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Relationships between Children's Use of Imagery and Domains of Physical Competence

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by

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ABSTRACT

Low levels of perceived motor and physical competence are viewed as barriers to physical activity in children (Weiss, 2000). Imagery is an effective psychological skill that can create feelings of competence in those who use it (Weinberg, 2008). As such, imagery may be one way to enhance perceptions of competence and increase physical activity participation. The overall purpose of the present study was to examine the relationship between children's use of active play imagery (fun, capability, and social imagery) and the domains of physical competence (global self-worth, physical self-worth, sport competence, body attractiveness, physical strength, and physical conditioning). Male (n = 96) and female (n = 55) children ranging from 9 to 12 years (M = 10.25, SD = 1.04) were recruited from local summer camp programs to participate in the study. Social imagery was identified as a predictor of body attractiveness, physical self-worth, and global self-worth, whereas fun imagery was identified as a predictor of strength, physical self-worth, and global self-worth. Encouraging children to engage in active play imagery, and more specifically, fun and social imagery, could serve as an effective strategy to enhance the perceptions of one's self-worth.

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RESEARCH ARTICLE

Introduction

Competence is a central component to human behaviour (White, 1959) and is positively associated with physical activity (PA) participation (Weiss & Ebbeck, 1996) and peer acceptance (Weiss & Duncan, 1992). In fact, competence is an innate desire, outlined by Deci and Ryan (2002) as one of the three basic psychological needs. Children are motivated to be competent, and their perceived competencies in specific domains are accompanied by positive emotional experiences, whereas their perceived lack of competence in other domains is accompanied by negative emotional experiences (Harter, 1978). In a longitudinal study, competence levels in sport and math declined over time from childhood to adolescence (Fredricks & Eccles, 2002) suggesting the dynamic nature of competence, but also highlighting the problematic decline of competence in adolescence. Given the association that competence has with motivation and PA participation, it is important to examine factors that can influence competence. A valuable mental skill that has been found to be positively related to a child's math and building competence in academics (Pirrone & Di Nuovo, 2014) as well their physical competence in active play (Tobin, Nadalin, Munroe-Chandler, & Hall, 2013) is imagery. Despite this relationship between imagery and physical competence, many questions about the specific domains of physical competence remain. Harter (1985b) noted the multidimensional nature of physical competence, and added that as individuals mature their sense of competence becomes more multidimensional, and they begin to possess many distinct subareas of competence that should also be investigated (Harter, 1985b).

In the Active Healthy Kids Canada report card for 2016, Canada received a "D+" for active play, indicating that very few children are meeting the national guidelines of several hours of active play each day (AHKC, 2016). Failure to meet the national guidelines for active play can be partially attributed to the many barriers children believe they cannot overcome (e.g., bullying, peer acceptance, competence; Watson, Eliot, & Mehta, 2015; Weiss, 2000). Low levels of perceived motor and physical competence are viewed as barriers to PA (Weiss, 2000; Weiss & Duncan, 1992), such that individuals are likely to avoid engaging in an activity when they hold negative beliefs about their ability. Individuals with high levels of perceived physical and motor competence are more likely to engage, enjoy, and persist in PA (Weiss & Ebbeck, 1996). Imagery is an effective psychological skill that can create feelings of competence in those who use it (Weinberg, 2008). As such, imagery may be one way to enhance perceptions of competence and increase active play participation in children. Thus, the current study seeks to further examine the relationship between the use of the three imagery types (fun, capability, and social imagery) and specific domains of competence including global self-worth, physical self-worth, sport competence, body attractiveness, physical strength and physical conditioning.

The need for competence refers to one's desire to feel that they can successfully complete a challenging task. According to the basic psychological needs theory (BPNT; Deci & Ryan, 2002), humans are motivated to grow and develop by pursuing opportunities to satisfy the three basic psychological needs (autonomy, relatedness, competence). These needs are fundamental and innate desires of all humans regardless of their age, gender, or culture. Research supports positive outcomes in those who are able

to satisfy their basic needs (McDonough & Crocker, 2007; Ryan, Williams, Patrick, & Deci, 2009). Research by Ryan et al. (2009) emphasized the value of psychological need satisfaction, stating that feelings of competence may lead to enhanced motivation whereas diminished levels of competence may lead to discouragement or disengagement. Therefore, when all of the needs are satisfied, an individual is experiencing psychological harmony and thus, optimal growth is achieved. The current study is grounded in the basic psychological needs theory, wherein the satisfaction of the need for competence is accompanied by favourable outcomes (Deci & Ryan, 2002).

In addition to the importance of competence outlined by Deci and Ryan (2002), it has also been described as a central component to human behaviour (White, 1959). As children mature into adolescents, they begin to make self-judgments and evaluate their competence in certain domains, leading to either positive or negative feelings (Trent, Cooney, Russell, & Warton, 1996). As a result, research related to self-perceptions in specific achievement domains, including perceived competence, has generated considerable interest (Weiss, 1995). Harter (1982, 1985a) expanded on the domain-specific notion suggesting that perceptions of competence and perceptions of social regard make up an individual's self-worth. The perceptions of competence that form an individual's self-worth occur in five distinct domains, including physical appearance, likeability by peers, athletic/sport competence, behavioural conduct, and scholastic competence (Harter, 1999).

Although children's competence has been examined in various settings, one study in the PA setting found that physical and motor competence were positively associated with the amount of activity and the percentage of time engaging in moderate to vigorous

PA (Wrotniak, Epstein, Dorn, Jones, & Kondilis, 2006). A more recent study using Whitehead's (1995) Children and Youth Physical Self-Perception Profile (CY-PSPP) assessed the relationship between physical self-perceptions and PA levels in eighth grade children (Viira, 2011). The results indicated that the domains of sport competence and physical conditioning were the strongest predictors of PA. The researchers added that the subdomains of competence assessed with the CY-PSPP are important predictors of PA in early adolescence and as an individual matures (Viira, 2011).

Perceptions of competence have also been found to influence children's activity enjoyment (Carroll & Loumidis, 2001; Weiss, 2000), PA levels (Carroll & Loumidis, 2001), and PA involvement (Weiss, 2000). In a study examining the relationship between a parent's perception of their 9-11 year old children's competence in PA, and the children's reported levels of physical activity, researchers found that a parent's perception of their children's PA competence was associated with the children reporting higher levels of PA engagement (Bois, Sarrazin, Brustad, Trouilloud, & Cury, 2005). Parents were found to both directly (modeling) and indirectly (beliefs) influence their children's PA involvement. Although they were both significant predictors of children's reported PA involvement, the mother's indirect influence was found to be the most significant predictor. These findings suggest that children with high perceived competence, engage in more PA, are more likely to maintain the PA levels over time, and report higher levels of enjoyment.

Although research on the link between imagery and competence is limited, researchers have identified a relationship between imagery use and competence in learning and academics (Pirrone & Di Nuovo, 2014). In the academic setting, children's

ability in building blocks play and mental imagery significantly predicted their competence in mathematics (Pirrone & Di Nuovo, 2014). Further, fourth grade children in an imagery and relaxation training program reported higher levels of sport competence and physical appearance competence compared to those in the control group (Silvestri, Dantonio, & Eason, 1994).

