagement differed by gender. We began by calculating the Satora-Bentler Chi-Square difference (TRd) for each of our four models. This statistic was calculated by comparing a constrained version of the model (i.e., all paths were set to be equal between boys and girls) to an unconstrained version. A significant TRd suggested that a model had significant gender differences, which we followed up on by comparing the pattern of results of boys and girls and identifying differences in their statistically significant longitudinal paths.

To assess model fit, several standard indices were assessed. This included the Chi-square index (should be non-significant), the root-mean-square error of approximation (RMSEA; should be .06 or lower), as well as the comparative fit index (CFI) and Tucker-Lewis index (TLI; both should exceed 0.95; Kline, 2016). Of the 1,070 children who took the survey at Time 1, 707 took it again at Time 2 (33.93% of attrition). For those who completed the survey at both time points, an average of 2.31% (*range* = 0–5%) of the data was missing for the study variables. A Little's MCAR test indicated that the data were missing completely at random, $\chi^2(176) = 191.57$, $p = .20$.

Missing data were handled with the full information maximum likelihood (FIML) estimation method.

Results

Preliminary Analyses

Table 1 presents the bivariate associations among all study variables, estimated using generalized estimating equations to account for the clustering of students within classrooms. Notably, there were significant negative associations, both concurrent and longitudinal, between children's body dissatisfaction and nearly all types of engagement. Specifically, children who were more dissatisfied with their body were less engaged at school (i.e., affectively in math, behaviourally, and cognitively), whereas affective French engagement was not longitudinally associated with body dissatisfaction. Alternatively, children's weight perception was not concurrently nor longitudinally associated with any type of engagement. All three of our control variables (i.e., age, prosocial behaviours, and externalized behaviour problems) showed concurrent and longitudinal associations with all types of engagement, except for age and cognitive engagement. Specifically, prosocial behaviour showed positive concurrent and longitudinal associations with all types of engagement, such that children who were more prosocial were more engaged. Alternatively, age and externalized behaviour problems showed negative concurrent and longitudinal associations with engagement, such that older children and those with more externalized behaviour problems were less engaged.

Main Analyses

Affective Engagement in French

Fit indices indicated that the affective French engagement model showed good fit (χ^2 [df = 9] = 15.67, p = .074, RMSEA = .02, CFI = .99, TLI = .98). There were stability effects

between Time 1 and at Time 2 for affective French engagement (b = .70, SE = .02, p < .001), body dissatisfaction (b = .70, SE = .03, p < .001) and weight perception (b = .64, SE = .03, p < .001). In other words, children who were affectively engaged in French at Time 1 reported similar affective French engagement at Time 2. Similarly, children who were more dissatisfied with their body or perceived themselves as heavier at Time 1 reported similar body dissatisfaction and weight perception at Time 2. Contrary to our hypotheses, body dissatisfaction at Time 1 and weight perception at Time 1 were not associated with affective French engagement at Time 2. Similarly, affective French engagement at Time 1 was not a predictor of body dissatisfaction or weight perception at Time 2.

Affective Engagement in Math

Fit indices indicated that the affective math engagement model showed good fit (χ^2 [df = 9] = 16.56, p = .056; RMSEA = .02; CFI = .99; TLI = .98). There were stability effects between Time 1 and Time 2 for affective math engagement (b = .67, SE = .02, p < .001), body dissatisfaction (b = .68, SE = .02, p < .001) and weight perception (b = .59, SE = .03, p < .001). Specifically, children reported similar levels of affective math engagement, body dissatisfaction, and weight perception from Time 1 to Time 2. Contrary to our hypotheses, body dissatisfaction at Time 1 and weight perception at Time 1 were not associated with affective math engagement at Time 2. Similarly, affective math engagement at Time 1 was not a predictor of body dissatisfaction or weight perception at Time 2.

Behavioural Engagement

Despite a significant chi-square, fit indices indicated that the behavioural engagement model showed good fit (χ^2 [df = 9] = 18.25, p = .03; RMSEA = .03; CFI = .99; TLI = .97). There were stability effects between Time 1 and Time 2 for behavioural engagement (b = .58, SE = .03,

$p < .001$), body dissatisfaction ($b = .70$, $SE = .02$, $p < .001$) and weight perception ($b = .64$, $SE = .03$, $p < .001$). Specifically, children reported similar levels of behavioural engagement, body dissatisfaction, and weight perception from Time 1 to Time 2. Contrary to our hypotheses, body dissatisfaction and weight perception at Time 1 did not predict behavioural engagement at Time 2. However, there was a negative association between behavioural engagement at Time 1 and weight perception at Time 2 ($b = -.07$, $SE = .03$, $p = .025$), such that children who were less behaviourally engaged at Time 1 perceived themselves as heavier at Time 2. Conversely, behavioural engagement at Time 1 was not a predictor of body dissatisfaction at Time 2.

Cognitive Engagement

Despite a significant chi-square, fit indices indicated that the cognitive engagement model showed good fit (χ^2 [$df = 9$] = 21.25, $p = .011$; RMSEA = .03; CFI = .99; TLI = .97). There were stability effects between Time 1 and Time 2 for cognitive engagement ($b = .62$, $SE = .02$, $p < .001$), body dissatisfaction ($b = .70$, $SE = .02$, $p < .001$) and weight perception ($b = .64$, $SE = .03$, $p < .001$). Specifically, children reported similar levels of cognitive engagement, body dissatisfaction, and weight perception from Time 1 to Time 2. In line with our hypothesis, there was a negative association between body dissatisfaction at Time 1 and cognitive engagement at Time 2 ($b = -.08$, $SE = .03$, $p = .005$), such that children who were more dissatisfied with their body at Time 1 were less cognitively engaged at Time 2. Conversely, cognitive engagement at Time 1 did not predict body dissatisfaction at Time 2. Contrary to our hypothesis, weight perception at Time 1 did not predict cognitive engagement at Time 2. However, the opposite path indicated a negative association between cognitive engagement at Time 1 and weight perception at Time 2, ($b = -.07$, $SE = .02$, $p = .010$), such that children who were less cognitively engaged at Time 1 perceived themselves as heavier at Time 2.

Gender Differences

The behavioural and cognitive engagement models contained significant gender differences, as evidenced by a significant Satora-Bentler Chi-Square difference (TRd). Alternatively, the affective engagement models did not contain any significant gender differences in our hypothesized paths (see Figures 1 and 2).

Behavioural Engagement. In our behavioural engagement model (TRd = 55.71, p = .008), there was one notable gender difference. First, boys showed a negative association between behavioural engagement at Time 1 and body dissatisfaction at Time 2 (b = -.08, SE = .05, p = .035), whereas girls did not (b = -.04, SE = .04, p = .289). Specifically, boys who were less behaviourally engaged at Time 1 were more dissatisfied with their body at Time 2. This gender difference is illustrated in Figure 3.

Cognitive Engagement. In our cognitive engagement model (TRd = 55.39, p = .008), two gender differences emerged. First, girls showed a negative association between body dissatisfaction at Time 1 and cognitive engagement at Time 2 (b = -.08, SE = .04, p = .047), whereas boys did not (b = -.08, SE = .06, p = .156). Specifically, girls who were more dissatisfied with their body at Time 1 were less cognitively engaged at Time 2. Second, girls showed a negative association between cognitive engagement at Time 1 and weight perception at Time 2 (b = -.07, SE = .03, p = .031), whereas boys did not (b = -.07, SE = .04, p = .131). Specifically, girls who were less cognitively engaged at Time 1 perceived themselves as heavier at Time 2. These gender differences are illustrated in Figure 4.

Discussion

The first objective of this study was to examine the longitudinal associations between children's body dissatisfaction, weight perception, and the four types of engagement (i.e.,

affective French and math, behavioral, and cognitive). The second objective was to examine potential gender differences in these longitudinal associations.

Body Dissatisfaction and School Engagement

Affective Engagement

Contrary to our hypotheses, body dissatisfaction and weight perception did not predict changes in affective engagement (i.e., French or math) over time. Specifically, how children feel about their bodies and the way they perceive their weight does not appear to lead to changes in their enjoyment or interest in French or math classes. This suggests that affective engagement in elementary school may be shaped by more social or environmental factors, such as the quality of their relationships with peers, their teachers, and the general climate of their learning environment (Rautanen et al., 2020). It is also possible that body image only begins to influence affective engagement when a child's preoccupations with their body or weight are socially reinforced in the school environment as might be the case with frequent weight-based teasing or bullying (Guardabassi & Tomasetto, 2022). Moreover, our measure of affective engagement specifically tapped into children's specific enjoyment and interest in math and French learning activities, rather than their broader emotional comfort at school—the latter of which may be more intrinsically linked to body image issues.

Behavioral Engagement

Contrary to our hypothesis, body dissatisfaction at Time 1 was not associated with *behavioural engagement* at Time 2 in our overall sample (see below for gender differences). This contrasts with the findings of Guimond and Laursen (2022), which were that body dissatisfaction predicted decreases in their measure of academic engagement (i.e., included elements of affective and behavioural engagement) over an 8-week period. It is possible that behavioural

engagement is more driven by other factors, such as our control variables (e.g., children's prosocial behaviours or externalized issues), than it is by body dissatisfaction. Moreover, even if children are dissatisfied with their body, they may behave in a variety of ways to avoid drawing unwanted attention to themselves. This explanation is in line with the bullying literature, which has shown that children who are victims of bullying sometimes engage in social withdrawal as a tactic to avoid future instances of teasing (Coelho & Romão, 2018), whereas other children tend to react aggressively to being victimized (Olweus & Breivik, 2014). In the context of body dissatisfaction and behavioural engagement, children may simply cope differently with concerns about body-related teasing. Whereas some children might follow class rules to help them "blend in" and avoid being teased about their appearance by their peers, others might "act out" and exhibit disruptive classroom behaviours to accomplish the same goal.

Gender differences. Also contrary to our hypotheses, only boys who were less behaviourally engaged at Time 1 were more dissatisfied with their body at Time 2. The directionality of this effect was the reverse of what we predicted. With that said, this is in line with findings that boys are more at risk of becoming disengaged than girls (Martins et al., 2022; Janosz et al., 2008) and that they are especially at risk of becoming *behaviourally* disengaged at a young age (Blondal & Adalbjarnardottir, 2012). Moreover, it is worth noting that boys are slightly less likely to become dissatisfied with their body compared to girls (Ferreiro et al., 2014), and as a result, may need more adverse experiences or difficulties (e.g., behavioural disengagement) for their body dissatisfaction to worsen.

This gender difference could also be explained by a third variable, such as self esteem, which has been found to be associated with school engagement (Barragán Martín et al., 2021) and body dissatisfaction (Bos et al., 2010). This would be consistent with the vulnerability model

of self esteem (Beck, 1967), which posits that poor self esteem is a long-term risk factor for various forms of psychopathology. Notably, boys and girls with low self esteem differ in their coping strategies, as boys tend to rely more on avoidance coping strategies whereas girls rely more on problem solving strategies and seeking social support (Eschenbeck et al., 2007). Therefore, boys with poorer self esteem may not feel confident about their academic abilities and choose to use avoidant coping strategies to avoid opportunities for disappointment (e.g., purposely not trying at school), which could ultimately lead to behavioural disengagement. On the other hand, girls might respond to poor academic self esteem with more active coping strategies (e.g., working harder to make up for their perceived weaknesses), which could explain why girls tend to report greater behavioural engagement (Janosz et al., 2008). Ultimately, for boys with poor academic self esteem, an overreliance on avoidant strategies may result in their self esteem worsening and spreading to other areas over time, such as body dissatisfaction.

Cognitive Engagement

As hypothesized, greater body dissatisfaction at Time 1 predicted lower *cognitive engagement* at Time 2 in our overall sample (see below for gender differences). To our knowledge, we are the first to report this finding, and it suggests that body dissatisfaction leads to meaningful interference with how children manage and organize their schoolwork. While the mechanism through which this interference occurs is unclear, it is worth noting that being dissatisfied with one's body is often marked by preoccupations with body-related thoughts and concerns about being negatively evaluated by others. These tendencies may tax the cognitive resources that children require to adequately employ self-regulating, cognitive, and metacognitive strategies that support learning. This aligns with research on self-objectification (i.e., the tendency to internalize observers' perspectives on one's body; Fredrickson & Roberts,

1997) which has been shown to begin in early childhood (Daniels et al., 2020) and subsequently drive body dissatisfaction through habitual self-monitoring (Tiggemann & Lynch, 2001). For instance, greater self-objectification predicts poorer math reasoning in high school students (Fredrickson et al., 1998) as well as poorer cognitive functioning in undergraduates (i.e., processing speed, logical reasoning, and spatial reasoning; Gapinski et al., 2003). Though cognitive functioning is its own distinct construct, cognitive engagement is likely required to perform well on most cognitive tasks.

Gender differences. Contrary to our hypotheses, only girls who were dissatisfied with their body at Time 1 were less cognitively engaged at Time 2. Our findings suggest that girls' body dissatisfaction does not lower their affective or behavioural engagement at school (e.g., does not make them enjoy learning less, does not make them follow rules less). However, girls' cognitive capacity to be organized and efficient with their schoolwork appears to be more negatively impacted by body dissatisfaction than their male peers. This suggests that girls may internalize their body dissatisfaction more than boys, which aligns with cross-cultural research identifying girls as more likely to experience an array of internalized difficulties (e.g., depression and anxiety; Campbell et al., 2021). Notably, girls are more likely than boys to engage in repetitive, self-focused thinking when confronted with stressors or negative emotions (Espinosa et al., 2022). In the context of body dissatisfaction, this tendency to ruminate may lead girls to dwell more extensively on appearance-related concerns and perceived shortcomings. Such repetitive thinking could further tax the cognitive resources required for planning, monitoring, and regulating schoolwork, thereby contributing to lower cognitive engagement over time.

One possible explanation for why body dissatisfaction was associated with subsequent cognitive disengagement, but not affective or behavioural disengagement, is that it may interfere

with the cognitive resources required for learning. From a self-objectification perspective, appearance-related self-monitoring and evaluation may occupy attentional resources that would otherwise be available for planning, monitoring, and regulating schoolwork. This account may be particularly relevant to cognitive engagement, which involves the use of learning strategies, rather than to children's enjoyment of school subjects or observable classroom behaviour. However, the present study did not directly assess self-objectification or the cognitive processes that might explain this association, so this interpretation remains tentative.

On the other hand, boys' Time 1 body dissatisfaction was not associated with Time 2 engagement in any model. This suggests that boys' decreasing levels of engagement might be better explained by other factors, such as externalized behavioural issues (Perdue et al., 2009) poor academic performance (Hughes et al., 2008), or a desire to maintain a "cool" and masculine image (Kessels et al., 2014).

Weight Perception and School Engagement

Contrary to our hypotheses, weight perception at Time 1 did not predict engagement at Time 2 in any model. This lack of associations may support the notion that a child's weight is less related to school engagement than their level of satisfaction with their weight. However, without an objective measure of children's weight status (i.e., BMI), we are unable to determine whether children's weight perception is accurate or distorted (i.e., weighing in the normal range but perceiving yourself as overweight), which prevents us from drawing this conclusion. With that said, it did not seem to matter whether children perceived themselves as heavier or slimmer—what mattered more with regard to engagement was the extent to which they were dissatisfied with this perception of their weight. This is contrary to research by Florin and colleagues (2011), who found that children's academic achievement was predicted by their

weight perception (i.e., students who perceived themselves as heavier performed worse at school). Although school achievement and engagement are distinct constructs, they are highly related to one another (Hughes et al., 2008). A possible explanation for this discrepancy in findings is that including more meaningful predictors in our models (i.e., body dissatisfaction, age, prosocial behaviours, and externalized behavioural problems) may make weight perception a nonsignificant predictor of engagement.

Also contrary to our hypotheses, lower behavioural and cognitive engagement at Time 1 predicted heavier weight perception at Time 2 in our overall sample. Again, this finding is difficult to interpret as we were unable to conclude whether children's weight perception was accurate or distorted. For instance, if children's weight perception was accurate, this finding could suggest that being less behaviourally and cognitively engaged puts children at risk of becoming overweight. This would align with research that has concurrently linked overweight status with a range of academic difficulties in childhood (Lv et al., 2020) and adolescence (Finn et al., 2018). On the other hand, if children's weight perception was distorted, this might be best explained by underlying self esteem issues that initially influence engagement before later manifesting as weight-based concerns (i.e., vulnerability model of self-esteem; Beck, 1967).

Strengths, Limitations, and Future Directions

Most notably, our study has identified novel findings regarding the long-term interplay between body image and school engagement in children. In particular, gender differences suggest directionally specific effects, such that boys and girls experience distinct risk factors for becoming dissatisfied with their body and disengaged in school. The primary strengths of our study are its large sample size and longitudinal design—both of which represent marked improvements in comparison to prior research. Moreover, our approach of including multi-

dimensional measures of body image and school engagement is a notable improvement compared to prior research that has typically measured only a single dimension of each. Moreover, our inclusion of known predictors of engagement as control variables in our models strengthens our confidence in the findings, as all our significant findings were found to be above and beyond the influence of these well-established risk factors (i.e., prosocial behaviours, externalized behavioural issues, age).