Imagery is believed to be a natural human behaviour in children when learning new skills (Weiss, 1991). White and Hardy (1998) defined imagery as "an experience that mimics real experience" (p. 389). In fact, researchers have noted that children are able to image at a young age (Estes, 1998). Further, Molina, Tijus, and Jouen (2008) stated that by age seven, they are able to construct images of actual action, which is also the age at which children report using imagery during their free play (Tobin et al., 2013).

The benefits of children using imagery is extensive. Imagery is one of the most commonly used psychological skills in sport (Cumming & Williams, 2013), and has shown significant performance improvements for young athletes (Li-Wei, Qi-Wei, Orlick, & Zitzelsberger, 1992; Rodgers, Hall, & Buckolz, 1991). Furthermore, the benefits of imagery have been identified in additional settings including academics (Egan, 2005), art (Keller, 2012), post-operative rehabilitation (Huth, Broome, & Good, 2004), and more recently active play (Tobin et al., 2017).

In the sport domain, young athletes use imagery and their imagery use can improve imagery ability and sport performance (Li-Wei et al., 1992; Rodgers et al., 1991). Sport researchers have also identified a positive association between imagery use and various psychosocial outcomes including confidence (Munroe-Chandler, Hall, & Fishburne, 2008), motivation (Harwood, Cumming, & Hall, 2003), and affect (McCarthy,

2009). Global findings in the children's sport imagery domain indicate that imagery is an effective strategy to reduce and manage anxiety in young athletes, while also increasing an athlete's feelings of confidence and efficacy (Munroe-Chandler et al., 2008; Munroe-Chandler & Morris, 2011; O, Munroe-Chandler, Hall, & Hall, 2014). Despite the benefits of imagery being so well documented in the sport domain, researchers have only begun to examine imagery use in children's leisure time physical activity (e.g., Guerrero, Tobin, Munroe-Chandler, & Hall, 2015; Tobin et al., 2017; Tobin et al., 2013).

In a recent qualitative study assessing whether children use imagery in active play, and how it relates to Deci and Ryan's (2002) three basic psychological needs, Tobin et al. (2013) noted that children (11-14 years) emphasized the basic need for competence, specifically related to improving skills, strategies, and increasing their confidence in active play. However, this limits itself by only examining a one-dimensional measure of general competence, as one of the basic psychological needs. In subsequent research by Tobin et al. (2017), the relationship between the three types of active play imagery (Cooke, Munroe-Chandler, Hall, Tobin, & Guerrero, 2014) and the three basic psychological needs (Deci & Ryan, 2002) were examined. Capability and fun imagery were positively related to the need for competence, whereas social imagery was related to the need for relatedness (Tobin et al., 2017). These findings are important to PA researchers given that high levels of intrinsic motivation, which can be achieved by satisfying the basic psychological needs (Deci & Ryan, 2002), are related to higher levels of PA (Sweet, Fortier, & Blanchard, 2014). As such, the relationship between active play imagery and the basic psychological needs may play an important role in increasing the PA levels of children (Tobin et al., 2013).

There are many ways for children to accumulate PA, including structured (sports and physical education classes) and unstructured (active play) activities. More specifically, active play is a form of free play that is defined as unstructured physical activity occurring in a child's leisure time (Veitch, Salmon, & Ball, 2008). It can be further described as an activity that is freely chosen, self-directed, and done for its own purpose rather than for a reward (Gray, 2009). Whereas adults prefer exercise as their PA, children typically prefer unstructured forms of PA (Caspersen, Powell, & Christienson, 1985; Veitch et al., 2008).

Given the importance that competency plays in children's engagement, levels, and satisfaction with PA, the need to examine children's imagery use and its relation to the physical domains of competence is apparent. The current study sought to expand on the research related to perceptions of general competence by examining physical competence from a multidimensional perspective. In doing so, various domains of physical competence were assessed. As such, this study examined the relationships between children's use of active play imagery and the physical domains of competence. Based on a combination of previous findings in similar contexts, such as the relationships identified between imagery use and competence in an academic domain (Pirrone & Di Nuovo, 2014), and the strong predictability of competence domains for PA levels (Timo, Sami, Anthony, & Jarmo, 2016), it was hypothesized that active play imagery use would predict physical competence. More specifically, it was hypothesized that social imagery would predict body attractiveness and that capability imagery would be the strongest predictor of sport competence, strength competence, and physical conditioning. Additionally, all other relationships between independent and dependent variables were exploratory.

Method

Participants

As calculated using G-Power 3.0.10 (Faul, Erdfelder, Buchner, & Lang, 2009) the current study required a minimum of 114 participants. A total of 158 participants were recruited. Seven participants were removed as their questionnaires were incomplete. As such, data from 151 (n = 96 male; n = 55 female) children ranging from 9 to 12 years (M = 10.25, SD = 1.04) were examined for the current study. Participants were recruited from the YMCA summer camps and the Lancer summer camp programs.

Measures

Demographics. Participants indicated their age and gender.

Active play imagery. Children's Active Play Imagery Questionnaire (CAPIQ; Cooke et al., 2014; see Appendix A) measured children's use of imagery in active play . The measure consists of 11 items, each rated on a 5-point Likert scale from 1 (*not at all*) to 5 (*very often*), and assesses one of the three subscales (capability 4 items, fun 3 items, and social 4 items). Capability imagery items refer to imaging movements of the body, and a sample item is, "When thinking about active play, I imagine how my body moves." Fun imagery refers to enjoyment or satisfaction with an activity, with a sample item reading, "When thinking about active play, I imagine the fun I have." Social imagery is creating images of playing alone or with others, with a sample item reading, "When thinking about active play, I imagine joining in with others." A composite score was obtained for each subscale using the average of the items within the scale (Cooke et al., 2014). Additionally, previous research has reported internal consistencies with

reliabilities greater than .70 for all three subscales (Cooke et al., 2014). The alpha coefficients for this measure in the current study are in Table 1

Physical competence. The CYPSPP (Whitehead, 1995; see Appendix B) measured the various domains of physical competence . This 36-item measure consists of six scales (global self-worth, physical self-worth, sport competence, body attractiveness, strength competence, and physical conditioning) producing a hierarchical model of self-worth. Each of the six scales consist of six items, scored using a 4-point structured alternative scale. The structured alternative format allows the participant a choice between two statements, followed by one additional decision to be made, indicating the extent to which the statement accurately describes oneself. A sample item for the sport competence subscale reads, “Some kids do very well at all kinds of sports, but other kids don’t feel that they are very good when it comes to sports.” A sample item for the body attractiveness subscale reads, “Some kids think that it’s hard to keep their bodies looking fit and in good shape, but other kids find it easy to keep their bodies looking fit and in good shape.” The perceived strength and muscular development subscale sample reads, “Some kids think they have stronger muscles than other kids their age, but other kids feel that they have weaker muscles than other kids their age.” A sample for the physical conditioning subscale reads, “Some kids don’t usually have much fitness and endurance, but other kids always have lots of fitness and endurance.” A sample item from the subscale of physical self-worth reads, “Some kids don’t feel very confident about themselves physically, but other kids really feel good about themselves physically.” Every item was given a score from one to four, where four indicates a high perception on that item. A composite score for each scale was obtained from the average of the six

items that make up the specific scale (Welk & Eklund, 2005). The subscales of CY-PSPP have demonstrated acceptable reliability in a population of 4th and 5th grade children, with alpha coefficients ranging from .77 to .91 (Welk, Corbin, Nann Dowell, & Harris, 1997). Additionally, a recent study by Kolovelonis, Mousouraki, Goudas, and Michalopoulou (2013) supported these findings in a Greek version of the CY-PSPP, wherein the alpha coefficients ranged from 0.75-0.88 with a population of young children (grade 5-7). The alpha coefficients for this measure for the current study are in Table 1.