Despite these strengths, there are limitations worth noting when interpreting our findings. First, a significant path in one gender and a non-significant path in the other does not, on its own, establish that the paths differ by gender. Although the overall model comparisons indicated gender differences, they do not identify which specific path coefficients differed; therefore, the gender-specific pathways highlighted here are best understood as patterns of statistical significance, not evidence of significant differences between those pathways. Non-significant paths should likewise not be interpreted as evidence of no association, but as estimates for which there was insufficient evidence of a non-zero effect. Second, weight perception was measured using a single item, which prevented us from assessing its internal consistency. Beyond reliability concerns, the primary issue with our measure of weight perception is that, without an objective measure of weight status, we were unable to determine whether children perceived their weight accurately or in a distorted manner (e.g., reporting that they perceive themselves as overweight when they are in the normal range). Ultimately, this makes it difficult to interpret the lack of directional effects from weight status to school engagement. Moreover, although weight perception is commonly assessed as a perceptual dimension of body image in youth research (Wang et al., 2018), body image perceptions can also encompass broader aspects of appearance, such as body shape or specific physical features. Future studies using more comprehensive

measures of body perception may reveal stronger or more nuanced associations with school engagement.

Second, while our sample was considerably larger than most prior studies, we did experience notable attrition from Time 1 to Time 2 (i.e., 34%). This sample size reduction led to lower statistical power, which increased our risk of Type II errors—ultimately making it more challenging to detect real effects. It is worth noting that we were unable to determine why individual children did not participate at Time 2, as reasons for non-participation were not systematically recorded. However, no entire classrooms declined to participate at Time 2, and some children completed Time 2 measures despite not having participated at Time 1. These children were excluded from the final analytic sample because inclusion required at least partial data at both time points. Future research that records reasons for non-participation could help clarify the sources and potential implications of attrition. While our findings suggest that children's body image and engagement influence one another over time, additional research is needed to clarify the nature of these associations. For instance, future studies should include an objective measure of children's weight status (e.g., age- and sex-specific BMI percentile) as this would allow us to tease apart the relative influences of body image (i.e., satisfaction and perception) and weight on engagement. Additionally, although family wealth was measured, our sample was relatively affluent and socioeconomically homogeneous, which limited our ability to meaningfully examine the potential role of socioeconomic factors in these associations. Future studies should replicate these findings in more socioeconomically diverse samples, given that findings suggest that lower socioeconomic status is associated with lower school engagement, likely due to differences in access to educational resources, parental support, and increased exposure to chronic stressors (Martins et al., 2022).

Conclusions

Our findings provide new insights into how children's body image and school engagement influence each other over time. Should our findings continue to be replicated, this could inform gender-specific intervention approaches to address body image issues and school disengagement in children. Specifically, boys appear to become disengaged prior to becoming dissatisfied with their body, whereas the reverse seems true for girls. This could suggest that young boys may benefit more from preventative interventions designed to promote school engagement, whereas young girls may benefit more from early interventions designed to foster a positive body image.

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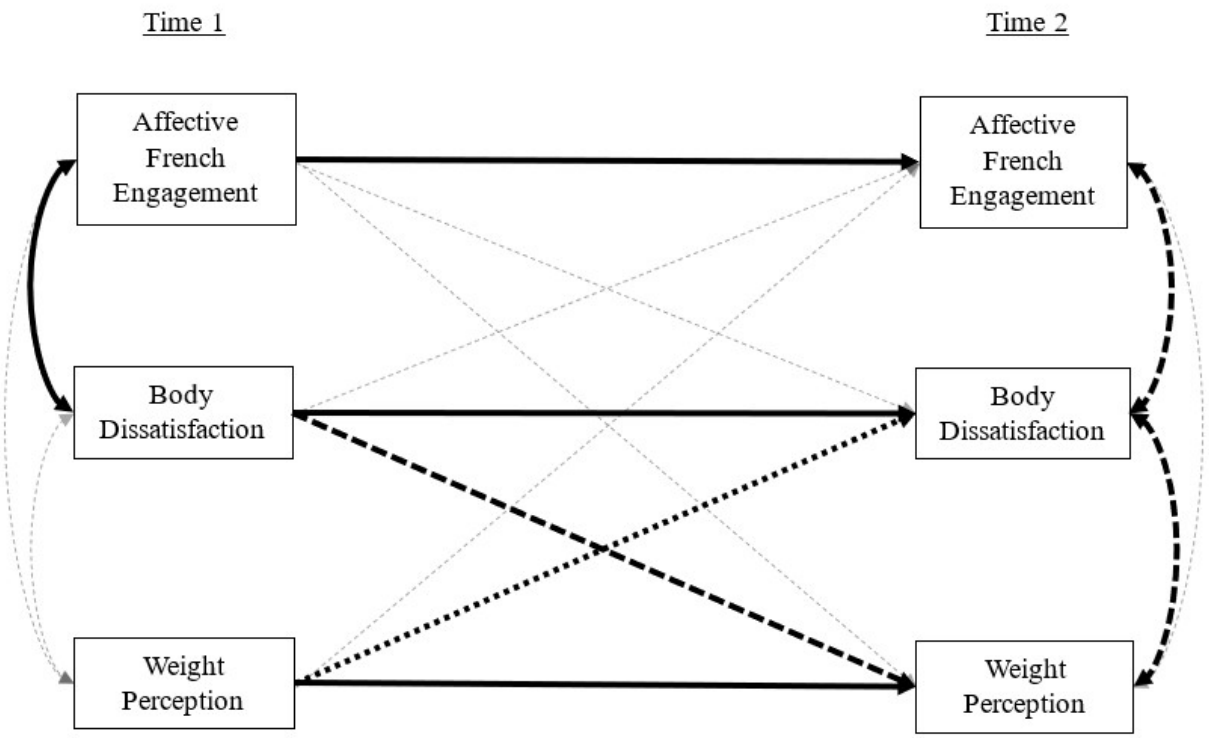
Table 2.1 Bivariate Associations Among Study Variables: Generalized Estimating Equation Standardized Beta Coefficients

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Body Dis. T1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2. Weight Perception T1	.04 [-.02, .10]	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3. Affective Engagement (French) T1	-.10** [-.17, -.04]	.01 [-.04, .08]	–	–	–	–	–	–	–	–	–	–	–	–	–
4. Affective Engagement (Math) T1	-.25*** [-.31, -.17]	.00 [-.06, .06]	.40*** [.33, .46]	–	–	–	–	–	–	–	–	–	–	–	–
5. Behavioural Engagement T1	-.20*** [-.26, -.13]	.04 [-.01, .10]	.51*** [.45, .57]	.49*** [.43, .55]	–	–	–	–	–	–	–	–	–	–	–
6. Cognitive Engagement T1	-.18*** [-.24, -.11]	.02 [-.04, .08]	.45*** [.38, .51]	.49*** [.43, .55]	.74*** [.70, .79]	–	–	–	–	–	–	–	–	–	–
7. Body Dis. T2	.71*** [.63, .77]	-.00 [-.09, .08]	-.06 [-.13, .01]	-.22*** [-.31, -.13]	-.12*** [-.19, -.05]	-.11** [-.18, -.04]	–	–	–	–	–	–	–	–	–
8. Weight Perception T2	.14** [.04, .22]	.65*** [.56, .74]	-.01 [-.08, .06]	-.05 [-.14, .04]	-.02 [-.10, .04]	-.06 [-.13, .01]	.10* [.01, .19]	–	–	–	–	–	–	–	–

9. Affective Engagement (French) T2	-.08 [-.15, .00]	.03 [-.04, .10]	.70*** [.65, .75]	.26*** [.19, .33]	.37*** [.30, .44]	.31*** [.24, .38]	-.09* [-.17, -.02]	.00 [-.07, .07]	–	–	–	–	–	–	–
10. Affective Engagement (Math) T2	-.23*** [-.29, -.15]	.01 [-.07, .09]	.31*** [.23, .39]	.73*** [.67, .78]	.36*** [.29, .43]	.38*** [.30, .45]	-.22*** [-.29, -.14]	-.01 [-.10, .08]	.37*** [.28, .45]	–	–	–	–	–	–
11. Behavioural Engagement T2	-.15*** [-.21, -.07]	.01 [-.06, .10]	.46*** [.38, .54]	.45*** [.37, .54]	.58*** [.51, .64]	.47*** [.40, .55]	-.17*** [-.26, -.08]	-.02 [-.10, .05]	.51*** [.44, .59]	.56*** [.49, .64]	–	–	–	–	–
12. Cognitive Engagement T2	-.17*** [-.24, -.09]	-.00 [-.08, .06]	.40*** [.34, .47]	.45*** [.37, .53]	.52*** [.45, .59]	.63*** [.56, .70]	-.16*** [-.24, -.07]	-.02 [-.10, .05]	.47*** [.40, .54]	.52*** [.43, .60]	.74*** [.69, .79]	–	–	–	–
13. Externalized Behaviours T1	.31*** [.25, .36]	-.08* [-.15, -.01]	-.44*** [-.49, -.38]	-.37*** [-.43, -.32]	-.56*** [-.61, -.51]	-.51*** [-.57, -.46]	.23*** [.15, .30]	-.04 [-.12, .04]	-.32*** [-.38, -.26]	-.31*** [-.39, -.22]	-.41*** [-.50, -.33]	-.43*** [-.51, -.36]	–	–	–
14. Prosocial Behaviours T1	-.06 [-.12, .00]	.09* [.02, .16]	.35*** [.29, .42]	.22*** [.15, .28]	.41*** [.33, .49]	.41*** [.34, .48]	-.00 [-.08, .07]	.02 [-.05, .10]	.28*** [.20, .35]	.16*** [.07, .25]	.26*** [.17, .36]	.28*** [.19, .38]	-.35*** [-.42, -.29]	–	–
15. Age T1	.07** [.02, .12]	-.06* [-.10, -.00]	-.09*** [-.14, -.03]	-.15*** [-.20, -.09]	-.07*** [-.12, -.03]	-.00 [-.06, .04]	.10*** [.04, .16]	-.03 [-.09, .03]	-.11*** [-.18, -.04]	-.16*** [-.23, -.09]	-.10*** [-.15, -.04]	-.05 [-.11, .01]	-.01 [-.06, .03]	-.00 [-.04, .03]	–

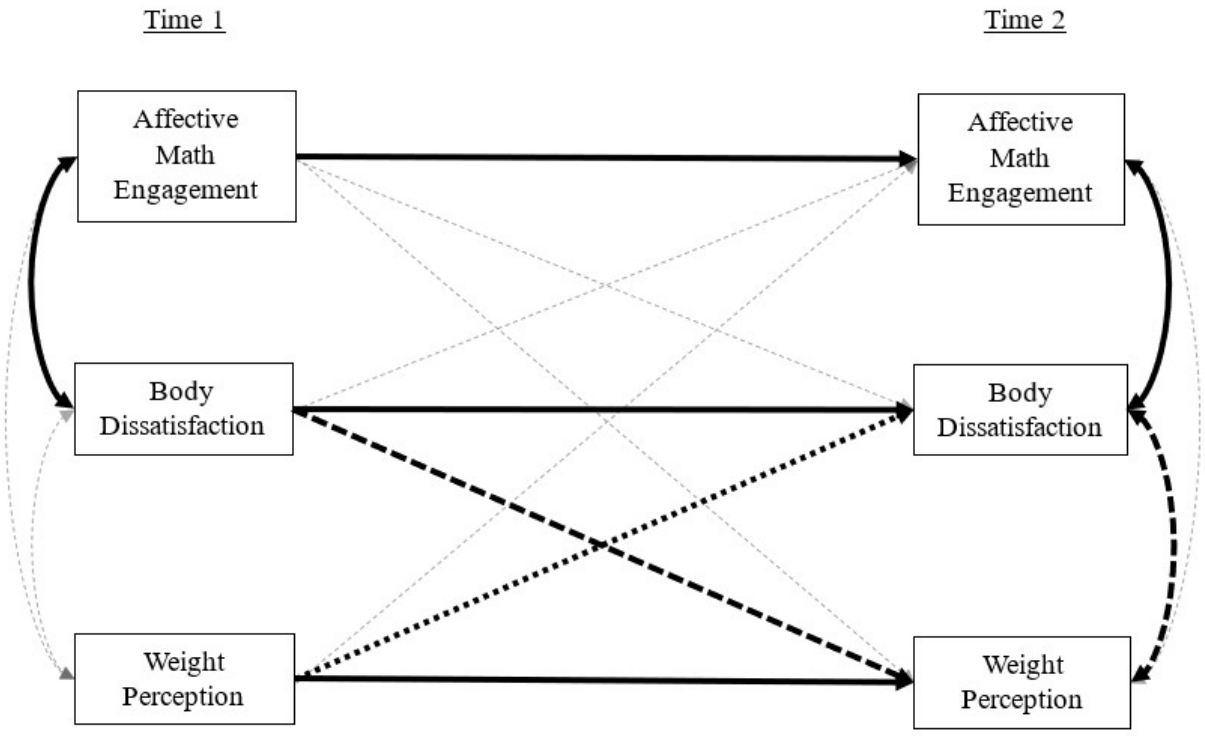
Note: N_{T1} = 1070; N_{T2} = 707. 95% Confidence intervals are presented in brackets. *p < .05, **p < .01, *** p < .001 two-tailed.

Figure 2.1 Concurrent and Longitudinal Associations between Affective French Engagement and Body Image Variables (Boys and Girls)



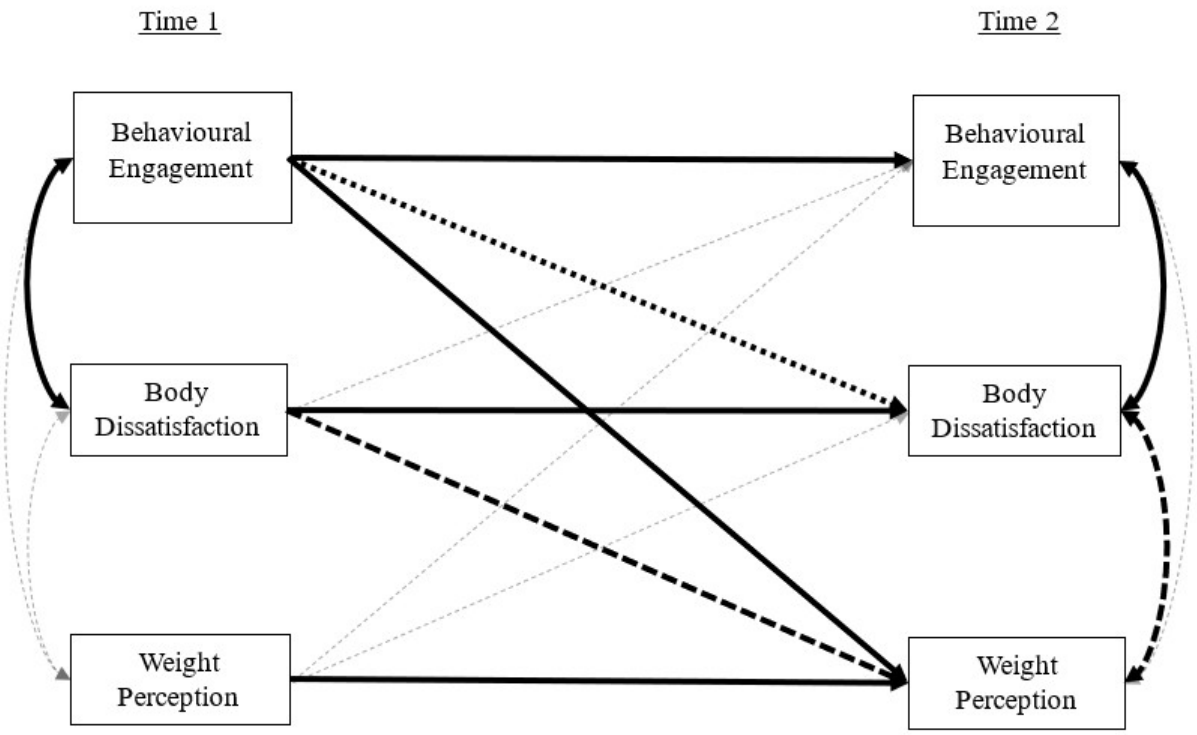
Note. This figure shows the concurrent and longitudinal paths between our body image variables and affective French engagement for boys and girls. Significant paths are illustrated with solid arrows (solid = overall sample; square dot = boys only; rectangle dot = girls only. Non-significant paths are illustrated with transparent dashed lines. Absent from this figure are three control variables (i.e., age, prosocial behaviours, and externalized behaviours), all of which were controlled for at Time 1.

Figure 2.2 Concurrent and Longitudinal Associations between Affective Math Engagement and Body Image Variables (Boys and Girls)



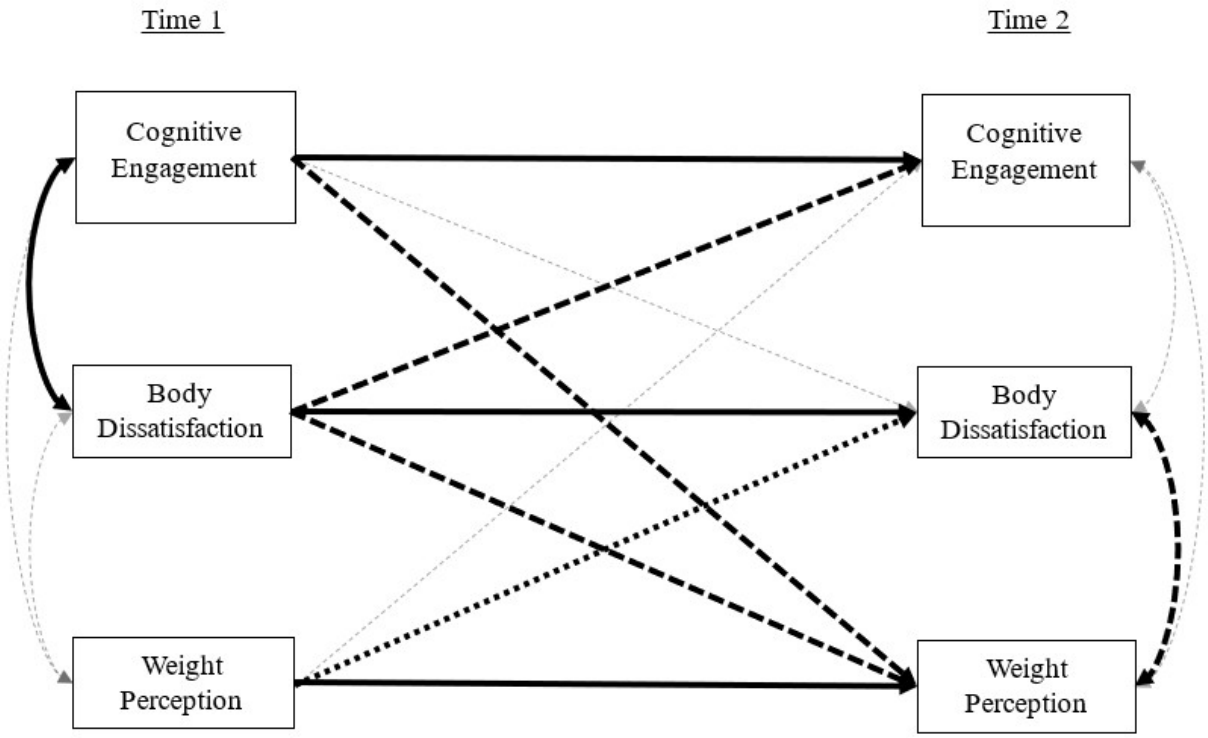
Note. This figure shows the concurrent and longitudinal paths between our body image variables and affective math engagement for boys and girls. Significant paths are illustrated with solid arrows (solid = overall sample; square dot = boys only; rectangle dot = girls only). Non-significant paths are illustrated with transparent dashed lines. Absent from this figure are three control variables (i.e., age, prosocial behaviours, and externalized behaviours), all of which were controlled for at Time 1.

Figure 2.3 Concurrent and Longitudinal Associations between Behavioural Engagement and Body Image Variables (Boys and Girls)



Note. This figure shows the concurrent and longitudinal paths between our body image variables and behavioural engagement for boys and girls. Significant paths are illustrated with solid arrows (solid = overall sample; square dot = boys only; rectangle dot = girls only). Non-significant paths are illustrated with transparent dashed lines. Absent from this figure are three control variables (i.e., age, prosocial behaviours, and externalized behaviours), all of which were controlled for at Time 1.

Figure 2.4 Significant Concurrent and Longitudinal Associations between Cognitive Engagement and Body Image Variables (Boys and Girls)



Note. This figure shows the concurrent and longitudinal paths between our body image variables and cognitive engagement for boys and girls. Significant paths are illustrated with solid arrows (solid = overall sample; square dot = boys only; rectangle dot = girls only). Non-significant paths are illustrated with transparent dashed lines. Absent from this figure are three control variables (i.e., age, prosocial behaviours, and externalized behaviours), all of which were controlled for at Time 1.

Appendix 2.1 Cross-Lagged Panel Analysis Model

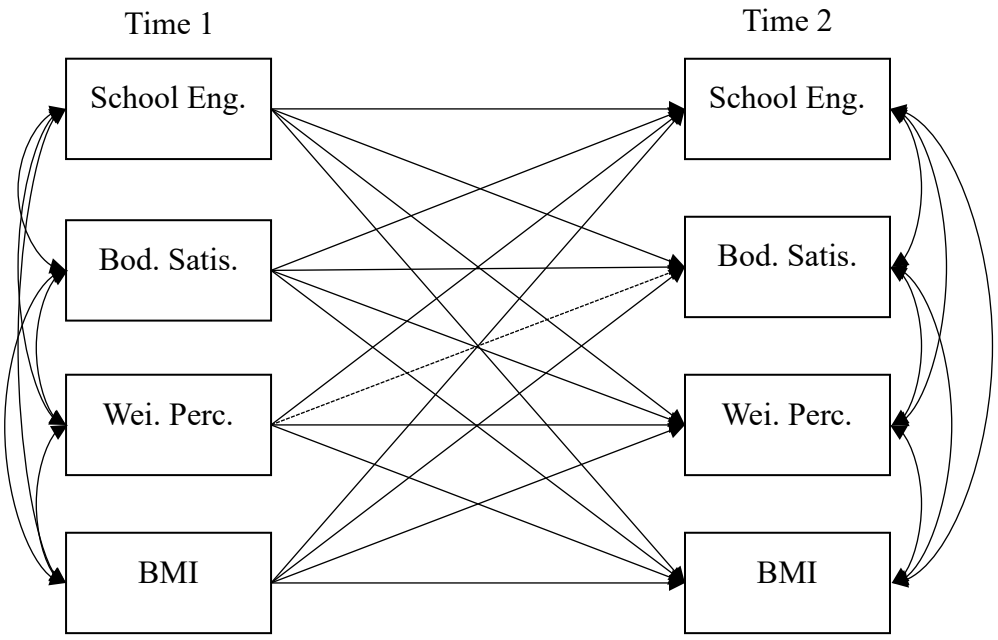


Figure i. Example of cross-lagged panel analyses that were performed for Time 1 and Time 2 data. These bi-directional relationships allowed us to estimate the influence these variables have on each other over time, and at each time point. School Engagement was considered as four separate variables (i.e., behavioural, cognitive, affective math, and affective French). School Eng. = School Engagement; Bod. Satis. = Body Satisfaction; Wei. Perc. = Weight Perception.

CHAPTER III: STUDY 2

Body Image Profiles and School Engagement in Children:

A Latent Profile Analysis

Abstract

Body image is a multidimensional construct encompassing affective, perceptual, and behavioural components. Findings suggest that body image may play an important role in children's academic functioning, though this is relatively understudied. This study aimed to identify body image profiles in elementary school students and examine whether profile membership was associated with age, gender, and school engagement at two time points (i.e., 8 months apart). Participants were 1,087 Canadian children aged 9–12 years. Latent profile analysis was conducted using four body image indicators assessed at the beginning of the school year: body dissatisfaction, compulsive self-monitoring, body comparisons, and weight perception. Subsequent analyses examined profile differences in age, gender, and affective, behavioural, and cognitive dimensions of school engagement at both time points. A three-profile solution emerged, consisting of Low (65.9%), Moderate (21.4%), and High (12.7%) Body Image Issues. Profiles differed primarily in body dissatisfaction, compulsive self-monitoring, and body comparisons, whereas weight perception did not distinguish profile membership. The Moderate and High profiles were more likely to consist of girls and older children, and also showed poorer affective, behavioural, and cognitive engagement than children in the Low profile at both time points. Our findings suggest that body image difficulties appear to cluster according to severity during late childhood and are associated with multi-dimensional differences in school engagement. Body image may represent an important and underrecognized factor in children's academic functioning, and this highlights the potential value of targeted interventions to promote healthy body image in late childhood.

Keywords: body image, school engagement, elementary school, latent profile analysis

Introduction

Body image is a multi-dimensional construct comprised of a perceptual component (i.e., a mental representation of your body), an affective component (i.e., how satisfied you are with your body), and a behavioural component (e.g., restrictive dieting, excessive exercise). A range of factors can be considered when assessing body image, such as body dissatisfaction, which denotes a tendency to negatively evaluate one's body due to not meeting an idealized standard (Cash & Pruzinsky, 1990), and weight perception (i.e., whether you view your weight status as average, slim, or heavy; Wang et al., 2018). Importantly, body image issues can lead to the manifestation of behaviours related to one's body, such as making body comparisons to others (e.g., comparisons based on weight, attractiveness, or other physical features; Fardouly et al., 2015; Jones, 2001) or compulsive self-monitoring (e.g., repeated mirror checking or monitoring of one's appearance; Cuzzolaro et al., 2006). While body image is typically studied using varying combinations of variables such as these, most researchers confer that a *positive* body image is denoted by acceptance, gratitude, and appreciation of one's body (Tylka & Wood-Barcalow, 2015). On the other hand, a negative body image is typically associated with concerns regarding any part of one's appearance (Thompson & Stice, 2001).

Emerging research suggests that children with body image issues may be at risk of school disengagement (Guimond & Laursen, 2022; MacGregor et al., 2026), which is a construct that encompasses *affective* (e.g., valuing school, enjoying school), *behavioural* (e.g., paying attention, following rules), and *cognitive* (e.g., using effective strategies to plan and monitor learning) dimensions (Fredricks et al., 2004). However, research linking body image to school disengagement tends to dichotomize body image into positive and negative categories, which does not accurately capture the depth of this construct. Accordingly, studies suggest that body

image can also be measured by creating complex profiles rather than simple positive/negative dichotomies. This can be seen in adolescent studies that have examined multiple body image constructs, as individuals can be highly satisfied with certain aspects of their body (e.g., their weight), yet dissatisfied and concerned about others (e.g., their muscularity; Hoffmann & Warschburger, 2018). This shift towards conceptualizing body image as a profile has led to burgeoning research on the topic and offers an intriguing view of how distinct body image profiles may differentiate between children at varying levels of academic functioning.

A Person-Centered Approach to Body Image Issues

Research on body image profiles is relatively new, but evidence suggests considerable diversity in the types of profiles that can emerge. This appears to depend largely on the types of body image constructs measured, as well as the age and gender of the participants being studied. For instance, Hoffman and Warschburger (2018) found that adolescent weight and muscularity concerns appear to fluctuate together, as evidenced by the emergence of three body image profiles, which included "inconspicuous" (*small* amounts of weight and muscularity concerns), "borderline" (*moderate* amounts of weight and muscularity concerns), and "conspicuous" (*marked* weight and muscularity concerns). These profiles subsequently predicted different outcomes depending on the gender of the participant. Specifically, boys in the "conspicuous" profile were more likely to restrain their eating and engage in emotional exercise (i.e., exercising due to feelings of guilt) than boys in other profiles. On the other hand, girls in the "conspicuous" profile were more likely to engage in binge eating, restrained eating, emotional exercise, and muscularity-oriented behaviour (i.e., taking energy supplements or weightlifting) compared to girls in other profiles. These findings not only shed light on the diversity of body image profiles,

but also on how gender differences within these profiles can provide highly specific targets for interventions in adolescent boys and girls.

Body image profiles also appear to depend on the age of the participants. In a study by Calzo and colleagues (2016), three profiles emerged when studying a sample of male adolescents between the age of 15-20 years. This included a "healthy" profile (low body image concerns and less weight- and shape-related behaviours), a "muscle-concerned" profile (high concern with muscularity and high muscularity product use), and a "lean-concerned" profile (high concern with weight and shape, as well as higher likelihood of dieting and binge eating). Unlike the profiles reported by Hoffman and Warschburger (2018), these profiles suggest that drives for thinness and muscularity can be mutually exclusive. Moreover, age-based analyses revealed that 15–16-year-old boys did not form a "muscle-concerned" profile, suggesting that concerns regarding one's level of muscularity may not become relevant until later in adolescence. Ultimately, this suggests that children might experience different body image concerns than those seen in adolescents.

Studies examining body image profiles in children are especially scarce, though preliminary findings suggest that distinct profiles still emerge. Lacroix and colleagues (2022) assessed body image longitudinally in a sample of 11-year-olds and found that three profiles emerged at each of their four annual timepoints. This included "*high* body esteem", "*moderate* body esteem", and "*low* body esteem". Children in the "low body esteem" profile experienced more appearance-related teasing, had lower self-esteem, less positive affect, and exhibited higher dietary restraint. Within the "high body esteem" profile, children had higher self-esteem and lower dietary restraint. Importantly, all three body image profiles appeared to represent stable trajectories over the course of four years. In other words, children who fit the "low body esteem"

profile at the age of 11 continued to match this profile in following years. This lack of developmental change across body image trajectories is concerning, given that roughly 15% of children mapped onto the "low body esteem" profile. This also suggests that, if there is a critical period for body image development, it may occur prior to the age of 11.

Identifying Body Image Profiles in Children

Despite a lack of research on children's body image profiles, researchers have suggested that early childhood and pre-adolescent children (i.e., under the age of 12) may be the most important to study, as this could be a point when a problematic body image has not yet become ingrained (Lacroix et al., 2022). Indeed, identifying distinct body image profiles in children could serve to identify specific groups who are at risk of long-term problems with body image issues and other areas of functioning. Though it is unclear which types of profiles would emerge in children this young, a plethora of variable-centered research, as well as the growing literature on body image profiles in older populations can help inform our hypotheses.

The most reliable finding in person-centered body image research is that the majority of individuals have a healthy body image profile (may range between 39% and 70%; Hoffman & Warschburger, 2018; Lacroix, 2022; Paul, 2017). While these profiles differ slightly depending on the constructs being measured, they are typically characterized by fewer weight concerns, fewer behaviours related to weight/shape concerns, fewer concerns regarding muscularity, as well as greater satisfaction with one's appearance, body, and level of attractiveness. Given that a healthy body image profile appears to represent the majority in adolescent and adult samples, this pattern is likely to emerge in a younger sample as well. If anything, this type of profile may represent an even larger portion of a younger sample, given that children's appearance and weight satisfaction tend to decline as they get older (Nelson et al., 2018).

Additionally, more problematic body image profiles seem to emerge in smaller, yet still sizeable, subsets of older individuals. These profiles differ from one another in that some are characterized by a more general dissatisfaction with one's body (Lacroix et al., 2022), whereas others are highly specific, and characterized by dissatisfaction with a single aspect of one's body (e.g., muscularity; Calzo et al., 2015). With regard to the types of problematic body image profiles that might emerge in children, it is difficult to comment on whether they would be broad or specified in nature. However, variable-centered research can help shed light on specific variables that we might expect to be relevant in a child sample. For instance, children as young as 7-years-old have been shown to report a drive for thinness, as well as a preoccupation with their weight (Phares et al., 2003). Seven-year-olds have also shown signs of disordered eating, such as binging, dietary restraint, and feelings of guilt after eating (Davison et al., 2003). However, one element of body image that may not be relevant to child body image profiles is a drive for muscularity. Despite some evidence that children as young as 10-years-old can endorse a drive for muscularity (Heidelberger & Smith, 2018), person-centered analyses have indicated that a "muscle-concerned" profile only emerged after the age of 17 (Calzo et al., 2015). This may suggest that, even if some children express a desire to be more muscular, this may not be a significant aspect of their body image at younger ages. As a result, a more global measure of body dissatisfaction may be more appropriate for children.

There are also several elements of body image that have yet to be examined in person-centered research. First, children have been shown to begin forming, and later maintaining, their body image through body comparisons with other children and compulsive self-monitoring of their body (Doiron, 2019). These important behavioural factors have been absent in body image profile research. Gender differences are also likely to emerge in child body image profiles. A

consistent finding from variable-centered research is that girls experience more body dissatisfaction than boys, and that girls are specifically more likely to endorse a drive for thinness (Anderson & Bulik, 2004). This trend extends to person-centered research, such that girls are more likely than boys to be assigned to body image profiles with more pronounced difficulties (Jackson et al., 2022) and *less* likely to be assigned to healthier body image profiles (Hoffman & Warschburger, 2018).

Predicting School Engagement from Child Body Image Profiles

To date, body image profiles have not been used to examine differences in school-related outcomes. Indeed, most researchers have only aimed to identify distinct profiles without using them to predict trajectories or outcomes in other areas, whereas a small number of studies have investigated how body image profiles correspond to health-related constructs such as eating attitudes (Jackson et al., 2022), exercise motivation (Hoffman & Warschburger, 2018), and adverse health outcomes (i.e., obesity, binge drinking, drug use; Calzo et al., 2016). Though this research is valuable, it fails to address the possibility of body image impacting other areas of functioning that are not directly related to physical health. As outlined previously, school disengagement is one variable that may be especially sensitive to the influence of body image and has been linked to a range of negative long-term outcomes (e.g., drug/alcohol use, inadequate physical activity, high-risk sexual activity; Carter et al., 2007).

A student's body image may interfere with school engagement in various ways, likely through interactions with other salient domains of functioning, such as academic self-concept, peer belonging, and social competence. For instance, a student who dislikes their body may avoid school in an effort to avoid situations where their peers can judge their appearance (Cox et al., 2011). Over time, as children begin to view school as an intimidating and threatening place

due to their body insecurities, it may lead to jaded feelings and viewing school as not useful or enjoyable. Moreover, children who experience high levels of body dissatisfaction have been shown to ruminate about negative evaluations by peers (Vannucci & Ohannessian, 2018). This rumination may specifically impact children's ability to cognitively attend to relevant class material and perform to the best of their cognitive ability. This perspective is generally consistent with self-objectification theory, which suggests that habitual monitoring of one's appearance can interfere with cognitive functioning by diverting limited attentional resources (Fredrickson & Roberts, 1997; Winn & Cornelius, 2020). In fact, this rumination may extend beyond worrying about negative evaluations, and could include any thoughts related to one's body, such as ruminating over how you need to change your diet or comparing your body to others.