Procedure

After receiving approval from the University of Windsor's Research Ethics Board, participants were recruited from the YMCA of Western-Ontario, Windsor location summer camps and the University of Windsor Lancer summer camp programs. Permission to collect data at the YMCA was obtained from the Director of community activities (see Appendix C) and the permission to collect data at the Lancer camps was obtained from the Lancer Camps Coordinator (see Appendix D). Parents of children registered in the various camps were approached by the student investigator (i.e., Mr. Martin) during sign-in/sign-out times (outside doors of the gymnasium at the YMCA camps and in the front lobby of the St. Denis Center) and were given an information package containing the letter of information (see Appendix E), consent form (see Appendix F) for the parent/guardian, and the child assent form (see Appendix G). If the parent agreed to allow their child to participate in the study (i.e., signed consent form), assent was then sought from the child prior to data collection. The following day at camp, children completed the questionnaires during their lunch break under the supervision of

the student investigator. The completion of the questionnaires took approximately 20 minutes.

Results

Data Screening

Using SPSS (Versions 23), a missing data analysis was conducted to determine the amount of missing data and to identify whether there was a pattern of missing data. Missing values (less than 1% missing) were deemed to be missing completely at random and were treated using expectation maximization. This technique accounted for the conditions in which the missing data occurred, and created accurate parameters (Polit, 2010). One case was identified as a univariate outlier and therefore removed from the data set. Although the outliers were treated on a case by case basis to support the uniqueness of each participant, this case was removed as it was deemed to be a univariate outlier on more than one scale (physical self-worth, fun imagery). No multivariate outliers were identified using a Mahalanobis distance statistic of $p < .001$ (Tabachnick & Fidell, 2007). The assumptions of normality were examined and met using the skewness and kurtosis values from the descriptives table (the skewness and kurtosis values should be close to zero, whereby acceptable values fall within the range of ±1; Tabachnick & Fidell, 2007).

Preliminary Analysis

Prior to examining the study's hypotheses, a series of one-way ANOVAs (Table 2) were conducted to determine if there were any significant age and gender differences in the subscales of the CAPIQ and CYPSPP. Although no differences were found across age, significant differences across gender were identified for the Strength competence

subscale of the CYPSPP ($p < .05$). This difference was controlled for in the main analysis by entering gender in block one, followed by the remaining variables simultaneously in block two.

Descriptive Statistics

Table 1 shows the means, standard deviations, and correlations for age and gender, as well as the subscale means and Cronbach's alphas for active play imagery and physical competence. Mean values for the active play imagery subscales ranged from 3.26– 4.11out of 5 and 2.93– 3.44 out of 4 for the physical competence subscales. The highest mean from the CAPIQ was fun imagery, and from the CYPSPP the highest mean was global self-worth.

Regressions

Hierarchical regression analyses were performed to examine possible relationships between the frequency of capability, fun, and social imagery and children's perceptions of their physical competence (see Table 3). Six separate models were conducted, one for each of the forms of physical competence (i.e., CYPSPP subscales). For all but one of the physical competence subscales, all of the imagery subscale scores were entered concurrently in Step 1. However, the regression model for strength was unique as a result of the preliminary one-way ANOVA. In this model, gender was entered in Step 1 to account for the differences in male and female perceptions of strength, and the remaining variables were entered in Step 2.

Body attractiveness. Consistent with the first hypothesis, a significant overall model was found for predicting perceptions of body attractiveness, $F(3, 146) = 4.28$, $p = .01$, accounting for 8.1% (adj $R^2 = .06$) of the variance. When controlling for the other

types of active play imagery, examination of the beta weights and *p* values revealed that social imagery (β = .22) positively and significantly predicted perceptions of body attractiveness.

Sport competence. Contrary to the hypotheses, no relationships were identified between sport competence and capability imagery (p = .73). Additionally, fun imagery (p = .10) and social imagery (p = .32) did not predict sport competence.

Physical strength. A significant overall model was found for predicting perceptions of physical strength, $F(4, 145) = 3.86$, p = .01 accounting for 9.6% (adj R^2 = .07) of the variance. In Step 1, gender significantly predicted physical strength (β = -.17) and accounted for 3% of the overall variance (adj R^2 = .02). In Step 2, the CAPIQ subscales were entered, and only fun imagery significantly contributed to the regression (ΔR^2 = .07, p = .01) when controlling for the other types of active play imagery. Examination of the beta weights and *p* values revealed that gender (β = -.19) predicted physical strength, whereby males had higher perceptions of physical strength than females. Additionally, in support of our exploratory analyses, greater use of fun imagery (β = .20) significantly predicted perceptions of physical strength. Thus, contrary to the second hypothesis, capability imagery was not the strongest predictor of physical strength.

Physical conditioning. A significant overall model was found for predicting perceptions of physical conditioning, $F(3, 146) = 3.76$, p = .01, accounting for 7.2% (adj R^2 = .05) of the variance. However, contrary to the hypotheses, examination of the beta weights and *p* values revealed that no imagery types were significant predictors of physical conditioning.

Physical self-worth. A significant overall model was found for predicting perceptions of physical self-worth, $F(3, 146) = 7.87$, $p < .001$, accounting for 13.9% (adj $R^2 = .12$) of the variance. In the exploratory analyses, examination of the beta weights and *p* values revealed that greater use of fun imagery (β = .24) and social imagery (β = .23), but not capability imagery (β = -.07), significantly predicted perceptions of physical self-worth.

Global self-worth. A significant overall model was found for predicting perceptions of global self-worth, $F(3, 146) = 7.40$, $p < .001$, accounting for 13.2% (adj $R^2 = .11$) of the variance. In the exploratory analyses, examination of the beta weights and *p* values, once again, revealed that fun imagery (β = .26) and social imagery (β = .18), but not capability imagery (β = -.02), significantly predicted perceptions of global self-worth.

Discussion

The overall purpose of the present study was to examine the relationship between children's use of active play imagery and the domains of physical competence. It was hypothesized that social imagery would predict body attractiveness and that capability imagery would be the strongest predictor of sport competence, strength competence, and physical conditioning. Additionally, exploratory relationships were examined between all independent and dependent variables.

The findings provide partial support for the noted hypotheses. As predicted, social imagery was identified as a predictor of body attractiveness. However, there was no support for capability imagery predicting any of the competence domains. Despite only partial support for the hypotheses, several other predictive relationships were identified between children's active play imagery and the domains of physical competence. For instance, social imagery was identified as a predictor of body attractiveness, physical

self-worth, and global self-worth, whereas fun imagery was identified as a predictor of strength, physical self-worth, and global self-worth.

Support for social imagery as a predictor of body attractiveness has been previously noted in the literature. Researchers have identified a positive relationship between social imagery and the satisfaction of the need for relatedness (Tobin et al., 2017). In this case, the need for relatedness involves an individual's sense of connection with others, and more specifically, their perceptions of worthiness to be loved and respected (Osterman, 2000). As such, peer acceptance plays a significant role in childhood and early adolescence (Somerville, 2013). The age range for the current study covers a period of development when significant changes begin to occur, both biologically and socially (Richter, 2006). That is, during early adolescence, parents become less influential and adolescents strive to be accepted by their peers as they become more sensitive to peer rejection (Brown, 1990; Somerville, 2013). Additionally, peer teasing and rejection have been identified as significant risk factors to body satisfaction (Paxton, Eisenberg, & Neumark-Sztainer, 2006). Being a target of peer teasing and rejection in childhood, specifically at age 10, is related to more frequent appearance monitoring and body shame in adolescence for both boys and girls (Lunde & Frisen, 2011). Further, researchers have found peer status and friendship quality to be negatively related to weight concern (Gerner & Wilson, 2005). Therefore, when children engage in social imagery, which is creating images of engaging in positive peer interactions (Tobin et al., 2017), they may reinforce their perceptions of peer status and friendship quality. Based on the aforementioned relationships, this could result in less

frequent appearance monitoring, and a decrease in body shame and weight concern or an increase in perceived body attractiveness.

In the current research, capability imagery was used the least frequently, which aligns with previous research (Guerrero et al., 2016; Tobin et al., 2017). This could support the notion that the participants perceived themselves to be competent prior to being enrolled in the camp. Therefore, satisfying the need for competence was not a priority, and the focus was likely on the social and fun aspects of summer camp. Another plausible explanation, based on capability imagery being used the least frequently when compared to the other types of imagery, is the possibility of there being a dose response to active play imagery use. This response would indicate that the children must engage in specific amount of a certain type of imagery in order to reap the benefits. However, the present study did not use a longitudinal method, and as such, it is impossible to ascertain from the data whether this explanation is accurate. Additionally, it is possible with the imagery types being entered into the regression concurrently and capability imagery being used the least, that capability imagery was not able to predict any of the domains of physical competence above and beyond the other two types of imagery.

When considering the exploratory investigation of social imagery, it was identified as a predictor of physical self-worth and global self-worth. This relationship has been supported in the children's active play imagery literature. As previously noted, research by Tobin et al. (2017) identified a relationship between social imagery use and the satisfaction of the need for relatedness. According to Deci and Ryan's (2002) basic psychological needs theory, when the fundamental needs are satisfied, the individual experiences a sense of psychological harmony and optimal growth. Research supports a

positive association between psychological need satisfaction and feelings of well-being and self-worth across various contexts of PA (Baard, Deci, & Ryan, 2004; Kasser & Ryan, 1999). Further, those who are unable to satisfy their fundamental needs experience negative outcomes (Deci & Ryan, 2002). For instance, when fundamental needs are unfulfilled, anxiety, anger, and hostility become central components of one's experience (Deci & Ryan, 2002). These negative outcomes are akin to the protective measures engaged in when they have unstable self-esteem, which is also described as vulnerable feelings of self-worth (Kernis & Paradise, 2002). Therefore, support for the predictive relationship between social imagery and physical and global self-worth can be drawn from research by Tobin et al. (2017), such that when an individual engages in social imagery they are more likely to satisfy theirbasic need for relatedness which would involve a sense of harmony and well-being. This may, in turn, foster positive perceptions of global and physical self-worth.

The present study also identified fun imagery as a predictor of one's perceptions of physical and global self-worth. Given that the use of fun imagery requires an individual to create images related to enjoyment and interest in an activity, this finding is in accordance with previous research that has examined activity enjoyment and fun imagery in various settings (Guerrero, Hoffmann, & Munroe-Chandler, 2016; Tobin et al., 2013). For example, children are more likely to engage and persist in PA if they perceive it to be fun and enjoyable, which may result in increased motivation as well as more opportunities for skill development (Pharez, 2016; Tobin et al., 2013). Additionally, fun could lead to an increase in activity intensity (Lyons, Ward, Ribisl, Bowling, & Kalyanaraman, 2014), more frequent current and future participation in activities (Ainley

& Ainley, 2011), as well as psychological benefits including, improved psychological adjustment (Peck, Roeser, Zarrett, & Eccles, 2008), increased self-esteem (Adachi & Willoughby, 2014), and a decrease in symptoms of depression and anxiety (Wankel, 1993).

Above and beyond the widespread direct benefits of fun, there are also many indirect benefits to one's well-being that result from an increased involvement and persistence in PA (Agans et al., 2014; Parfitt & Eston, 2005; Pavey, Parfitt, Rowlands, & Welsman, 2012). More specifically, the concept of well-being is described as the presence of global self-worth and the absence of anxiety and depression (Calfas & Taylor, 1994; Parfitt & Eston, 2005). One study found that increased time spent in structured and unstructured PA is associated with feelings of global self-worth, and fewer symptoms of anxiety and depression (Parfitt & Eston, 2005). In addition, increases in PA involvement is related to greater growth of social skills (Zurc, 2012) and positive youth development (Agans et al., 2014). In summary, children who engage in fun imagery may experience a sense of enjoyment in their active play (Tobin et al., 2013). This can subsequently increase their engagement in PA (Ainley & Ainley, 2011; Lyons et al., 2014), which may ultimately lead to many beneficial outcomes including increased perceptions of global and physical self-worth (Parfitt & Eston, 2005).

In the current study, fun imagery was also a significant predictor of perceived strength. Once again, relying on the increase in PA engagement that results from activity enjoyment, this relationship aligns with the body of research that has examined self-perceptions in various contexts (Webb, Benjamin, Gammon, McKee, & Biddle, 2013). Researchers have noted that sedentary behaviour, or behaviour with low energy costs, the

most common being television viewing (Harvey, 1990), is negatively associated with one's perception of physical strength (Webb et al., 2013). More specifically, those who engage in habitual PA hold higher perceptions of their own physical strength, when compared to those who engage in high amounts of sedentary behaviour (Webb et al., 2013). Thus, the use of fun imagery may be an effective strategy to promote increases in PA involvement, and consequently decreases in sedentary behaviour (Deliens, Deforche, De Bourdeaudhuij, & Clarys, 2015). This increase is likely to lead to enhanced perceptions of strength. Regardless of the activity type, children engage in activities they enjoy most often, whether it is sedentary or physical in nature (Epstein, Saelens, Myers, & Vito, 1997). Therefore, if sedentary activities are preferred, children will be less likely to engage in PA, which may, in turn, result in the deterioration of their perceived strength (Epstein et al., 1997).