Proposed Study

The purpose of this study was threefold: a) to investigate whether distinct body image profiles emerge in a child sample; b) to evaluate predictors of profile membership; and c) to determine whether these profiles are associated with differences in school engagement both concurrently and longitudinally. For the first objective, data was collected on variables known to be relevant to child body image based on prior studies. This included body satisfaction (e.g., the degree to which you like your body, want to change parts of your body and judge your body), weight perception (e.g., viewing yourself as slim, heavy, or average-sized), body comparisons (i.e., the degree to which you compare your body to others), and compulsive self-monitoring (i.e., the tendency to spend time monitoring your physical appearance). Though data was collected on these variables at two time points—once near the beginning and once near the end of the school year—we created our profiles using Time 1 data. This allowed us to determine

whether body image profile membership at the *beginning* of the school year (Time 1) predicted school engagement at the *end* of the school year (Time 2).

Predicting the specific profiles that would emerge was challenging given the limited person-centered research on children's body image. However, prior research suggested that we the following profiles were likely: 1) Low body image issues (i.e., high body satisfaction, low body comparisons and self-monitoring, average weight perception); 2) Heavier + body image issues (i.e., low body satisfaction, high body comparison and self-monitoring, heavier weight perception); and 3) Slim + body image issues (i.e., low body satisfaction, high body comparison and self-monitoring, slimmer weight perception). In addition to these profiles, we anticipated that more diverse profiles could emerge, such as children who are satisfied by their body but still compare their body to others, children who do not perceive their weight as average but still report minimal body image issues, and/or children who present with moderate scores across all measures.

For the second objective, we predicted that body image profile membership would be influenced by child gender and age, such that girls and older children would be more likely to be members of profiles with greater body image issues than boys. Finally, for the third objective, our analyses are largely exploratory given the scarcity of prior research on how body image relates to school engagement in children. With that said, we expected more profiles with greater body image issues to be associated with poorer Time 1 and Time 2 school engagement (i.e., affective, behavioural, and cognitive) than more profiles with lower body image issues.

Method

Participants

Our initial sample consisted of 1,400 elementary school students from 9 to 12 years old. After excluding participants who disclosed a diagnosis of a mental disorder or learning disability, our final sample included 1,070 students. In Fall 2021, these participants were recruited from 47 French public schools in semi-urban areas of Montreal, Canada. We collected data at two time points near the beginning (Time 1) and end (Time 2) of the school year. Specifically, our Time 1 data collection occurred between November-December 2021 (n = 1,070 students; boys = 487, girls = 583; M_{age} = 11.04 years), and our Time 2 data collection occurred between May-June 2022 (n = 727 students; boys = 321, girls = 393, not specified = 8; M_{age} = 11.01 years). Mean age was calculated at each time point using age at Time 1, which was calculated based on participants' self-reported birth date and testing date.

Ethnicity data were available for 51.3% of participants (n = 558). Among participants who disclosed an ethnic background, the majority identified as White (85.1%), followed by Black (5.6%), Latinx (5.4%), Middle Eastern (3.2%), Indigenous (2.7%), East Asian (2.0%), and South or South-East Asian (1.1%). Additionally, 7.9% of these participants identified with more than one ethnic background. Because participants could select multiple ethnic backgrounds, percentages do not sum to 100%. Only 6.9% of children were born outside of Canada, and French was the majority language spoken at home (98.5%), followed by English (1.5%). Some children also specified that they spoke other languages at home (4.5%). Most children reported that their mother (79%) and father (62.7%) had at least a college or a bachelor's degree and were employed (94.2% and 96%, respectively).

As children might be unaware of their household annual income, the Family Affluence Scale (FAS; Boyce et al., 2006) was used to calculate an index of family wealth. The FAS is moderately associated to parental earned income and has been shown to distinguish between low- and high-income households (Corell et al., 2021). Scores are calculated by summing the number of cars, computers, tablets, and cellphones owned, as well as whether the child has their own bedroom (maximum total score = 18). Total FAS scores indicated that the sample was relatively affluent (M = 14.23, SD = 1.88, range = 9–18). Almost all children reported that their family had at least one car (99.7%), a computer (98.5%), a tablet (87.6%), a cellphone (100%), and that they had their own bedroom (89.5%).

Procedure

This study was approved by the research ethics board at the University of Ottawa (#H-02-22-7488) and at the University of Sherbrooke (#2020-2698) and was part of a larger longitudinal study on student academic adjustment and outcomes. We initially contacted school boards in the province of Quebec, Canada to seek permission to recruit from schools in their respective districts. If we received approval, our request was then forwarded to principals of those schools within each district. If school principals approved our request, we then contacted teachers in those schools about our research project. Finally, if teachers approved of our study, we began our informed consent process with children, their parents, and their teacher. Parents and teachers provided their consent, whereas assent was obtained from all children who participated.

Upon obtaining consent and assent, data collection dates were scheduled with teachers at the various schools. Data collection took place virtually, as surveys at both time points were completed by children on tablets during class time. Surveys took approximately 30 to 45 minutes to complete. All measures were administered in French at both time points.

Measures

Body Image

Body Satisfaction. Children's body dissatisfaction was assessed using the 9-item body image concerns subscale (i.e., "I like clothes that hide my body", "I spend a lot of time thinking about some defects of my physical appearance", "I think my life would change significantly if I could correct some of my physical defects", "I feel I am laughed at because of my appearance", "I am dissatisfied with my appearance", "My physical appearance is disappointing compared to my ideal image", "I can't stand the idea of living with the appearance I have" and "I am ashamed of my body") from the Body Uneasiness Test (BUT; Cuzzolaro et al., 2006). This scale was used to assess the affective and evaluative component of body image. Items used a 6-point Likert scale ranging from 1 (*never*) to 6 (*always*). Item scores were summed to create total scale scores for each participant (M_{T1} = 19.58, SD = 9.67; M_{T2} = 20.19, SD = 10.83). Scores could range from 6 to 36, with higher scores indicating greater body dissatisfaction.

The BUT was initially validated using a large adolescent sample (N = 3,273) and has demonstrated satisfactory internal consistency (i.e., $\alpha > .70$), as well as strong test-retest reliability in healthy controls (i.e., one week interval, r = .83) and concurrent reliability (i.e., correlates significantly with other related measures, such as the Eating Disorder Inventory-2 and the Eating Assessment Tool-26; Cuzzolaro et al., 2006). The reliability assessed in our sample demonstrated excellent internal consistency at both time points (α = .91-.93).

Compulsive Self-Monitoring. Children's compulsive self-monitoring behaviours were assessed using three items from the compulsive self-monitoring subscale (e.g., "I look in the mirror for an image of myself which satisfies me, and I continue to search until I am sure I have found it") from the BUT (Cuzzolaro et al., 2006). All items used a 6-point Likert scale ranging

from 1 (*never*) to 6 (*always*). Item scores were summed to create total scale scores for each participant (M_{T1} = 5.99, *SD* = 3.08; M_{T2} = 6.10, *SD* = 3.40). The reliability assessed in our sample demonstrated good internal consistency at both time points (α = .77-.82). Scores could range from 3 to 18, with higher scores indicating greater compulsive self-monitoring.

Body Comparisons. The extent to which children perform body comparisons was assessed using the Physical Appearance Comparison Scale (PACS; Dany & Urdapilleta, 2012), which is a 5-item self-report scale that assesses body comparisons made on the basis of physical appearance (e.g., "in social situations, I sometimes compare my figure to the figures of other people"), weight (e.g., "the best way for a person to know if they are overweight or underweight is to compare their body to the body of others"), and clothing ("when I am around others, I compare my clothes to theirs"). All items were answered using a 5-point Likert scale ranging from 1 *(never*) to 5 (*always*). Item scores were summed to create total scale scores for each participant (M_{T1} = 6.56, *SD* = 3.45; M_{T2} = 7.17, *SD* = 4.02). Scores could range from 5 to 25, with higher scores indicating greater body comparisons.

The PACS was validated using a sample of American undergraduate students, and has shown concurrent validity with relevant psychosocial variables, such as body satisfaction, body size estimation, and self-esteem (Dany & Urdapilleta, 2012), as well as good internal consistency (Cronbach's alpha = .79). The PACS has also demonstrated strong convergent validity, as it correlates negatively with measures of self-esteem and body satisfaction (Schaefer & Thompson, 2014). To our knowledge, there is currently no measure of body comparisons that has been specifically validated using a child sample. Therefore, we adjusted certain items from the PACS to be more appropriate for younger respondents. For instance, two items initially referred to being "at parties or other social events", which we edited to instead say "when I am around

others". The reliability assessed in our sample demonstrated acceptable internal consistency at both time points (α = .72-.77).

Weight Perception. Children's weight perception was assessed using a single self-report item ("How do you perceive your weight? I think I am…"; Uccula & Nuvoli, 2017). This item was included to assess the perceptual component of body image (i.e., how children perceive their weight), rather than the extent to which they feel positively or negatively about that perception. The item was initially validated in Italian by Monaci and Nuvoli (2002) and was scored on a 5-point scale ranging from 1 (*very slim*) to 5 (*very heavy*). Item responses were used in our models at both time points (M_{T1} = 2.78, SD = .50; M_{T2} = 2.81, SD = .52).

School Engagement

Children's school engagement was assessed using child self-report on the 18-item Classroom Engagement Scale (CES; Archambault & Vandenbossche-Makombo, 2014), which consists of four subscales: affective engagement in French, and affective engagement in math, behavioural engagement, and cognitive engagement. The *affective French* and *affective math engagement* subscales contain three items each that assess students' feelings and perceptions of French and math class respectively (i.e., French: "I find reading and writing activities boring", "Reading and writing activities are interesting", "I like reading and writing"; Math: "I find math activities boring", "What we are learning in math is interesting", and "I like math"). The *behavioural engagement* subscale contains six items that assess students' conduct and participation in the French and math class (i.e., "I always do my best in math/French, even when the work doesn't count on my report card", "I always follow my teacher's instructions during math/French activities", and "I listen carefully to the explanations of my teacher during math/French activities"). Finally, the *cognitive engagement* subscale contains six items and

assesses students' use of strategies to plan and monitor their learning in French and math class (i.e., "I read over my math answers to make sure I did not make mistakes", "When I don't understand a math question, I read it again and try to understand", "When I make a mistake in math, I try to figure out what I don't understand", "When I don't understand a word, I look it up in the dictionary", "When I make a mistake when reading or writing, I try to figure out what I don't understand", and "When I finish my French work, I read it over to make sure I did not make any mistakes").

For all subscales, items are answered using a 5-point Likert-type scale ranging from 1 (*not at all* or *never*) to 5 (*a lot* or *always*). Total scores were computed at each time point for each engagement subscale, including affective French (M_{T1} = 11.84, *SD* = 3.24; M_{T2} = 11.55, *SD* = 3.31), affective math (M_{T1} = 13.03, *SD* = 3.00; M_{T2} = 12.38, *SD* = 3.29), behavioural (M_{T1} = 31.53, *SD* = 4.40; M_{T2} = 30.81, *SD* = 4.90), and cognitive (M_{T1} = 28.83, *SD* = 5.37; M_{T2} = 27.83, *SD* = 5.58). Total scores for the affective French and math subscales ranged from 3 to 15, whereas the behavioural and cognitive subscales ranged from 5 to 25. A validation study conducted by Archambault and Vandenbossche-Makombo (2014) with elementary school students (i.e., Grade 3-6; M_{Age} = 9.78 years) showed that the predictive validity of the CES appears to be strong, as evidenced by moderate correlations with subsequent school achievement in math and reading. Moreover, the authors reported that each subscale shows adequate internal consistency (i.e., α = .72 – .86) and structural equation modelling findings support this four-factor structure for school engagement. In our sample, the internal consistency of the CES subscales was strong at both time points (affective French: α = .80-.83; affective math: α = .81-.87; behavioural: α = .87-.88; cognitive: α = .84-.85).

Plan of Analysis & Data Screening

Analyses were performed in two broad steps. In the first step, latent profile analysis (LPA) was performed using the Mixture function in MPlus Version 8.11, with the goal of sorting elementary school students into latent profiles based on their body image. Once the optimal number of profiles was identified, one-way ANOVAs were used in SPSS Version 28 to assess whether body image variables differed between profiles. The second step involved investigating inter-profile differences in gender using the R3STEP function, as well as inter-profile differences in age and school engagement using the DE3STEP function. These procedures account for classification uncertainty when comparing latent profiles on external variables. When omnibus tests were significant, pairwise profile comparisons were examined to identify specific between-profile differences. A conservative threshold for statistical significance of $p < .01$ was used in all analyses to reduce the risk of Type 1 error.

LPAs used four Time 1 body image indicators (i.e., body dissatisfaction, compulsive self-monitoring, body comparison and weight perception) to test models that ranged from one-to-six body image profiles and assessed them based on a variety of evaluative criteria. This included 1) indicators of model fit, 2) case classification accuracy, and 3) the interpretability of the clustering solution (i.e., parsimony, profile size, and the meaningfulness of differences between profiles). Model fit was explored using multiple information criteria, namely the Bayesian Information Criterion (BIC), Sample-Size Adjusted Bayesian Information Criterion (SABIC), and the Akaike Information Criterion (AIC), on which lower values indicate better relative fit (Vermunt & Magidson, 2016). Subsequently, the accuracy with which models classified individuals into clusters was examined using entropy values, in which higher values (between 0 and 1) indicate better accuracy (Vermunt & Magidson, 2016). Average posterior probabilities (APPs) were used

to assess confidence in profile membership, with greater values suggesting stronger confidence. Lastly, the Lo-Mendell Rubin likelihood ratio test (LMR-LRT) provided a metric to assess whether a model was preferred over the model with one fewer profile, with a value below .05 suggesting that the current model was preferred.

LPAs were estimated using complete-case (listwise deletion) procedures. Missing data on the four body image indicators ranged from 4% to 9%, which resulted in a final analytical sample of 948 participants. Given the relatively low proportion of missing data and large remaining sample size, this approach was considered acceptable for profile estimation (Tabachnick & Fidell, 2019). To reduce the influence of outliers, body dissatisfaction, compulsive self-monitoring, body comparison, and weight perception scores were winsorized by truncating values at the 5th and 95th percentiles. Regarding follow-up analyses with other study variables, missing data among age, gender, body image, and Time 1 school engagement variables was similarly low, ranging from 0.0% to 9.0%.

Results

Bivariate Associations

Bivariate associations among study variables are presented in Table 1. Due to participants being nested within classrooms, generalized estimating equation (GEE) models were used to estimate these associations while accounting for the non-independence of observations. Body dissatisfaction, body comparisons, and compulsive self-monitoring were positively associated with one another, with standardized associations ranging from moderate to strong in magnitude (βs = .53–.73, ps < .001). In contrast, weight perception was not significantly associated with other body image variables. Higher levels of body dissatisfaction and body comparisons were consistently associated with lower levels of school engagement across both Time 1 and Time 2

(βs = -.11 to -.24, *p*s < .01). Compulsive self-monitoring demonstrated a weaker pattern of associations, showing negative relations with affective math engagement and behavioural engagement at Time 1 and affective math engagement at Time 2 (βs = -.11 to -.16, *p*s < .01). Weight perception was not significantly associated with any school engagement variable.

Latent Profile Analysis

LPAs were estimated using the four Time 1 body image indicators. Fit statistics for the one- through six-profile solutions are presented in Table 1, with the 3- and 4-profile solutions emerging as the most optimal solutions. Overall, the 4-profile solution was supported by slightly smaller AIC, BIC, and SABIC values compared to the 3-profile solution. However, further comparison of these two models revealed that the 3-profile solution maximized classification confidence (lowest APP: 90% vs. 87%), and accuracy (entropy: 91% vs. 90%). Moreover, the LMR-LRT suggested that the 3-profile solution was preferred over the 4-profile solution ($p < .001$ vs. $p = .606$). This preference was further supported by the 3-profile solution's smallest profile containing a greater percentage of the sample than the 4-profile solution's smallest profile (12.3% vs. 7.3%). This is relevant due to guidelines recommending that profiles should include at least 5-8% of participants to avoid the retention of "rare" and unstable data clusters. (Nylund-Gibson & Choi, 2018). Accordingly, the 3-profile solution was retained for all subsequent analyses.

Profile Interpretation & Labeling

First, to examine whether the four body image variables differed significantly across the three latent profiles, four one-way ANOVAs were conducted, each with profile membership (i.e., Profile 1, Profile 2, or Profile 3) as the independent variable and one of the body image variables as the dependent variable (i.e., body dissatisfaction, compulsive self-monitoring, body

comparisons, or weight perception). Post hoc comparisons were then performed using a Bonferroni correction, or a Games-Howell test when the assumption of homogeneity of variance was violated, to assess whether specific profiles differed from one another on the body image indicators.