The current results also revealed a gender difference in perceptions of strength, whereby boys reported higher perceptions of strength than girls. This finding is not surprising as it is consistent with previous research (Fox & Corbin, 1989; Hayes, Crocker, & Kowalski, 1999; Lubans & Cliff, 2010; Whitehead, 1995). Historically, and in most current Western and non-Western cultures, masculinity requires one to be physically strong, and to be an imposing physical presence. As a result of these cultural norms, males and females experience different forms of socialization (Connell, 2005). In fact, perceptions of physical strength in males were more strongly related to their physical self-worth (Crocker, Sabiston, Kowalski, McDonough, & Kowalski, 2006). Additionally, when comparing the influence of the domains of physical competence,

researchers indicated that in females, perceptions of physical strength had the weakest influence on their overall physical self-worth (Crocker et al., 2006).

The present study failed to support its second set of hypotheses as no relationships were found between capability imagery and sport competence, strength competence, or physical condition. These results are somewhat surprising as they contradict the body of active play imagery research that has previously identified a relationship between capability imagery and the basic psychological need of competence (Tobin et al., 2017). The aforementioned hypothesis was not only based on previous research, but also on the similarities between the need for competence and capability imagery. Capability imagery consists of images related to feelings of competence, being achievement oriented, and being motivated to be active (Cooke et al., 2014), whereas the need for competence is feeling successful in fulfilling a challenging task and expressing one'scapabilities (Deci & Ryan, 2002). Yet despite the similarities, no relationships were identified. One possible explanation for this can be attributed to the population sampled. The participants were primarily recruited from sport camps. Children who participate in sport tend to score higher on many domains of competence including sport competence, conditioning, and strength (Kolovelonis & Goudas, 2013). The mean scores from the current study's sample would seem to support this given their high competency scores (e.g., physical self-worth, M = 3.30; physical conditioning, M = 3.14 out of 4.00). In fact, when compared to previous studies' mean for physical conditioning (M = 2.75) and sport competence (M = 2.80; Morgan, Graser, & Pangrazi, 2008), the current study's mean scores for physical conditioning (M = 3.14) and sport competence (M = 2.97) were higher. This may be indicative of a competent sample at baseline.

The current study is not without limitations. As previously noted, the sample of participants was primarily from sport camps. This may limit the generalizability of the findings given that previous research indicates that children participating in sport report higher levels of competence in multiple domains compared to those who do not engage in sport (Kolovelonis & Goudas, 2013). Future research should either control for the type of camp or examine participants in a school setting as it is likely to be more generalizable. Additionally, the CY-PSPP as a measure of competence resulted in some confusion for the participants. Despite the use of the CY-PSPP in many contexts, and its validation with children as young as 8 years of age (Welk et al., 1997), the structured alternative method appeared to cause some difficulties in some of the younger participants. Future research using the CY-PSPP should be with older children.

Despite the limitations, the current study also had some strengths. Few studies have examined competence in children, and even fewer studies have examined competence from a multidimensional perspective in children, making this the first known research to examine active play imagery and the domains of physical competence. This is important given that children's active play imagery research remains in its infancy. Researchers have only just begun to examine the many specific settings in which children's use of imagery could be beneficial. The expansion of the body of active play imagery research and the multidimensional perspective of competence encourages the development of targeted imagery interventions.

Support for the relationship between fun imagery and the three domains of physical competence (strength, physical self-worth, and global self-worth), in addition to the benefits associated with fun imagery, emphasize the value of active play imagery use

in children. Specifically, researchers have highlighted benefits and risks associated with a positive self-worth (Crocker, Eklund, & Kowalski, 2000; Crocker et al., 2006; Goñi & Rodríguez, 2007). For example, those who hold negative perceptions of their self-worth are at risk of developing mental health issues including, anxiety, depression, and eating disorders (Crocker et al., 2000; Crocker et al., 2006). As such, encouraging children to engage in active play imagery, specifically, fun and social imagery, could serve as an effective strategy to enhance the perceptions of one's self-worth. Doing so may serve to guard against mental health issues, and indirectly protect against physical health issues (e.g., may increase enjoyment and need satisfaction, as well as reducing inactivity; Dietz, 1996). In conclusion, two of the three types of active play imagery (fun imagery and social imagery) were identified as significant predictors of various domains of physical competence (body attractiveness, strength, physical self-worth, and global self-worth). Taken together, it is important for parents, teachers, and practitioners to encourage children to use their imagination, and specifically to engage in active play imagery. Further, imagery use in children is an effective strategy to enhance domains of one's physical competence, and indirectly protect against mental health issues. Given that in general, these findings support the findings of previous research by Tobin and colleagues (2013, 2017), future studies should use the collection of findings as the foundation for intervention research. This research could examine the effect of incorporating imagery into the daily schedule of summer camps on a child's perceptions of physical competence. More specifically, at the beginning of each day, a brief script including fun and social imagery could be read by the camp counselor to the participants. Based on the established relationships between imagery use and physical competence, in addition to

the recognized benefits of imagery use, incorporating imagery into summer camps could serve as a fruitful addition to the daily schedule.

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Tables

Table 1

Descriptive Statistics for Gender, Age, Imagery Types, and Domains of Physical Competence

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Age	-									
2. Capability imagery	-.02	-								
3. Social imagery	.05	.30**	-							
4. Fun imagery	-.03	.27**	.41**	-						
5. Physical Strength	.11	.03	.18*	.22**	-					
6. Body Attractiveness	.04	.12	.27**	.20*	.40**	-				
7. Physical Self-worth	.02	.06	.30**	.31**	.43**	.68**	-			
8. Global Self-worth	.12	.10	.28**	.32**	.20*	.51**	.55**	-		
9. Physical Conditioning	.09	.14	.23**	.21**	.44**	.61**	.59**	.41**	-	
10. Sport Competence	.11	.04	.14	.18*	.57**	.44**	.50**	.36**	.65**	-
M	10.25	3.26	3.83	4.11	2.94	3.01	3.30	3.45	3.14	2.97
SD	1.04	.97	.80	.78	.61	.53	.51	.47	.50	.66
α	--	.79	.73	.66	.84	.73	.79	.75	.71	.81
Scale range	9-12	1-5	1-5	1-5	1-4	1-4	1-4	1-4	1-4	1-4

Note. The CAPIQ is rated on a 5-point scale ranging from 1 *(not at all)* to 5 *(very often)*. The CY-PSPP is scored using a 4-point structured alternative scale ranging from 1 *(very low perceived competence)* to 4 *(very high perceived competence).*

Table 2

One-way Analysis of Variances (ANOVAs) for Domains of Physical Competence by Gender and Age

	Gender			Age		
Variable	*df*	*F*	*p*	*df*	*F*	*p*
Physical Strength	1, 148	4.62	.03	3, 146	0.67	.57
Body Attractiveness	1, 148	1.61	.21	3, 146	0.98	.41
Physical Self-worth	1, 148	0.95	.33	3, 146	0.95	.42
Global Self-worth	1, 148	0.04	.84	3, 146	0.74	.53
Physical Conditioning	1, 148	3.26	.07	3, 146	0.89	.45
Sport Competence	1, 148	2.85	.09	3, 146	1.04	.38

Table 3

Regression Analyses for Active Play Imagery Predicting Domains of Physical Competence

Predictor variables	ΔR^2	β	*T*	*p*
Physical Strength				
Step 1:	.03*			
Gender		-.17	-2.15	.03
Step 2:	.07*			
Gender		-.19	-2.43	.02
Capability imagery		-.08	-.92	.36
Social imagery		.13	1.42	.16
Fun imagery		.20	2.24	.03
Body Attractiveness				
	.08*			
Capability imagery		.03	.31	.76
Social imagery		.22	2.45	.02
Fun imagery		.10	1.15	.25
Physical Self-worth				
	.14**			
Capability imagery		-.07	-.87	.39
Social imagery		.23	2.64	.01
Fun imagery		.24	2.81	.01
Global Self-worth				
	.13**			
Capability imagery		-.02	-.27	.78
Social imagery		.18	2.12	.04
Fun imagery		.26	2.99	.003
Physical Conditoning				
	.07*			
Capability imagery		.06	.70	.49
Social imagery		.16	1.74	.08
Fun imagery		.13	1.50	.14
Sport Competence				
	.13			
Capability imagery		-.03	-.34	.73
Social imagery		.09	1.61	.32
Fun imagery		.14	1.01	.10

*$p < .05$, **$p < .01$.