Profile characteristics are detailed in Figure 1. One-way ANOVAs indicated significant profile differences in body dissatisfaction, $F(2, 945) = 588.81$, $p < .001$, $\eta^2 = .56$, compulsive self-monitoring, $F(2, 945) = 226.62$, $p < .001$, $\eta^2 = .32$, and body comparisons, $F(2, 945) = 2539.46$, $p < .001$, $\eta^2 = .84$. Post hoc comparisons revealed a consistent pattern in which Profile 1 reported the lowest levels of body dissatisfaction, compulsive self-monitoring, and body comparisons, Profile 3 reported the highest levels, and Profile 2 fell between the two (all ps < .001). In contrast, profiles did not differ on weight perception, $F(2, 945) = .56$, $p = .572$, $\eta^2 < .001$.

These results indicated that the three latent profiles found in our sample differed significantly from one another on all body image variables, except for weight perception, which was similarly average across profiles. Specifically, children in Profile 3 ($n = 120$; $M_{age} = 11.27$ years, 80% girls) had the highest self-reported difficulties in body dissatisfaction, compulsive self-monitoring, and body comparisons. This subgroup was thus labeled the "High Body Image Issues" profile. In contrast, Profile 1 ($n = 625$; $M_{age} = 11$ years, 51.8% boys) reported the lowest difficulties across these body image variables and comprised the largest proportion of students. Accordingly, this profile was labeled "Low Body Image Issues". Lastly, Profile 2 ($n = 203$; $M_{age} = 11.20$ years, 65.3% girls) reported lower overall difficulties than Profile 3, but higher difficulties than Profile 1 in each of these body image variables. Therefore, this subgroup was

labeled the “Moderate Body Image Issues” profile. Moving forward, these three profiles will simply be referred to as “Low”, “Moderate” and “High”.

Profile Differences (Time 1)

Gender

Gender differed significantly across the body image profiles. Relative to girls, boys were more likely to belong to the Low profile than the Moderate profile (*OR* = 2.33, 95% CI [1.58, 3.43], $p < .001$) and the High profile (*OR* = 5.00, 95% CI [3.03, 8.33], $p < .001$). The difference between the Moderate and High profiles did not meet the study's significance threshold ($p = .013$).

Age

Age also differed significantly across body image profiles, Wald $\chi^2(2) = 16.73$, $p < .001$. Pairwise comparisons indicated that participants in the Low (*M* = 11.01, *SE* = 0.04) were younger than those in the Moderate profile (*M* = 11.22, *SE* = 0.06; $p = .002$) and the High profile (*M* = 11.28, *SE* = 0.08; $p = .001$). The Moderate and High profiles did not differ significantly ($p = .527$).

School Engagement

There were inter-profile differences in all types of school engagement at Time 1 (see Figure 2). First, profiles differed significantly on affective engagement at Time 1, $\chi^2(2) = 14.26$, $p = .001$. The Low profile exhibited higher affective engagement (*M* = 0.102, *SE* = 0.041) than the Moderate profile (*M* = -0.154, *SE* = 0.077; $p = .005$) and the High profile (*M* = -0.214, *SE* = 0.103; $p = .004$). The Moderate and High Body profiles did not differ significantly ($p = .646$). Second, profiles differed significantly on affective math engagement at Time 1, $\chi^2(2) = 40.10$, $p < .001$. The Low profile exhibited higher affective math engagement (*M* = 0.157, *SE* = 0.038)

than both the Moderate (M = -0.138, SE = 0.077; p = .001) and High (M = -0.541, SE = 0.119; p < .001) profiles. The Moderate profile also exhibited higher affective math engagement than the High profile (p = .007). Third, profiles differed significantly on behavioral engagement at Time 1, $\chi^2(2) = 40.09$, $p < .001$. The Low profile exhibited higher behavioral engagement (M = 0.179, SE = 0.037) than both the Moderate profile (M = -0.241, SE = 0.090; $p < .001$) and the High profile (M = -0.428, SE = 0.118; $p < .001$). The Moderate and High profiles did not differ significantly (p = .234). Fourth, profiles differed significantly on cognitive engagement at Time 1, $\chi^2(2) = 29.54$, $p < .001$. The Low profile exhibited higher cognitive engagement (M = 0.147, SE = 0.039) than both the Moderate profile (M = -0.169, SE = 0.084; p = .001) and the High profile (M = -0.396, SE = 0.111; $p < .001$). The Moderate and High profiles did not differ significantly (p = .118).

Profile Differences (Time 2)

Attrition Analysis

Due to a 34% attrition rate from Time 1 to Time 2, attrition analyses were conducted to examine whether participants retained at Time 2 differed from those lost to follow-up on baseline age, gender, body image, and school engagement variables. Participants were classified as retained if they provided data at Time 2 and lost if they did not. Independent-samples *t*-tests were used to compare retained and lost participants on continuous Time 1 variables, including age, body dissatisfaction, weight perception, compulsive self-monitoring, body comparison, affective French engagement, affective math engagement, behavioural engagement, and cognitive engagement. Gender differences in attrition were examined using a chi-square test of independence.

Attrition analyses indicated that participants retained at Time 2 did not differ significantly from those lost to follow-up on age, gender, body dissatisfaction, weight perception, compulsive self-monitoring, body comparison, affective French engagement, affective math engagement, or cognitive engagement (all *ps* > .01). A significant, but small, difference emerged for behavioural engagement, such that participants lost to follow-up reported slightly higher behavioural engagement at Time 1 ($M = 0.11$, $SD = 0.89$) than participants retained at Time 2 ($M = -0.06$, $SD = 1.05$), $t(782.22) = 2.69$, $p = .007$, $d = 0.17$. In the context of these findings, missing data on Time 2 school engagement variables (33.7%-34.3%) was interpreted as primarily reflecting participant attrition between time points rather than selective item nonresponse.

School Engagement

There were inter-profile differences in all types of school engagement at Time 2 (see Figure 2). First, profiles differed significantly on affective French engagement, $\chi^2(2) = 10.15$, $p = .006$. Pairwise comparisons indicated that the Low profile exhibited higher affective French engagement ($M = 0.108$, $SE = 0.050$) than the "Moderate" profile ($M = -0.170$, $SE = 0.085$; $p = .007$). No other pairwise comparisons met the established significance threshold (*p*s > .01). Second, profiles also differed significantly on affective math engagement, $\chi^2(2) = 22.96$, $p < .001$. Pairwise comparisons indicated that the Low profile exhibited higher affective math engagement ($M = 0.138$, $SE = 0.049$) than the High profile ($M = -0.475$, $SE = 0.130$; $p < .001$). No other pairwise comparisons met the study's significance threshold (*p*s > .01). Third, profiles differed significantly on behavioural engagement, $\chi^2(2) = 17.51$, $p < .001$. Pairwise comparisons indicated that the Low profile exhibited higher behavioural engagement ($M = 0.145$, $SE = 0.047$) than both the Moderate ($M = -0.178$, $SE = 0.096$; $p = .003$) and High ($M = -0.336$, $SE = 0.140$; $p = .001$) profiles. The Moderate and High profiles did not differ significantly ($p = .366$). Fourth,

profiles also differed significantly on cognitive engagement, $\chi^2(2) = 11.99$, $p = .002$. Pairwise comparisons indicated that the Low profile exhibited higher cognitive engagement ($M = 0.104$, $SE = 0.050$) than the High profile ($M = -0.325$, $SE = 0.130$; $p = .008$). No other pairwise comparisons met the study's significance threshold ($ps > .01$).

Discussion

The first objective of the study was to determine whether distinct body image profiles would emerge in late childhood sample. The second objective was to determine whether profile membership was associated with age and/or gender differences. The third objective was to determine whether profile membership was associated with differing levels of school engagement at Time 1 and Time 2.

Distinct Body Image Profiles

As hypothesized, distinct body image profiles emerged from our LPA using four indicators (i.e., body dissatisfaction, compulsive self-monitoring, body comparisons, and weight perception). With that said, contrary to our hypotheses, the three profiles differed primarily in severity (i.e., Low, Moderate, High issues) rather than in kind (i.e., elevations on some dimensions of body image, but not others). This aligns with the findings of Lacroix and colleagues (2022), who found similar profiles in an early adolescent sample using different indicators. This suggests that, during early adolescence, body image issues may have not yet differentiated into the more specific profiles that have been recorded in adolescents and adults (Calzo et al., 2015; Hoffman and Warschburger 2018). Indeed, individual profiles showed generally consistent levels of affective (i.e., body dissatisfaction) and behavioural (i.e., compulsive self-monitoring, body comparisons) dimensions of body image. The exception was the High profile, which had especially high levels of body comparisons. This could suggest that

behavioural elements of body image that rely on social comparison processes are especially salient markers of more severe body image disturbances in late childhood. This aligns with research on early body image development, which has suggested that behavioural dimensions of body image, such as social comparisons, tend to precede issues in the affective dimension, such as body dissatisfaction (Barbierik et al., 2023; Fardouly et al., 2015). In other words, children may first begin to excessively compare themselves to others, which in turn is associated with greater dissatisfaction with their body.

Contrary to our hypotheses, weight perception was a nonsignificant predictor of body image profile membership. In fact, weight perception was virtually identical across the three profiles, with standardized scores suggesting that each profile's membership tended to perceive themselves as being of average weight. Taken at face value, this could suggest that body image in late childhood tends to be less rooted in weight-based concerns, which aligns with research suggesting that children are more inclined to be preoccupied with other aspects of appearance, such as their clothing and hair (Cash & Smolak, 2015). Accordingly, children's body image difficulties may be rooted more strongly in non-weight-related appearance evaluations and social comparison processes than in explicit perceptions of body weight. As children progress into adolescence and become increasingly exposed to sociocultural appearance ideals, body image concerns may become more strongly organized around weight and shape (de Coen, 2021; Paxton & Damiano, 2017). With this in mind, other measures of perceptual body image, such as muscularity or other appearance-based concerns, may be more meaningful indicators for body image profiles in a late childhood sample.

Age & Gender Differences

As hypothesized, members of profiles with fewer body image issues were more likely to be younger and boys. Indeed, members of the Low profile were significantly younger, and more likely to be boys, than members of the Moderate and High profiles. However, there were no age or gender differences between the Moderate and High profiles. This suggests that, while girls and older children may be generally more likely to exhibit elevated body image issues, these demographic factors do not help identify which children develop especially severe body image issues from those with more moderately elevated issues. Our findings further suggest that appearance-related pressures are already disproportionately affecting girls in late childhood, and that these pressures are manifesting into both affective and behavioural body image disturbances. Moreover, even with a relatively narrow developmental window (9-12-years-old), older children were still more likely to belong to profiles with elevated body image issues, suggesting that early adolescence is a developmental period in which body image changes relatively quickly. Overall, these findings are consistent with well-established gender and age differences in the body image literature, such that getting older and being a girl are seen as risk factors for body image issues (Anderson & Bulik, 2004; Hoffman & Warschburger, 2018; Jackson et al. 2022).

School Engagement Differences

To our knowledge, this study is the first to examine how school engagement relates to body image profile membership. As hypothesized, children in profiles characterized by lower levels of body dissatisfaction, body comparisons, and compulsive self-monitoring consistently demonstrated stronger school engagement of all types compared to their peers in profiles with moderately or highly elevated body image difficulties. These findings held both concurrently and across the school year, suggesting that body image may represent an important and enduring

correlate of children's academic functioning. However, as was the case with age and gender, the Moderate and High profiles rarely differed significantly on school engagement (i.e., only Time 1 affective math engagement).

These findings align well with the framework of self-objectification theory, such that body image issues may be drawing away attentional and emotional resources that could otherwise be directed towards school functioning (Fredrickson & Roberts, 1997; Winn & Cornelius, 2020). More specifically, our profiles suggest that affective and behavioural aspects of body image seem to be associated with less enjoyment, active participation, and effective use of learning strategies at school. This suggests that body image difficulties do not simply interfere with children's concentration or academic performance but are instead linked to broader aspects of their educational experience. Importantly, body image profile membership remained a relevant predictor of school engagement at Time 2, suggesting that body image may represent more than a concurrent correlate of children's academic functioning. Although the magnitude and consistency of profile differences diminished somewhat by the end of the school year, children in the Low profile continued to report stronger affective, behavioural, and cognitive engagement than their peers in profiles characterized by elevated body image difficulties. The persistence of these differences across multiple dimensions of school engagement is particularly noteworthy and highlights the importance of early identification and intervention efforts, as children may begin experiencing enduring academic consequences of body image difficulties before such concerns become especially severe.

Furthermore, the lack of differences between Moderate and High profiles seems to suggest that the simply experiencing moderately elevated body image issues is sufficient to impact school engagement. While there was a general trend for children in the High profile to

exhibit poorer engagement than those in the Moderate profile, these differences were rarely statistically significant. The notable exception was affective math engagement at Time 1, where children in the High profile reported significantly lower levels of engagement. The fact that this difference emerged in affective engagement for math, but not French, could also be explained by self-objectification theory, given the high working memory demands associated with math studies. However, it is worth noting that children's math-related self-concepts are heavily drawn from peer comparisons on competency and achievement (Möller et al., 2009). Given this, it is possible that other subjects, such as French language studies, may offer fewer immediately observable performance comparisons or may be perceived as more subjective, therefore reducing the emotional impact of social comparison processes. Given that the High profile had especially elevated levels of body comparisons, it is possible that our measure for this variable is also capturing a more global tendency to engage in comparisons beyond body image. Though speculative, this interpretation aligns well with social comparison theory (Festinger, 1954), which suggests that individuals evaluate their abilities and personal attributes by comparing themselves with others, particularly when objective standards for self-evaluation are unavailable or ambiguous (Wood, 1989).

Strengths, Limitations, and Future Directions

The present study possesses several notable strengths. Most importantly, it marks the first study, to our knowledge, to utilize a person-centered approach to studying the relationship between body image and school engagement. The use of LPA allowed us to capture the multidimensional nature of body image while also identifying meaningful subgroups of children that otherwise may have been obscured through traditional variable-centered approaches. Moreover, our large sample size and longitudinal design further strengthen confidence in our

findings and stand out as meaningful improvements over existing literature in this area. Finally, by examining all three dimensions of school engagement, the present study provides a more comprehensive understanding of how body image difficulties are associated with children's school experiences.

Despite these strengths, there are limitations worth considering when interpreting our findings. First, our measures relied exclusively on children's self-report. Given the relatively young age of the sample, this raises concerns regarding possible inaccurate self-perceptions, such that some children may have had difficulty evaluating their body image and school engagement. Future research should aim to incorporate multiple informants (e.g., parents, teachers) and explore how this data compares to child self-report. One measure in particular that may have been impacted by children's inaccurate self-perceptions is weight perception, which was unexpectedly a nonsignificant predictor of other body image indicators and school engagement. While this could indicate that weight perception is simply not a central aspect of children's body image in late childhood, it could also signal that our measure failed to adequately assess the true scope of children's weight-based perceptions. Future studies should aim to assess weight perception using a more robust measure of weight perception, utilizing multiple informants and/or evaluating other aspects of body perception, such as non-weight-related aspects of appearance (e.g., muscularity, nose, ears).

Another possible limitation is that our profiles may also partly reflect individual differences in response style, such that some children tend to respond more negatively or positively across survey items. Response style was not directly assessed or controlled for in the present study, so this alternative explanation cannot be ruled out. However, profile membership was associated with age and gender, and weight perception did not distinguish between profiles despite

differences in the other three indicators. This pattern is not fully consistent with a simple generalized response tendency, although it does not exclude that possibility. Future research could incorporate response-style measures or multiple informants to help determine whether profiles reflect substantive differences in body image concerns, response tendencies, or both. Finally, our sample of Canadian children was predominantly French-speaking, White, and relatively affluent. This raises questions regarding the generalizability of the findings, particularly given evidence that body image development is influenced by cultural and ethnic factors that shape appearance ideals, body-related attitudes, and experiences of body dissatisfaction (Paxton & Damiano, 2017). Future studies should investigate whether these results differ across different ethnicities, socio-economic statuses, and countries of origin.

Conclusions

This study contributes to the growing literature on body image in childhood by showing that body image profiles can be identified among elementary school students. Three profiles emerged that differed primarily in levels of body dissatisfaction, body comparisons, and compulsive self-monitoring, with girls and older children more likely to belong to profiles characterized by elevated body image difficulties. Importantly, children with fewer body image issues consistently reported higher levels of school engagement both concurrently and over the school year. These findings suggest that body image may represent an important yet overlooked factor in children's academic functioning and highlight the potential value of early efforts to reduce body image concerns during late childhood.