LITERATURE REVIEW

The overall purpose of the present study was to examine the relationship between children's use of active play imagery and global physical competence. Specifically, I aimed to investigate the relationship between active play imagery and the various physical domains of competence in children 9-12 years of age. The review of literature is divided into two main parts (a) competence and (b) imagery.

Competence

Research related to self-perceptions in specific achievement domains has generated considerable interest (Weiss, 1995). Consequently, as children mature into early adolescence, they begin to make self-judgments, evoking either positive or negative feelings, based on the evaluation of their self-perceptions of their competence in certain domains (Trent, Cooney, Russell, & Warton, 1996). Harter (1978) suggested the importance for people to demonstrate competence, especially in specific domains considered by the individual to be valuable. Competence is a broad term comprised of various subdomains, and is typically defined as an individuals' perception of their abilities in a specific domain (Horn, 2003). Perceived physical competence is one of the most researched subdomains, commonly investigated to develop an understanding of individual differences in motivated behaviour (Weiss & Ebbeck, 1996). Physical competence, the focus of the current research proposal, is a person's perception of their abilities in a physical domain such as exercise, sport, and active play, and is made up of appearance competence and athletic/sport competence (Harter, 1988).

Theories and Models of Competence

White (1959) viewed competence as one's ability to successfully engage with their environment. He also believed that the initial theories and models of motivation insufficiently explained humans' motivational behaviour, and therefore noted competence motivation as one of the main mediating factors of mastery attempts in human behaviour. His theory represented the foundation of competence theories and models, suggesting that competence is a central component to human behaviour. As such, competence tends to be at the center of various theories and models (Fox & Corbin, 1989; Yun & Ulrich, 1997).

Harter's self-construction and effectance motivation. Harter (1978) believed that children are motivated to be competent, and their perceived competencies are accompanied by positive emotional experiences. Conversely, negative emotional experiences are associated with a child perceiving themselves to lack competence in a specific domain. With Harter's (1978) basic belief, researchers were able to examine the causes and consequences of emotional experiences (e.g., Wankel & Kriesel, 1985; Weiss & Horn, 1990). A few years later, Harter (1982, 1985) expanded on her basic belief of domain-specific competence to develop a theory on the development of global self, and how it explains emotion and motivated behaviour. This new theory of the global self suggested that an individual's self-worth is composed of two main perceptions (see Figure 1): perceptions of competence in domain specific activities and perceptions of social regard. In children, five domains make up an individual's perception of competence in domain specific activities, including cognitive competence, physical competence, physical appearance, social competence, and behavioural conduct (Harter, 1985). It is said that domains valued by the individual have the greatest impact on the

individual's self-worth. The make-up of this main component of self-worth differs between children, adolescents, and adults. For example, in young children, parents and significant others are the primary sources of social support and regard. Contrastingly, in late childhood the ability to assess the standards of others and use them as a personal guide develops, allowing peer comparison to emerge as a source for social regard and competence information (Harter, 1999). Harter (1987) found that peer comparisons influenced self-worth independent of the perceptions of competence. Furthermore, global self-worth, which is an outcome of the two main perceptual components (competence and social regard), is believed to influence an individual's behaviour and emotions. It is also thought to mediate the relationship of perceived competence and social regard with affect and subsequently motivational behaviours

Harter (1999) made additional amendments to her model of self-worth (see Figure 2) distiguishing the five domains (physical appearance, likeability by peers, athletic/sport competence, behavioural conduct, and scholastic competence) of perceived competence related to different sources of social support and approval. This added level in the model created two clusters of perceived competence and social support sources, where the domains of physical competence can either independently influence the emotional outcomes (self-worth, affect, and hopelessness), or they can influence the sources of social support which subsequently influence the emotional aspects. The first cluster consists of perceptions of physical appearance, likeability by peers, and athletic/sport competence. The competence domains in the first cluster have the strongest relationship with peer support and approval. The second cluster consists of perceptions of behavioural conduct and scholastic competence and is most closely associated with parental support

and approval. Harter's (1999) revised theoretical model expanded the literature by acknowledging the importance of integrating two valuable constructs generally examined separately: perceptions of competence and social influences.

Basic psychological needs theory. In Deci and Ryan's (1985) self-determination theory, an individual's motivational behaviour is influenced by a number of factors above and beyond the impact of social situational variables (Standage & Duda, 2003). This broad framework was later divided into six mini theories, one of which is the basic psychological needs theory (BPNT; Deci & Ryan, 2002). The BPNT is based on assumptions that humans are continuously seeking to grow and develop by pursuing opportunities to fulfill the three key psychological needs. The fundamental and innate needs that all humans, regardless of their age, gender, or culture, strive to fulfill include the needs for competence, autonomy, and relatedness. The need for competence refers to their desire to feel that they can successfully complete a challenging task. Autonomy is the need for a sense of control over one's behaviour and environment, whereas relatedness is the need to feel a significant connection and a sense of belonging with others (Deci & Ryan, 2002). When all of the needs are satisfied, the individual is in psychological harmony and is experiencing optimal growth. Additionally, research supports a positive association between psychological need satisfaction and well-being across various contexts of physical activity (PA; McDonough & Crocker, 2007; Ryan, Williams, Patrick, & Deci, 2009). On the other hand, researchers have also suggested that those who persistently fail to satisfy their psychological needs are likely to experience negative outcomes (Deci & Ryan, 2002).

Measurement of Competence

Despite the difficulty for researchers to observe competence, it remains a central construct in various theories and models (Fox & Corbin, 1989) and has been heavily studied. Initially, researchers viewed self-worth as a unidimensional construct, which provided limited research value as it did not consider the complexity of the many elements that make up one's self-worth (Fox & Corbin, 1989). More recently, researchers have observed increasing value in a multidimensional approach to measure self-worth, in which various domains of competence (physical, cognitive, and social) make up the subscales and are used to assess one's self-worth, in addition to the general self-worth measure (Harter, 1985). The various multidimensional measures of competence have continued to evolve over the years, and have been supported in a variety of settings. Harter (1985), being a research pioneer of the self, developed the Self-Perception Profile for Children, which is a multidimensional measure of competence. It was followed up by Fox and Corbin's (1989) Physical Self-Perception Profile, and then again adapted by Whitehead (1995) for a population of young children. Given the popularity of these instruments, they continue to be readily used in research (e.g., Viira, 2011; Welk & Eklund, 2005).