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Table 3.1 Bivariate Associations Between Time 1 Body Image Variables and Study Variables at Time 1 and Time 2

Predictor	Outcome	*B* (standardized) [95% CI]	SE	Wald χ^2
Body Dissatisfaction (T1)	Compulsive Self-Monitoring (T1)	.53** [.47, .60]	.03	262.21
	Body Comparisons (T1)	.73** [.66, .79]	.03	498.46
	Weight Perception (T1)	.06 [-.00, .12]	.03	3.69
	Affective French Engagement (T1)	-.15 [-.22, -.07]	.04	15.26
	Affective Math Engagement (T1)	-.20** [-.27, -.13]	.04	29.35
	Behavioural Engagement (T1)	-.19** [-.27, -.11]	.04	21.05
	Cognitive Engagement (T1)	-.19** [-.26, -.11]	.04	24.47
	Affective French Engagement (T2)	-.15** [-.23, -.07]	.04	14.11
	Affective Math Engagement (T2)	-.24** [-.32, -.16]	.04	35.13
	Behavioural Engagement (T2)	-.20** [-.28, -.12]	.04	23.75
	Cognitive Engagement (T2)	-.18** [-.27, -.09]	.05	16.27
Compulsive Self-Monitoring (T1)	Body Dissatisfaction (T1)	.54** [.47, .60]	.03	245.99
	Body Comparisons (T1)	.57** [.49, .65]	.04	200.58
	Weight Perception (T1)	-.05 [.11, .02]	.03	1.91
	Affective French Engagement (T1)	-.03 [-.09, .04]	.03	.69
	Affective Math Engagement (T1)	-.16** [-.24, -.09]	.04	19.34
	Behavioural Engagement (T1)	-.11** [-.17, -.05]	.03	13.67
	Cognitive Engagement (T1)	-.06 [-.12, .00]	.03	2.97
	Affective French Engagement (T2)	.00 [-.07, .08]	.04	.01
	Affective Math Engagement (T2)	-.12* [-.19, -.03]	.04	8.19
	Behavioural Engagement (T2)	-.05 [-.12, .02]	.04	1.99
	Cognitive Engagement (T2)	-.00 [-.07, .06]	.04	.04
Body Comparisons (T1)	Body Dissatisfaction (T1)	.73** [.68, .78]	.03	779.10
	Compulsive Self-Monitoring (T1)	.57** [.50, .63]	.03	280.60
	Weight Perception (T1)	.03 [-.05, .09]	.04	.54
	Affective French Engagement (T1)	-.11* [-.18, -.04]	.04	8.57
	Affective Math Engagement (T1)	-.20** [-.28, -.12]	.04	23.15
	Behavioural Engagement (T1)	-.19** [-.27, -.12]	.04	26.15
	Cognitive Engagement (T1)	-.17** [-.24, -.09]	.04	20.14
	Affective French Engagement (T2)	-.11* [-.18, -.04]	.04	8.68
	Affective Math Engagement (T2)	-.22** [-.30, -.13]	.05	23.50
	Behavioural Engagement (T2)	-.19** [-.27, -.10]	.04	19.19
	Cognitive Engagement (T2)	-.14** [-.22, -.06]	.04	12.35
Weight Perception (T1)	Body Dissatisfaction (T1)	.06 [-.00, .13]	.03	3.54
	Compulsive Self-Monitoring (T1)	-.05 [-.11, .02]	.03	2.02
	Body Comparisons (T1)	.03 [-.04, .09]	.04	.55
	Affective French Engagement (T1)	-.00 [-.06, .06]	.03	.00
	Affective Math Engagement (T1)	.02 [-.05, .09]	.04	.28

Behavioural Engagement (T1)	.02 [-.05, .08]	.03	.27
Cognitive Engagement (T1)	.02 [-.05, .10]	.04	.35
Affective French Engagement (T2)	-.02 [-.09, .06]	.04	.16
Affective Math Engagement (T2)	.03 [-.06, .11]	.04	.35
Behavioural Engagement (T2)	.00 [-.08, .09]	.04	.03
Cognitive Engagement (T2)	-.02 [-.09, .06]	.04	.15

Note. All variables z standardized. Values are standardized regression coefficients (β) from generalized estimating equation (GEE) models, which were used to account for the nestedness of our data (i.e., some children were from the same classroom). Positive coefficients indicate that higher scores on the Time 1 body image variable were associated with higher scores on the outcome variable.

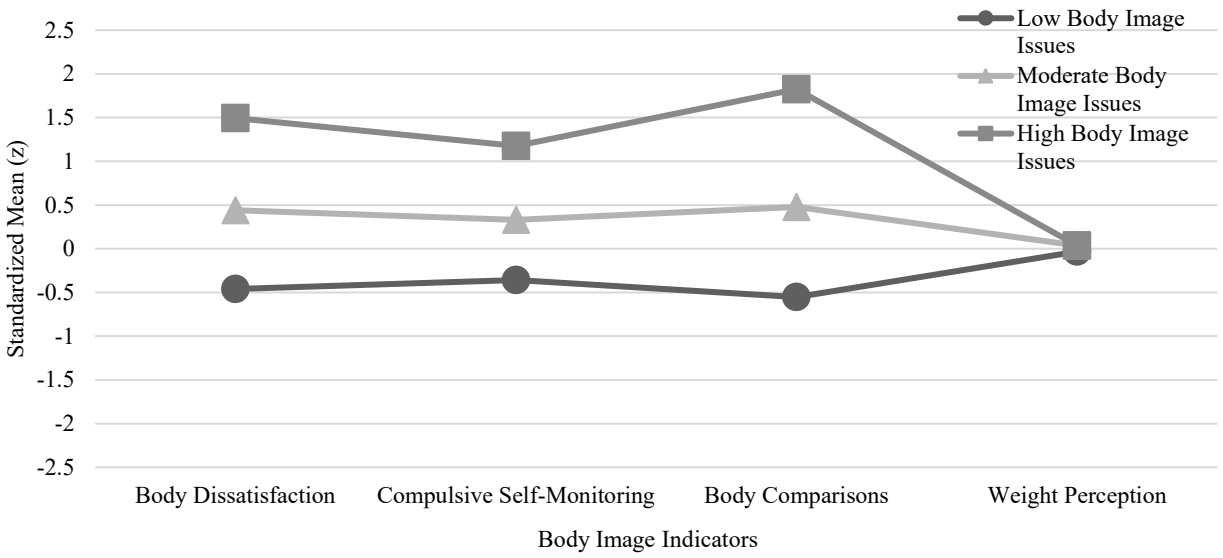
* $p < .01$, ** $p < .001$.

Table 3.2 Results from Sensitivity Analyses (Latent Profile Solutions)

# of Profiles	AIC	BIC	SABIC	LMR-LRT p-value	Entropy	Smallest Class (%)	Lowest APP
1	10207.52	10246.35	10220.95	--	--	--	--
2	8943.71	9006.82	8965.53	0	***.94***	***.19***	***.96***
3	8583.64	8671.02	8613.85	***0***	.91	.12	.90
4	8408.57	8520.22	8447.18	.61	.90	.07	.87
5	8418.57	8554.5	8465.57	.85	.90	.00	0
6	***8260.927***	***8421.121***	***8316.315***	.97	.93	.00	0

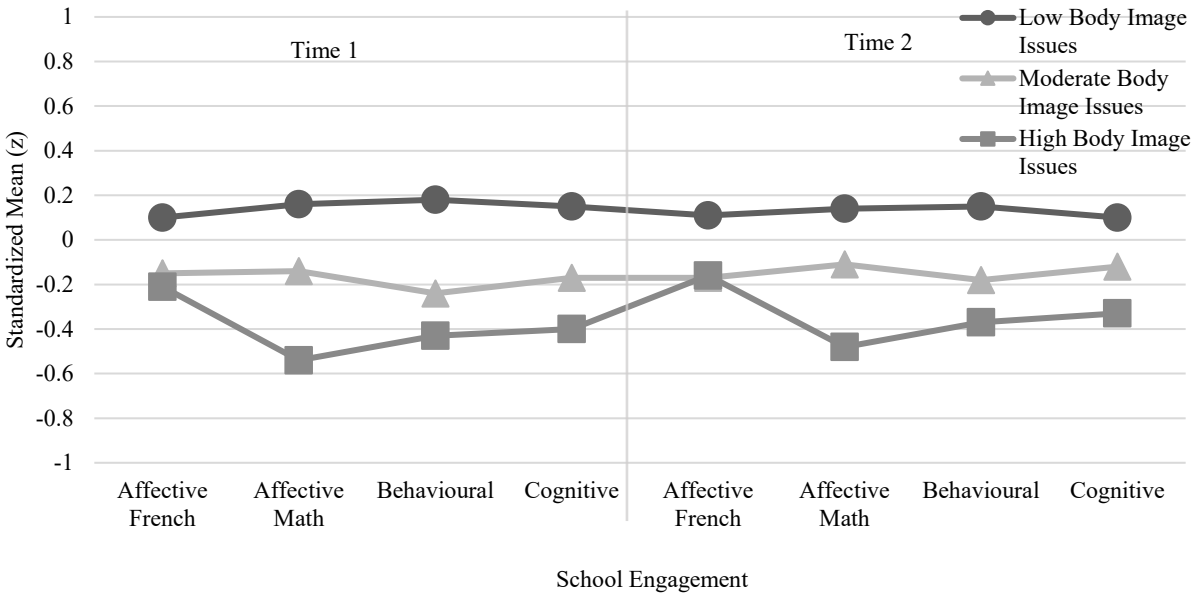
Note. Optimal relative values of model fit indicators are bolded and italicized. AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion, SABIC = Sample-Size Adjusted Bayesian Information Criterion, LMR-LRT = Lo-Mendell-Rubin Adjusted Likelihood Ratio Test, APP = Average Posterior Probabilities.

Figure 3.1 Standardized Body Image Indicators Across Latent Profiles



Note. Values represent standardized scores on the four body image indicators. Higher scores indicate greater body dissatisfaction, compulsive self-monitoring, body comparisons, and weight perception.

Figure 3.2 School Engagement Across Body Image Profiles at Time 1 and Time 2



Note. Values represent standardized means for each school engagement variable. Higher scores indicate greater school engagement.

Appendix 3.1 Supplemental Tables

Table i. Comparing Body Image Profiles on Body Dissatisfaction, Body Comparisons, Compulsive Self-Monitoring, and Weight Perception

Body Image Variables	Profiles			Test	Effect Size	Pairwise Comparisons[a]
	1 Low BI Issues $n = 625$	2 Moderate BI Issues $n = 203$	3 High BI Issues $n = 120$			
	Adj. M (SE)			*F*	η^2	
Body Dissatisfaction	15.02 (.21)	24.11 (.52)	36.07 (.92)	588.81**	.55	P3>P1** P3>P2** P2>P1**
Compulsive Self-Monitoring	4.91 (.09)	7.04 (.19)	10.06 (.34)	226.62**	.32	P3>P1** P3>P2** P2>P1**
Body Comparisons	4.62 (.03)	8.17 (.09)	14.08 (.26)	2539.46**	.84	P3>P1** P3>P2** P2>P1**
Weight Perception	2.77 (.02)	2.81 (.03)	2.80 (.05)	.56	.00	--

Note. Results from the one-way ANOVAs (*F*) are displayed with effect sizes (η^2). $p < .01$ was used as the threshold for statistical significance.

[a] Body dissatisfaction, compulsive self-monitoring, and body comparisons used Games-Howell test values due to being unable to assume equal variances. Weight perception used Bonferroni-corrected values due to assuming equal variances.

*$p < .01$, **$p < .001$, BI = body image.

Table ii. Body Image Profile Differences in Age, Gender, and z-standardized School Engagement Variables

Outcomes	Profiles						Test	Pairwise[a] Comparisons
	1 Low BI Issues $n = 625$		2 Moderate BI Issues $n = 203$		3 High BI Issues $n = 120$			
	%	*M (SE)*	%	*M (SE)*	%	*M (SE)*	*Wald* χ^2	
Boys	52.1		33.7		18.5			P1>P2** P1>P3** P2=P3
Age		11.01 (.03)		11.22 (.06)		11.28 (.08)	16.73**	P3>P1* P2>P1* P2=P3
Affective French Engagement (T1)		.10 (.04)		-.15 (.07)		-.21 (.10)	14.26**	P1>P2* P1>P3* P2=P3
Affective Math Engagement (T1)		.16 (.04)		-.14 (.08)		-.54 (0.12)	40.10**	P1>P2** P1>P3** P2>P3*
Behavioural Engagement (T1)		.18 (.04)		-.24 (.09)		-.43 (.12)	40.09**	P1>P2** P1>P3** P2=P3
Cognitive Engagement (T1)		.15 (.04)		-.17 (.08)		-.40 (.11)	29.54**	P1>P2** P1>P3** P2=P3
Affective French Engagement (T2)		.11 (.05)		-.17 (.09)		-.16 (.11)	10.15*	P1>P2* P1=P3 P2=P3
Affective Math Engagement (T2)		.14 (.05)		-.11 (.08)		-.48 (.13)	22.96**	P1>P3** P1=P2 P2=P3
Behavioural Engagement (T2)		.15 (.05)		-.18 (.09)		-.37 (.14)	17.51**	P1>P2* P1>P3** P2=P3

Cognitive Engagement (T2)	.10 (.05)	-.12 (.09)	-.33 (.13)	11.99*	P1>P3* P1=P2 P2=P3

Note: Profile differences in age and school engagement variables were examined using the DE3STEP auxiliary procedure in Mplus. Gender differences were examined using the R3STEP auxiliary procedure. For pairwise comparisons, both DE3STEP and R3STEP procedures account for classification uncertainty when comparing outcomes across profiles. Values for age and school engagement variables represent estimated means with standard errors in parentheses. Wald χ^2 statistics represent overall tests of profile differences. Pairwise comparisons are reported only when statistically significant at $p < .01$.

*$p < .01$, ** $p < .001$, BI = Body image, T1 = Time 1, T2 = Time 2

Table iii. Descriptive Statistics of Study Variables (T1-T2)

Variable	*M*	*SD*
Body Dissatisfaction (T1)	19.58	9.68
Compulsive Self-Monitoring (T1)	5.99	3.08
Body Comparisons (T1)	6.57	3.45
Weight Perception (T1)	2.78	.50
Affective French Engagement (T1)	11.85	3.24
Affective Math Engagement (T1)	13.03	3.00
Behavioural Engagement (T1)	31.54	4.41
Cognitive Engagement (T1)	28.83	5.37
Affective French Engagement (T2)	11.55	3.31
Affective Math Engagement (T2)	12.39	3.29
Behavioural Engagement (T2)	30.81	4.91
Cognitive Engagement (T2)	27.83	5.58
Age	11.05	.84

CHAPTER IV: GENERAL DISCUSSION

Body image issues and school disengagement have generally been understood as separate risk factors for long-term physical and mental health difficulties (e.g., Blundell et al., 2024; Carter et al., 2007); both of which represent notable public health concerns for these reasons. However, self-objectification theory presents a framework that suggests body image issues may indirectly lead to school disengagement, such that appearance-related concerns and behaviours could be overly taxing the limited attentional resources that are required to remain engaged at school (Fredrickson & Roberts, 1997; Winn & Cornelius, 2020). Ascribing to this framework, the current dissertation sought to further clarify how body image and school engagement co-develop in late childhood by 1) using a variable-centered approach to determine whether multiple dimensions of body image and school engagement influence one another over time, and 2) using a person-centered approach to determine whether specific body image profiles emerge in late childhood and whether these profiles predict differing levels of school engagement.

Study 1 was designed to investigate how children's body dissatisfaction and weight perception related to their affective, behavioural and cognitive school engagement. Specifically, we created integrated longitudinal models that allowed us to assess whether these variables were associated with each other concurrently and longitudinally (i.e., 7 months apart). Importantly, our models were designed to control for other well-established predictors of school engagement (i.e., age, prosocial behaviours, externalizing behavioural issues), allowing us to obtain a more accurate measure of the strength of associations between various dimensions of body image and school engagement. Building upon this investigation of broader risk patterns between body image and school engagement, Study 2 was designed to explore whether body image subgroups could be identified in children and whether these subgroups exhibited varying levels of school engagement. Latent profile analysis was used to classify a sample of elementary school students

into body image profiles using their scores on measures of body dissatisfaction, body comparisons, compulsive self-monitoring, and weight perception. The major findings from Study 1 and Study 2 are summarized and discussed below.

Summary of Major Findings

Study 1 Findings

This study was the first, to our knowledge, to explore concurrent and longitudinal associations between multiple dimensions of body image and school engagement. Findings indicated that body dissatisfaction only predicted a decrease in cognitive engagement over the course of the school year. Moreover, weight perception did not predict subsequent changes in any dimension of school engagement. Collectively, these findings suggest that children's subjective dissatisfaction with their bodies (i.e., an attitudinal dimension of body image) may be a more relevant risk factor than how they perceive their weight (i.e., a perceptual dimension of body image) when it comes to future cognitive disengagement at school.

Study 1 also provided evidence that the relationship between body image and school engagement may be reciprocal. Although body dissatisfaction predicted subsequent decreases in cognitive engagement, lower behavioural and cognitive engagement both predicted subsequently heavier weight perception. In other words, children who participated less actively in class and who used fewer strategies to monitor their learning went on to perceive their weight as heavier at the end of the school year. If we assume that this heavier weight perception is distorted (i.e., children begin to perceive themselves as heavier than their BMI would suggest), then the vulnerability model of self-esteem (Orth & Robins, 2014) provides a framework to interpret these findings. For instance, children who are less behaviourally and cognitively engaged may experience fewer opportunities for success, mastery, and positive feedback from teachers and

peers. Over time, this could contribute to a decrease in global self-esteem, which may then predispose children to develop unfavourable perceptions of themselves. In our overall sample, this did not appear to extend to the evaluative dimension of body image, as lower behavioural or cognitive engagement did not predict greater body dissatisfaction—only heavier weight perception. This suggests that school disengagement may initially alter children's mental representations of themselves, whereas more emotionally charged self-evaluations may be driven by well-established socio-cultural influences like thin-ideal internalization (Evans et al., 2013; Paterna et al., 2021), weight-related teasing (Eisenberg et al. 2006; Valois et al., 2019), and media pressures (De Coen et al., 2021).