Self-Perception Profile for Children. Following significant research related to the self, and more specifically, self-concept, and perceived competence, Harter (1985) developed a multidimensional measure of competence, the Self-Perception Profile for Children (SPPC). Given that children were believed to evaluate their competencies from a domain-specific perspective, Harter (1985) devised five specific domains of competence (i.e., scholastic competence, social competence, athletic/sport competence, physical appearance, and behavioural conduct), as well as one separate global subscale of

self-worth. Scholastic competence refers to individuals' perceived cognitive competence related to their school work, whereas the domain of social competence refers to individuals' perceptions of competence in terms of making friends, knowing what it takes to be popular, or getting others to like oneself. Athletic/sport competence is related to individuals' perceived competence in their abilities related to sports and outdoor games, whereas physical competence refers to individuals' feelings about their looks (e.g., body, face, hair). The final specific domain examined in Harter's (1985) measure is the behavioural conduct scale, which assesses the extent to which individuals like the way they behave. In addition to the specific domains, and unlike other measures that sum the total of the specific competency domains as a measure, the scale of global self-worth is separate. It quantitatively assesses how much one likes oneself, whether one is happy with oneself as a person, the way life is progressing, and where life is headed. This aspect of the measure is similar to Rosenberg's (1979) unidimensional measure of self-esteem; however, the language has been adapted to be more appropriate for children.

Each of Harter's (1985) six subscales consist of six items and use a structured alternative format in an effort to reduce the influence of social desirability in the responses. With this format, the participant must first decide, of the options provided, which is most like them (e.g., some kids often forget what they learn but other kids can remember things easily- Scholastic Domain). Once they have made that initial decision, they must then decide how accurately the statement they have selected describes them by selecting either '*really true for me,'* or *'sort of true for me.'* A detailed scoring key is employed as each of the 36 items are scored on a 4-point scale from 1 to 4 where 1 represents the lowest level of perceived competence and 4 represents the highest level of

perceived competence. The SPPC incorporates counterbalancing where three questions in each subscale are reversed scored, suggesting that for half of the items the first box reflects low competency and for the other half, the first box reflects high competence. The SPPC has demonstrated strong psychometric properties in a sample of young children (M_{age} = 11.2 yrs.; Muris, Meesters, & Fijen, 2003). The internal consistencies for all subscales are acceptable with alpha coefficients ranging from 0.73-0.81.

Physical Self-Perception Profile. Using the same methodology as Harter's SPPC (1985), Fox and Corbin (1989) developed the Physical Self-Perception Profile (PSPP) with the aim to develop and validate a physical self-perception profile that reflects appropriate self-perception content and allows for tests of hierarchical structuring. This 30-item measure was created to assess significant content that makes up one's self-perception, as well as to investigate the relationship of various dimensions related to the physical self. The PSPP consists of five subscales (i.e., sport competence, perceived bodily attractiveness, perceived physical strength and muscular development, perceived level of physical conditioning and exercise, and physical self-worth), with each subscale having six items. The measure has shown to have relatively high and stable internal consistencies across the subscales, ranging from .81 to .92, in a sample of undergraduate university students (Fox & Corbin, 1989). Although the PSPP is said to be suitable for research examining gender differences in self-perception in a physical setting, it has only been used and has demonstrated acceptable psychometric properties with adult samples (Fox & Corbin, 1989).

Children and Youth Physical Self-Perception Profile. Given the PSPP was only used and validated with adult college students (Fox & Corbin, 1989), Whitehead

(1995) developed the Children and Youth Physical Self-Perception Profile (CY-PSPP; see Appendix B). The purpose of the CY-PSPP research was to bridge the gap created by the PSPP by replicating Fox and Corbin's (1989) adult sample findings with a sample of children. The CY-PSPP consists of six scales (global self-worth, physical self-worth, sport competence, body attractiveness, strength competence, and physical conditioning adequacy) producing a hierarchical model of self-worth (see Figure 3). Each of the six scales consist of six items, scored using a 4-point structured alternative scale. The structured alternative format allows the participant a choice between two statements with one additional decision is to be made, indicating the extent to which the statement accurately describes oneself. A sample item for the sport competence subscale reads, "Some kids do very well at all kinds of sports, but other kids don't feel that they are very good when it comes to sports." A sample item for the body attractiveness subscale reads, "Some kids think that it's hard to keep their bodies looking fit and in good shape, but other kids find it easy to keep their bodies looking fit and in good shape." The perceived strength and muscular development subscale sample reads, "Some kids think they have stronger muscles than other kids their age, but other kids feel that they have weaker muscles than other kids their age." A sample for the physical condition subscale reads, "Some kids don't usually have much fitness and endurance, but other kids always have lots of fitness and endurance." The subscale of physical self-worth is made up of six items, with a sample item reading, "Some kids don't feel very confident about themselves physically, but other kids really feel good about themselves physically." The subscales of CY-PSPP have demonstrated acceptable reliability in a population of 4^{th} and 5^{th} grade children, with alpha coefficients ranging from .77 to .91 (Welk, Corbin, Nann Dowell, &

Harris, 1997). More recently Kolovelonis, Mousouraki, Goudas, and Michalopoulou (2013) supported these findings in a Greek version of the CY-PSPP, wherein the alpha coefficients were acceptable (.75-.88) with a population of young children (grade 5-7).

The CY-PSPP has been touted as the best measure to use when assessing competence in children, and has strong psychometric properties in a population of young children (Welk & Eklund, 2005). The CY-PSPP is also a more precise measure of self-perception than the SPPC, as it specifically examines the domains of physical self-perception. The CY-PSPP has been used in samples of young children in sport and physical education settings (e.g., Hamiwka, Cantell, Crawford, & Clark, 2009; Welk & Eklund, 2005; Whithead, Eklund, & Williams, 2003). Moreover, a significant relationship has been demonstrated between the physical self-perceptions measured by the CY-PSPP and PA levels in boys and girls (Viira, 2011).

Research Examining Children's Competence in Physical Activity

Competence and children's physical activity. As previously noted, competence is a broad term that can be examined in many different domains. In middle-childhood, individuals are able to self-evaluate across multiple domains (Harter, 2012). Further, the physical and motor domains of competence and how they relate to PA levels in children has been examined. More specifically, Bois, Sarrazin, Brustad, Trouilloud, and Cury (2005) examined perceived PA competence in children and found the more a child perceives themselves to be competent in a PA setting, the more likely they will be to participate in PA. As well, researchers have also found that a child's perceived competence influences activity enjoyment and PA involvement (Weiss, 2000). Carroll and Loumidis (2001) supported these findings in a study examining the relationship

between children's (10-11 years) perceived competence in physical education and their enjoyment of the subject, as well as their levels of PA. They found that children with high perceptions of competence, and enjoyment in physical education, reported engaging in significantly more PA outside of school than those who had low perceptions of competence.