Lastly, gender-specific analyses revealed that some longitudinal associations were not uniform across all children. Body dissatisfaction predicted subsequently lower cognitive engagement in girls, suggesting that girls may be more likely to internalize their body dissatisfaction than boys. This aligned with findings suggesting that girls are more likely to engage in repetitive and self-focused thinking when stressed (Espinosa et al., 2022), which may lead them to dwell more on appearance-related concerns in ways that subsequently drain their limited cognitive resources, although these interpretations remain tentative, as the studies did not directly assess these proposed processes.

Additionally, lower behavioural engagement predicted subsequently greater body dissatisfaction in boys. It is noteworthy that boys are more likely to withdraw when experiencing low self-esteem, whereas girls rely more on problem solving strategies and seeking social support (Eschenbeck et al., 2007). If we again consider the vulnerability model of self-esteem, it could explain why boys are particularly at risk of worsening body dissatisfaction when they become behaviourally disengaged, as their avoidant coping may lead to worsening self-esteem

that spreads to other areas over time. Moreover, school disengagement may simply not be a relevant predictor of body dissatisfaction in girls, given the presence of other salient socio-cultural factors that drive these difficulties at an early age, as discussed previously.

The relative stability of the measures across the study period is also important to consider when interpreting these findings. Similar group means at Time 1 and Time 2 do not necessarily mean that individual children experienced little change; different patterns of individual change may offset one another at the group level. However, the modest size of the observed changes also warrants caution. Some small differences may be better explained by measurement error rather than substantive change, particularly given the stability of scores across time relative to the reliability of the measures. Thus, the findings should be interpreted as modest longitudinal associations within a generally stable pattern of body dissatisfaction and school engagement, rather than evidence of substantial change over the study period.

Study 2 Findings

This study was the first, to our knowledge, to utilize a person-centered approach to investigate how specific body image profiles relate to school engagement. In this study, the body image patterns of elementary school students were best captured by three profiles: *Low* (65.9%), *Moderate* (21.4%), and *High* (12.7%) body image issues. Within each profile, the levels of body dissatisfaction, compulsive self-monitoring, and body comparisons were relatively similar, and increased from the *Low* to *Moderate* to *High* profiles. However, there were two exceptions to this trend. First, the *High* profile showed especially elevated scores on body comparisons compared to the other dimensions of body image. Second, weight perception was identical between profiles—with scores suggesting that children generally perceived themselves as being of "average weight" regardless of their broader body image issues. Despite these exceptions, we

generally did not identify qualitatively distinct combinations of body image concerns within each profile (e.g., high body comparisons but low dissatisfaction). Instead, the Study 2 findings suggest that multiple affective and behavioural components of body image tend to worsen together. This pattern aligns with multidimensional conceptualizations of body image (Cash & Smolak, 2011), which propose that different body image processes are closely interconnected and mutually reinforcing. Notably, weight perception did not differentiate the profiles, despite marked differences in all other body image indicators. This finding supports the conceptual distinction between weight perception and broader aspects of body image; reinforcing the importance of assessing multiple dimensions of body image rather than solely relying on a child's weight perception or status.

Overall, students in the *Low* profile were more likely to be boys and younger than those in the *Moderate* or *High* profiles. On the other hand, the *Moderate* and *High* profiles did not differ significantly on age or gender. With regard to school engagement, at Time 1, the *Low* profile showed consistently greater engagement of all types (affective, behavioural and cognitive) when compared to the *Moderate* and *High* profiles. Alternatively, the *Moderate* profile only showed greater affective math engagement than the *High* profile, with all other forms of engagement not differing significantly. With that said, there was a visual trend for the *Moderate* profile to show greater behavioural and cognitive engagement than the *High* profile. At Time 2, a similar trend emerged, with the *Low* profile exhibiting consistently greater engagement of all types when compared to the *Moderate* and/or *High* profiles. While there continued to be a visual trend for the *High* profile to exhibit lower engagement than the *Moderate* profile at Time 2, none of these differences were statistically significant.

Again, these findings align with self-objectification theory (Fredrickson & Roberts, 1997), which proposes that frequent appearance monitoring diverts attentional resources away from other important activities. Children with body image concerns may therefore have fewer cognitive and self-regulatory resources available to fully engage in classroom learning. Moreover, the general lack of school engagement differences between the *Moderate* and *High* profiles may suggest a threshold effect, whereby relatively modest elevations in body image issues are sufficient to disrupt school engagement, with further increases in symptom severity yielding comparatively smaller decreases in engagement. This interpretation, while tentative, is consistent with developmental models proposing that associations between risk and adjustment are often nonlinear, with adverse outcomes emerging once a critical level of risk has been exceeded (i.e., cumulative risk; Evans et al., 2013; Rutter, 1987). With regard to adverse academic outcomes, moderately elevated body image issues may be this critical level of risk. However, a competing explanation for the lack of consistent differences between the *Moderate* and *High* profiles could be that the *High* profile was relatively small (n = 120). This likely led to limited power when testing between-profile differences. Moreover, the *Moderate* and *High* profiles differed on affective math engagement at both time points, so the pattern was not consistent across all engagement outcomes. Thus, the present findings do not establish a threshold effect; they suggest that body image difficulties are associated with lower engagement, while leaving open whether the nonsignificant *Moderate–High* differences reflect a threshold effect or power issues. A larger sample would be needed to distinguish between these explanations. Moreover, power may also explain the greater number of significant between-profile differences involving the *Low* profile, due to more precise estimates and greater power to detect these differences.

Collective Interpretation of Findings Across Studies 1 and 2

While the studies from this dissertation both addressed how body image and school engagement relate to one another in childhood, their findings differed in important ways due to their analytical approaches. The variable-centered analyses used in Study 1 suggested that girls' body dissatisfaction was a population-level risk factor for subsequent cognitive disengagement, whereas body dissatisfaction was unrelated to changes in affective and behavioural engagement. As a follow-up, the person-centered analytical approach used in Study 2 revealed a different pattern of results. By dropping the assumption that our child sample was homogenous, we were able to identify a subgroup of children with the lowest body image issues (i.e., less body dissatisfaction, compulsive self-monitoring, and body comparisons) that had higher school engagement of all types. These profile analyses also allowed us to clarify that even moderate elevations in body image issues were enough to show significant decreases in school engagement of all types. Furthermore, these two studies led to distinct conclusions regarding gender differences in how body image relates to school engagement. Whereas the variable-centered findings in Study 1 led us to conclude that body dissatisfaction was only a risk factor for decreasing cognitive engagement in girls, the person-centered findings in Study 2 revealed that boys represented one third of the "Moderate Issues" profile, which was deemed a significant risk factor for decreasing engagement of all types. Therefore, Study 2 led to a more nuanced understanding of how body image relates to school engagement and how gender fits into these associations.

Indeed, an overreliance on variable-centered research could have incorrectly led some to the conclusion that boys' body image is not predictive of their school engagement. While a nonsignificant association should not be interpreted as proof that no association exists, this is

often how null findings are interpreted and communicated in policy and public health contexts. Indeed, outside of academic contexts, the distinction between "non-significance" and "no association" may be lost, potentially reinforcing the perception that body image is primarily a concern for girls. Our person-centered analyses offer a complementary way to communicate the findings which reduces the likelihood of this erroneous interpretation, as it highlights the heterogeneity of our sample (i.e., individual differences) beyond high-level gender differences. This does not resolve uncertainty about the association for boys, but it may help convey a more nuanced picture of the data to audiences who are less familiar with the limits of null-hypothesis testing (e.g., policy makers, public advocacy groups).

Finally, while the profiles identified in Study 2 primarily reflected differences in severity rather than qualitatively distinct configurations of body image concerns, it did characterize how multiple body image concerns co-occurred within children and how these combined patterns related to school engagement. This person-centered perspective complements the variable-centered analyses by identifying subgroups of children with co-occurring concerns, while the overall similarity in profile patterns is itself an informative finding for this early adolescent age group.

Body Image Issues as a Predictor of School Engagement

Despite some discrepancies in findings, both of our studies suggested that body image difficulties are associated with poorer school engagement during late childhood. In Study 1, greater body dissatisfaction predicted lower cognitive engagement in girls, whereas no prospective associations emerged with affective or behavioural engagement. These findings align well with those of Guimond and Laursen (2022), who found that body dissatisfaction predicted decreases in academic engagement over a 2-month period. Interestingly, their measure of school

engagement was not specific to a single dimension engagement, and instead blended aspects of behavioural engagement (e.g., “I pay attention in class”) and cognitive engagement (“I try hard to do well in school”). Our decision to operationalize school engagement as a multi-dimensional variable allowed us to specifically highlight cognitive engagement as being at risk of decreasing due to body dissatisfaction.

Our findings also provide a competing explanation to prior research that has linked heavier weight status to poorer academic outcomes (Finn et al., 2018). Indeed, we concluded that weight perception was a nonsignificant predictor of school engagement after including it in a model that also included body dissatisfaction and several control variables (i.e., age, prosocial behaviours, externalized behavioural issues) as additional predictors. This casts doubt onto the relative importance of children’s weight perception with regard to their school engagement, conflicting with prior findings that children’s weight perception was even more predictive of behavioural disengagement than a child’s actual weight status (Florin et al., 2011). While our findings seem to point towards the conclusion that children’s weight is a less relevant risk factor for school disengagement than their body dissatisfaction, we were unable to test this directly due to not including an objective measure of children’s weight status.

Beyond the takeaways from our variable-centered Study 1, Study 2’s person-centered findings clarified that both boys and girls with moderately elevated body dissatisfaction, compulsive self-monitoring, and body comparisons had worse school engagement of all types than a subgroup of children with lower scores on these body image variables. This included affective and behavioural engagement, suggesting that children with greater body image issues liked school less and were less inclined to participate actively in class—potentially due to school being perceived undesirably because of concerns regarding negative appearance evaluations by

their peers. This explanation aligns with research that has linked various aspects of peer relationships to school engagement, such as relational aggression being associated with behavioural disengagement (i.e., school avoidance; Garbarino & deLara, 2003), peer difficulties predicting affective disengagement (i.e., liking school less; Hawker & Boulton, 2000), and peer acceptance mediating the relationship between weight status and academic performance (Lv et al., 2020).

Importantly, although members of the *Moderate* and *High* profiles were still predominantly girls (66.3% and 81.5%, respectively), the presence of boys in these profiles is consistent with evidence that body-related concerns also occur in boys during childhood, albeit at lower prevalence rates. For example, qualitative research suggests that boys engage in body-related social comparisons in middle childhood, although these comparisons tend to focus more on athleticism and functionality rather than the appearance-focused comparisons more commonly reported by girls (Tatangelo & Ricciardelli, 2017). With that said, more recent trends in Canadian population data on middle school students suggests that boys and girls both express preoccupations regarding their appearance. Indeed, the 2022 Health Behaviour in School-aged Children survey highlighted that 21% of boys and 29% of girls in Grades 6–8 perceived their bodies as “too fat”, whereas 17% of boys and 10% of girls perceived themselves as “too thin” (Public Health Agency of Canada, 2025). Our findings align with this and suggest that boys experience appearance-focused distress in as early as late childhood, as evidenced by elevated body dissatisfaction, compulsive self-monitoring, and body comparisons by boys in the *Moderate* and *High* profiles (i.e., approximately 90 boys, representing 10% of the overall sample). Therefore, despite providing further evidence that body image difficulties tend to be more prevalent in girls than boys, our findings also suggest that boys should not be overlooked

when considering children who may be vulnerable to school disengagement in the context of their body image concerns.

The differences in findings between Study 1 and Study 2 may partly reflect their distinct operationalizations and analytic aims. Study 1 examined prospective associations between body dissatisfaction and weight perception and subsequent engagement, while controlling for age, prosocial behaviour, and externalizing behaviour problems. Study 2, by contrast, examined engagement differences across profiles defined by body dissatisfaction, body comparisons, compulsive self-monitoring, and weight perception. These broader profiles may capture co-occurring body-image difficulties that are not represented by any single indicator. Accordingly, the more specific longitudinal findings in Study 1 and the broader engagement differences in Study 2 are not necessarily inconsistent, as they address different questions about how body image relates to school engagement. However, because the studies also differed in their analytic approaches and covariate adjustment, the present findings cannot determine which of these differences accounts for the pattern of results.

Bi-Directional Findings

The findings described above—namely that body image issues predicted subsequent school disengagement—were hypothesized and easily understood through self-objectification theory (i.e., body image issues tax the limited attentional resources that are required for school engagement). However, self-objectification theory does not explain why our variable-centered analyses in Study 1 revealed bi-directional longitudinal associations between body image and school engagement. Indeed, behavioural and cognitive engagement both predicted subsequently heavier weight perception later in the school year. This is a novel finding, as previous research has predominantly treated weight perception and weight status as longitudinal predictors of

school achievement (e.g., Finn et al., 2018; Watson et al., 2022) and as concurrent predictors of school engagement (Florin et al., 2011). Our findings suggest that this relationship may also operate in the opposite direction, such that engagement precedes changes in children's perceptions of their weight. In other words, children who are less behaviourally and cognitive engaged at school were more likely to report a heavier weight perception 7 months later.

Due to the nature of our weight perception measure (i.e., single self-report item), this finding is especially challenging to interpret. If one assumes that children's heavier weight perceptions reflected actual changes in their weight status (i.e., they were not simply capturing increasingly negative self-perceptions), it could suggest that school disengagement is a predictor of weight gain. Though perplexing at first glance, there is evidence to support such a link, such as longitudinal research with a large sample of 8-year-old American children revealing that less structured out-of-school activities predicted higher BMI a year later (Hunt et al., 2023; see the *structured days hypothesis*, Brazendale et al., 2017). In this way, behavioural and cognitive disengagement may be reflective of a lack of structure in the school environment, which could serve as a risk factor for weight gain, and therefore heavier weight perceptions. However, because weight perception was not assessed alongside an objective measure of weight status, it is unclear whether lower engagement predicted actual changes in weight or only changes in children's *perceptions* of their weight. Given the absence of an objective measure of weight, the structured days hypothesis remains one possible explanation, rather than a conclusion supported by the present data. The finding could also reflect changes in children's self-perceptions, though distinguishing between these explanations will require future studies that assess both objective weight status and weight perception over time.

Though speculative, if we assume that children's heavier weight perception is reflective of increasingly negative self perceptions, these bi-directional findings align well with a relational developmental systems (RDS) perspective. RDS is a metatheoretical framework that posits that development emerges through continuous and reciprocal transactions between children and their environment (Overton, 2015). Therefore, rather than conceptualizing body image issues as a static precursor to school engagement, RDS instead suggests that children develop dynamically, such that a child is constantly influenced, for better or worse, by interactions between them and their family, peers, school, culture, and biology (Lerner et al., 2018). In this way, a child who is less behaviourally engaged at school might receive less support from their teachers (Hasty et al., 2023; Hughes, 2011), perform worse academically (Wang et al., 2019), and be less accepted by their peers (Salvas et al., 2025); all of which become mutually reinforcing factors. The present findings are compatible with this broad perspective, but they do not provide strong evidence for it. Indeed, the study included only two time points, examined a limited set of variables, and did not assess the contextual or developmental processes that RDS emphasizes. Moreover, self-objectification theory and RDS need not be mutually exclusive. Self-objectification may help explain how appearance-related concerns could interfere with other aspects of functioning, while reciprocal influences between body image and school engagement may occur within a broader developmental system. The current data cannot determine whether these processes operate independently or interact.

With that said, these factors might contribute to children developing a weaker academic self-concept (i.e., less belief in their ability to succeed at school) and broader self-esteem issues (i.e., not valuing yourself overall) that may drive increasingly negative self perceptions, such as perceiving one's weight as heavier than it is. Indeed, various studies have linked poor self-

esteem to body dissatisfaction in children, including longitudinal associations in middle childhood (Smith et al., 2024) and concurrent associations in early adolescence (Paxton et al., 2006). Thus, rather than implying that school disengagement directly alters children's perceptions of their weight, it is possible that disengagement contributes to broader changes in children's sense of self that subsequently influence how they perceive and evaluate their body.

Self-Development as an Underlying Mechanism

Psychodynamic theories have long conceptualized the self as developing across the lifespan (Erikson, 1968; Mahler et al., 1975). The self has been defined as an integrative structure of the mind that forms the cognitive and affective representation of one's subjective experiences and identity (Amianto et al., 2016). This conceptualization positions the body as an important component of the developing self, as children increasingly develop explicit representations, beliefs, attitudes, and feelings about their own bodies (Brownell et al., 2012). In cases of healthy self development, children typically learn to differentiate themselves from caregivers, peers, and important others through a gradual process of separation (i.e., "Can I exist as someone who is psychologically distinct from others?") and individuation (i.e., "Who am I as a distinct person?"; Mahler et al., 1975). If this process of separation and individuation is limited or does not occur, a child may instead develop a poorly differentiated sense of self and lack internal stability ("Am I good enough?", "What matters to me?") which can lead to self-worth becoming overly dependent on achievement or the approval of others (Blatt & Zuroff, 1992). However, when this process unfolds in the context of secure attachment, in which caregivers provide a reliable and emotionally supportive "secure base", children explore their environment and have opportunities to grow their autonomy and competencies (Bowlby, 1988). Collectively, these experiences help children develop a differentiated autonomous self (i.e., a reasonably

stable sense of who they are; La Guardia, 2009), which is believed to help ground their self-worth in their own internalized values, competencies, and interests, rather than it eventually becoming contingent on externally evaluated characteristics, such as their grades (Crocker et al., 2003) or appearance (Noser & Zeigler-Hill, 2014).

Relating psychodynamic theory to body image and school engagement, *a poorly differentiated self* typically presents as children struggling to distinguish their own feelings and values from the expectations of others. For instance, a child may lack an internal sense of whether their appearance is "good enough" and therefore believe that if their friends perceive them as ugly, they must, in fact, be ugly. A child may also lack an internalized view of themselves as resilient or capable of learning new things, thus interpreting any academic struggles as reflective of deeper inadequacies. Alternatively, in the case of *healthy differentiation*, a child may tolerate perceived imperfections in their appearance without extrapolating them into a broader narrative about their worth as a person. This child may also be less likely to interpret academic struggles as a sign of personal inadequacy, but instead as a sign that they must work harder to achieve their academic goals. Framed this way, self development becomes a compelling explanation for why children's body image and school engagement appear to worsen in tandem. It also provides an explanation for why a substantial portion of the children in our sample exhibited few body image issues and high levels of school engagement.

Practical and Clinical Implications

The present study has a number of practical and clinical implications. Although body image interventions have traditionally emphasized the prevention of eating disorders and other forms of psychopathology during adolescence (see Berry et al., 2025 and Wong et al., 2024), this dissertation's findings suggest that body image may also have implications for children's ability

to remain engaged in and benefit from their educational environments by as early as late childhood. Indeed, this aligns with a growing body of research indicating that body image concerns are already associated with children's functioning by late childhood and early adolescence, including body dissatisfaction predicting school disengagement (Guimond & Laursen, 2022) and heavier weight perception predicting school absenteeism (Duncan et al., 2022). Therefore, interventions may be particularly valuable during this period when body image concerns are emerging, but before adolescence, which longitudinal research has identified as a critical period during which these concerns begin to become stable traits (see Bucchianeri et al., 2013; Wang et al., 2019). Such an approach would be consistent with a developmental prevention framework (National Research Council & Institute of Medicine, 2009) that posits that interventions should be designed to strengthen protective processes before difficulties become sufficiently pronounced to interfere with children's broader functioning. In the context of body image, this might involve strengthening processes such as body acceptance (i.e., holding a nonjudgmental and accepting attitude toward the imperfections of one's body; Tylka & Wood-Barcalow, 2015), critical engagement with appearance-related messages, and self-compassion. With regard to the specific intervention recommendations, our overall findings suggest two potential approaches: 1) interventions that directly target body image or school engagement, and 2) broader interventions that target underlying mechanisms that may contribute to children's emerging difficulties in these areas.

Interventions Targeting Body Image or School Engagement

First, our Study 1 and Study 2 findings supported that body image issues, specifically body dissatisfaction, compulsive self-monitoring, and body comparisons, predicted decreases in school engagement. This may suggest that children could benefit academically from

interventions that directly target their body image. A review of existing prevention research supports the notion that body satisfaction, self-esteem, and appearance ideal internalization can all be improved throughout childhood and adolescence (i.e., 24 studies with children aged 5-17 years old; Chua et al., 2020), although interventions specifically designed to promote positive body image in younger children are less common (e.g., appearance-based board games, yoga-based interventions; Guest et al., 2022). Importantly, one such intervention used puppetry to deliver a wellness-based prevention program (e.g., accepting diversity of body shapes, rejecting diet messaging) to young children and it was most effective when parents and teachers were involved (i.e., in-service workshops on positive body image; Russell-Mayhew et al., 2007), suggesting that an ecological approach may be ideal. Paradoxically, some research has shown that body image interventions in late childhood can actually increase boys' appearance-ideal internalization (Halliwell et al., 2016), suggesting that simply exposing boys to appearance ideals that they were not previously aware of may inadvertently harm their body image. Given our findings that many boys had minimal body image issues at the start of the school year, prevention approaches in late childhood may benefit from either universally targeting girls or selectively identifying girls and boys who are already exhibiting body image issues (as suggested by Study 2's findings).

Second, our Study 1 finding that boys' behavioural disengagement predicted subsequently heavier weight perception suggests that their school engagement may present a more relevant intervention target in late childhood. Indeed, emerging intervention research provides support for this general approach, with school-based programs that target self-regulation leading to improvements in elementary students' classroom engagement (Cunha et al., 2023; Reichart et al., 2025). Notably, a cluster-randomized intervention (i.e., a story tool based

on the planning, execution, evaluation cyclical model; see Rosário et al., 2010) that was designed to promote affective, behavioural, and cognitive engagement among fourth-grade students produced stronger effects in boys than girls (Azevedo et al., 2023), further supporting the notion that engagement-focused interventions may be particularly valuable for boys during late childhood. Theoretically, increasing behavioural engagement may provide boys with greater opportunities to experience competence, receive positive feedback, and develop a sense of themselves as capable and effective, thus potentially interrupting the development of increasingly negative self-perceptions that may eventually extend to their body image.

Interventions Targeting Underlying Psychological Mechanisms

Whereas the above recommendations could be effective at targeting specific symptoms of body image issues and school disengagement, it is unclear whether they would address the underlying psychological factors that we hypothesize may be driving these issues in the first place. Therefore, rather than investigating how children can be taught to feel better about their bodies, interventions might also be designed to investigate how children's broader view of themselves can be strengthened such that body image and academic performance become less central to their overall sense of worth. This positions body image and school engagement as perhaps better addressed through broader prevention approaches, such as existing elementary-school initiatives focused on health and well-being. For instance, universal school-based programs based on social-emotional development (Taylor et al., 2017; Ruit et al., 2021), positive youth development (PYD; Curran & Wexler, 2017) and self-determination theory (Howard et al., 2025) are already used as population-level prevention strategies and may present an excellent option to indirectly prevent body image issues and school disengagement due to their focus on supporting the development of a healthy self-concept (e.g., providing children opportunities to

identify personal strengths, experience competence, develop agency, engage in supportive relationships). For instance, a meta-analysis of 213 social-emotional development programs, of which 119 were delivered to elementary school students, revealed that these programs produce small-to-moderate benefits across social and emotional skills (e.g., recognizing and managing emotions), improved attitudes (e.g., related to self, others, and school), behaviour (e.g., improvements in positive social behaviour and reductions in conduct problems and emotional distress) and academic achievement (i.e., 11-percentile-point gain; Durlak et al., 2011). Beyond serving as indirect preventative interventions for body image and school engagement, social-emotional development interventions such as these may also be well-positioned to incorporate psychoeducation on body image into its pre-existing framework. Indeed, it could provide an ideal context to provide children with developmentally appropriate education that encourages flexible attitudes towards their bodies, boosts appreciation of the functional capacities of their body (rather than solely focusing on appearance) and normalizes body diversity (see Project Body Neutrality; Smith et al., 2023).

Variable-Centered vs. Person-Centered Interventions

Finally, although population-level prevention approaches offer important advantages in terms of reach and efficiency, an exclusive reliance on population-level trends carries the risk that children whose difficulties do not conform to the dominant patterns observed in the broader population may be overlooked. Indeed, variable-centered research necessarily summarizes heterogeneity within groups, meaning that associations that are evident on average may not characterize the experiences or needs of all children. This consideration is particularly relevant to the present findings. Whereas Study 1 identified gender-specific developmental pathways at the group level, Study 2 revealed distinct subgroups of children whose patterns of body image

difficulties and school engagement did not necessarily conform to these broader gender-specific trends (i.e., boys clearly experienced appearance-related concerns in Study 2, but less so in Study 1). Collectively, these findings illustrate the potential limitations of relying exclusively on population-level associations to guide prevention and intervention. However, this does not necessarily mean that person-centered analyses should be standard practice when a variable-centered result is null. Their value depends on the research question, theoretical rationale, and whether the sample is sufficiently large to identify meaningful subgroups (Nylund-Gibson & Choi, 2018).

A similar dilemma has long been recognized in public health, where universal approaches may fail to adequately address differences in individual treatment needs, prompting calls for approaches such as proportionate universalism that combine universal access with support that is responsive to specific risk factors (Carey et al., 2015; Francis-Oliviero et al., 2021). A medical example of this is cardiovascular disease prevention, where population-level risk factors such as hypertension and cholesterol guide prevention efforts (i.e., medication), although individual patients may still present with differing treatment needs (i.e., lifestyle counselling, more intensive clinical monitoring) due to their specific risk profiles. Applied to body image and school engagement, this suggests that universal developmental programming should be complemented by effective screening tools to identify children whose unique risk factors diverge from population-level trends and require more individualized assessment and support. For instance, boys who are not yet exhibiting signs of body image issues may not benefit from universal body image prevention programs (e.g., Halliwell et al., 2016) and our findings suggest that they may instead benefit from school engagement interventions instead, due to disengagement appearing to precede shifts in boys' body perception. Ultimately, variable-

centered findings help guide the design of broadly accessible prevention, but individualized formulation remains essential for understanding how risk factors and treatment needs relate to a particular child's unique developmental context.

Taken together, an important takeaway from out studies is that body image in late childhood should be conceptualized broadly, rather than defined by any singular aspect of one's body image. For example, this dissertation found that body dissatisfaction and body-related behaviour (i.e., compulsive self-monitoring and body comparisons) were more consistently associated with school engagement than weight perception. School-based prevention efforts may therefore benefit from addressing children's broader appearance-related attitudes and comparison behaviours, while remaining attentive to weight-related concerns when they are present. This does not mean that weight is irrelevant for all children; rather, it suggests that weight-focused approaches alone may overlook other salient aspects of body image during late childhood. Prevention should also be developmentally sensitive, as efforts to promote body acceptance and media literacy may be useful, but programs should avoid inadvertently increasing children's attention to weight or appearance when these are not already concerns.

Limitations and Directions for Future Research

While the present dissertation adds to the scientific literature on child body image development and school engagement, there remain several knowledge gaps to address in future research. First and foremost, a major limitation of our studies was the absence of an objective measure of children's weight status (e.g., BMI). While a child's weight status does not always relate to their body dissatisfaction (Kennedy et al., 2020), variable-centered research using a population cohort of children in the United Kingdom established strong longitudinal links between a heavier weight status in middle childhood (7 years old) and subsequent body image

issues in late childhood (11 years; Blundell et al., 2024). Accordingly, some prevention and intervention programs have specifically targeted children's weight status through their parents and improved their body image (e.g., body esteem and appearance attitudes, Eldridge et al., 2016). With that said, recent sociocultural shifts such as the emergence of the body-neutrality movement (i.e., respecting and appreciating your body's functionality, nonjudgmental attitudes towards appearance, and de-emphasizing appearance as a determinant of self worth; Pellizzer & Wade, 2023) have introduced alternative ways of evaluating and relating to the body that deemphasize appearance and weight. These ongoing societal shifts in the way we moralize and value weight highlight the importance of continuing to study the extent to which children's weight factors into their body image development, and to adjust intervention approaches accordingly based on empirical findings.

Although a notable strength of our studies was the multi-dimensional measurement of body image (affective, perceptual, behavioural), the perceptual component of body image could be expanded upon in future research. For instance, our studies only included a single self-report item to measure *weight* perception, and this measure was generally not predictive of other dimensions of body image or school engagement. However, body perception also includes many aspects of appearance beyond weight that may become a source of eventual dissatisfaction or disordered behaviour, such as their hair, teeth, musculature, athleticism, and the size of specific body parts (e.g., nose, ears, eyebrows). Including a more robust measure of body perception could provide insight into common perceptions held by children who exhibit greater body dissatisfaction and engage in body-related behaviours (e.g., self-monitoring or body comparisons). This could be especially valuable for person-centered research, which could utilize this data to potentially identify subgroups of children who hold similar body perceptions

and link this to differences in the severity of the affective and behavioural dimensions of their body image.

Pubertal development may be another important, unmeasured factor in the associations observed across the two studies. Physical changes and their emotional and social implications may influence children's body image concerns and school engagement, and variation in pubertal timing relative to peers may be particularly relevant during late childhood (Hoyt et al., 2020; Tarif et al., 2025). Pubertal development could therefore help explain profile membership in Study 2 or changes between time points in Study 1, either through pathways involving mood, sleep, or peer relationships, or through its association with body image. Because pubertal status and timing were not measured, however, the present studies cannot determine whether puberty contributed to these findings. Therefore, future research should include age-appropriate measures of pubertal development and timing to clarify the role it plays in these associations.

Future research should examine whether the relative importance of weight-related and broader appearance-related concerns changes across development. For example, studies could assess weight perception alongside children's evaluations of other appearance features, body dissatisfaction, and body comparison behaviours across late childhood and into adolescence. This would help determine whether the pattern observed here reflects developmental differences in the aspects of appearance that are most salient to children, limitations of the weight-perception measure, or both. Such evidence could inform prevention programs that address the concerns most relevant to children at different developmental stages without unnecessarily foregrounding weight.

Another limitation of our studies is the reliance on child self-report for all measures. Although children are important informants regarding their subjective experiences, discrepancies

between child, parent, and teacher reports are common, particularly when assessing aspects of psychosocial functioning (De Los Reyes et al., 2019). Research on school engagement has specifically shown that teacher-reports on children's affective and behavioural engagement are stronger predictors of academic performance than child self-reports (Furrer & Skinner, 2003), suggesting that this should be integrated into future investigations. Regarding measurements of body image, child self-reports are ideal in most cases, given that body image consists primarily of internal processes that are not immediately observable by others. However, these child self-reports may be complemented by parent-reports on more externalized aspects of their child's body image, such as verbalized complaints or expressions of distress regarding their appearance or weight. Additionally, given research suggesting that maternal body image predicts children's body image development both cross-sectionally and prospectively (Rodgers et al., 2020), these same externalized body-related attitudes and behaviours in parents may serve as a valuable proxy or predictor of children's risk of developing body image issues.

Another possible limitation worth addressing is our relatively low mean scores on certain body image measures (e.g., compulsive self-monitoring and body comparisons). These scores should be interpreted through an appropriate developmental lens. Given that this dissertation examined body image in children aged 9–12, a period when body image concerns may not yet be pronounced for many children, it is likely that low average scores or apparent floor effects on measures of body image difficulties may reflect the relatively low prevalence of these experiences at this age, rather than necessarily indicating that the measures were inadequate. At the same time, restricted score distributions may limit the ability to detect larger individual differences or associations among children reporting few difficulties. The elevated scores observed among some children in Study 2 also suggest that meaningful variation was present

despite the low group-level averages. Future research should examine how body image measures perform across developmental stages and whether they are sensitive to both low levels of concern and the experiences of children with more pronounced difficulties.

A major strength of the current dissertation is our use of a longitudinal design to investigate how body image and school engagement change and relate to one another over time. Although our time frame of roughly one school year is a valuable addition to the literature, a study of how these variables change over several years and across various developmental stages (e.g., late childhood, early adolescence, adolescence, early adulthood) would be especially illuminating. This would provide valuable data to map out the developmental trajectories for children's body image and how these changes relate to various school outcomes. While cross-sectional research suggests that both body image and school engagement worsen as children age, our understanding of how they relate to one another over time remains limited.

While our research aligns well with certain theoretical accounts (i.e., self-development, self-objectification, relational dynamic systems), the current study design did not allow us to directly test possible underlying mechanisms for the links between body image and school engagement. Future research could better evaluate these explanations by following children across more time points and over a longer developmental period, while repeatedly assessing self-objectification, body dissatisfaction, school engagement, and relevant contextual factors (e.g., peer relationships, teacher support, and body-related teasing). Self-objectification theory would be more directly supported if changes in self-objectification reliably preceded changes in body dissatisfaction and subsequent changes in engagement. Evidence of reciprocal associations among body image, engagement, and contextual factors would be consistent with an RDS perspective, although such findings would not, by themselves, distinguish RDS from self-

objectification theory. Because the frameworks are not necessarily mutually exclusive, a stronger test would examine whether self-objectification predicts specific pathways within a broader system of reciprocal influences. Even with repeated observations, however, observational data would not establish causality. They would, however, allow us to make more defensible inferences due to more rigorous observational data.

Finally, person-centered approaches should continue to be utilized to deepen our understanding of individual differences in children's body image. While the findings in Study 2 suggested that various dimensions of body image generally tend to worsen in parallel, this may change if additional predictors are included in profile analyses. In doing so, this might elucidate more predominantly male profiles, or profiles characterized by especially severe elevations in a specific dimension of body image. The primary value of investigating the presence of these profiles is that it could help inform the development of more specific interventions, rather than more global approaches that fail to adequately address the primary concerns of certain children.

Conclusion

The present dissertation aimed to advance understanding of how body image issues and school engagement co-develop during late childhood, a developmental period in which both constructs begin to worsen in many children. Across two complementary longitudinal studies, findings showed that body image is associated with children's school engagement in ways that are both multidimensional and heterogeneous. Taken together, these findings suggest that body image may represent an important yet underrecognized factor associated with children's school functioning, while also illustrating the value of looking beyond variable-centered research to identify children whose difficulties may stray from group-level trends. These findings also underscore the importance of recognizing and addressing body image issues early in

development, before they become more firmly established and begin to interfere with children's academic, social, and psychological functioning. Moreover, the findings highlight that efforts to support children's school engagement should consider body image as one potentially meaningful component of their broader developmental context, with prevention and intervention approaches attending to the diverse ways in which body image difficulties may emerge and affect children's experiences at school.

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