Vedul-Kjelsås, Sigmundsson, Stensdotter, and Haga (2012) examined the relationship between motor competence, physical fitness, and self-perception in children as well as how this relationship would differ between genders. Using Harter's (1985) SPPC as a measure of self-perception, a relationship between motor competence, physical fitness, and self-perception in a sample of 6th grade school children was found. When examining gender differences, the aforementioned relationships were only found in boys. These variances may be due to gender differences in motivation or PA participation. Research suggests that boys engage in more PA than girls and therefore may be gaining more developmental opportunities than girls (Chan et al., 2003). Similar to the Bois et al.'s (2005) findings that those with high self-perceptions may engage in more PA, Vedul-Kjelsås et al. (2012) noted the scores on the SPPC were strongly related to the physical fitness scores. It was concluded that motor competence, physical fitness, and self-perception may all impact a child's participation in PA. More recently, these findings were supported when Bai, Chen, Vazou, Welk, and Schaben (2015) examined participants ranging from grade 3 to grade 12, assessing the mediating effect of perceived competence on their PA levels and sedentary behaviours. Perceptions of competence were found to directly and positively relate to PA levels, and negatively relate to sedentary behaviour.

In a longitudinal study, Viira (2011) examined the relationship between physical self-perceptions and moderate-to-vigorous PA in adolescents (grade 8). The participants completed the CY-PSPP to assess their perceived competence in various domains (sport, condition, body, and strength). Boys reported higher sport competence than girls, most likely due to the social desirability associated with sport proficiency. Given that it is socially desirable to be physically competent, Viira noted there may have been a strong tendency for boys to overestimate their sport competence. Further the results added that the competence domains of sport and condition were the strongest predictors of moderate-to-vigorous PA in boys and girls. The author suggested this latter finding was due to the prevalence of kids' involvement in youth sport and the associated requirement for significant conditioning. Viira also concluded that the subdomains in the CY-PSPP were important predictors of PA in early adolescents, and their importance remained stable over time.

Rather than directly examining physical competence and PA, Southall, Okely, and Steele (2004) compared the perceived and actual physical competence of overweight and nonoverweight children. Using a modified version of Harter's (1985) SPPC for the study as a measure of perceived physical competence, overweight children were found to have lower actual and perceived competence levels than nonoverweight children. These findings could be the result of the relationship of actual and perceived competence and PA, suggesting that those with low actual and perceived competence engage in less PA which is associated with weight gain in children (Ferguson, Yesalis, Pomrehn, & Kirkpatrick, 1989; O'Loughlin, Gray-Donald, Paradis, & Meshefedjian, 2000).

Welk and Eklund (2005) used the CY-PSPP to examine the influences of children's (8-12 years) self-perception on PA. Each subscale from the CY-PSPP was found to significantly correlate with PA, suggesting a low to moderate predictive ability for children's PA levels. More recently, researchers have been interested in the differences in physical fitness and sport participation in children (6-9 years) with varying levels of motor competence (Fransen et al., 2014). Children with high motor competence scored higher on the fitness measures and reported participating in more sports more often than those with low competence. Children with low motor competence may be at risk for living a physically inactive lifestyle. The body of competence literature in children, related to PA consistently supports the concept that individuals with high perceptions of competence are more likely to engage in more PA.

Imagery

The benefits of imagery have been noted in the sport (Munroe-Chandler & Hall, 2015; Munroe-Chandler & Hall, 2016), exercise (Hall, 2001), and, more recently, active play (Tobin, Nadalin, Munroe-Chandler, & Hall, 2013) domains. More specifically, researchers have found that imagery has a positive influence on a variety of outcomes including emotional state (Cumming & Stanley, 2009), motivation (Hall, 2001), affect (Hall, 2001), and cognition (Hall, 1995). The most commonly used definition of imagery is:

> an experience that mimics real experience. We can be aware of "seeing" an image, feeling movements as an image, or experiencing an image of smell, tastes, or sounds without actually experiencing the real thing. Sometimes people find that it

> helps to close their eyes. It differs from dreams in that we are awake and conscious when we form an image (White & Hardy, 1998, p. 389).

This definition covers multiple components of imagery, suggesting that it is a deliberate task given that one is awake and conscious when creating an image. Additionally, imagery is multi-sensory, as the individual engages many senses when creating an image, including their sense of smell, taste, touch, and hearing. Hall (2001) suggests that using a multisensory approach to imagery is most effective. Imagery has also been described as "perception without sensation" (Moran, 2004, p. 133) as the senses are activated without any physical stimuli.

Imagery is a skill of which we are all capable and comes naturally to children when learning and acquiring new skills and strategies (Weiss, 1991). Although children younger than seven years of age have been known to use imagery, an individual's imagery ability is not fully developed until age seven (Ashby, 1983). Younger children (7-8 yrs.) report using imagery more spontaneously, whereas older children (9-14 yrs.) report a more deliberate imagery use (Munroe-Chandler, Hall, Fishburne, O, & Hall, 2007).

To date, much of the imagery research in children's motor domain has been with young athletes. More specifically, many sport imagery researchers have investigated the relationship between imagery and confidence and found imagery to be an effective strategy in increasing an athlete's feelings of confidence and self-efficacy (cf. Munroe-Chandler & Morris, 2011). In addition to the positive influence imagery has on one's confidence and self-efficacy, imagery use in sport has also been positively associated with some of the measured components of self-concept (e.g., perceived strength, physical

conditioning; Wright & Smith, 2009). Recently, however, researchers have begun to examine imagery use in children's leisure time physical activity (e.g., Guerrero, Tobin, Munroe-Chandler, & Hall, 2015; Tobin et al., 2017; Tobin et al., 2013). Children were found to use active play imagery, which resulted in increases in intrinsic motivation and levels of active play (Tobin et al., 2017). Of note to this study, children's use of imagery also facilitated the satisfaction of two of the three basic needs (i.e., competency, relatedness) as outlined in the self-determination theory (Tobin et al., 2017). This latter finding is important to further explore because researchers have indicated that in a sample of students (M_{age} = 12.41 yrs.) perceived competence towards PA significantly predicted PA in later years (Timo, Sami, Anthony, & Jarmo, 2016). Additionally, trends in PA and sedentary behaviour, from youth to adulthood, are correlated (Gordon-Larsen, Nelson, & Popkin, 2004; Matton et al., 2006). Therefore with a strategy, like imagery, to regulate a child's competence in various domains, it is possible to not only enhance the PA of youth, but also to increase the number of physically active adults. Furthermore, where Tobin et al. (2017) examined the relationship between active play imagery use and the basic need of competence as an all-encompassing variable, the present study seeks to more specifically examine the domains of physical competence that make up one's self-concept, including global self-worth, physical self-worth, sport competence, body attractiveness, physical strength and physical conditioning.

Children's Imagery Use

In addition to children's imagery use in the motor domain, it is also worth noting that children's imagery use has been explored, and used successfully, in other domains such as learning and academics (D'Zamko & Schwab, 1991; Pressley, 1977), as well as

pre- and post-operation (Huth, Broome, & Good, 2004). The breadth of imagery use by children is not surprising given their cognitive capacity. From Piaget's (1971) stages of cognitive development, it can be noted that as children progress through the four stages of development (sensorimotor, pre-operational, concrete operational, and formal operation) they develop a more distinguished capacity to image. In the first stage of development, the child's experience is based primarily on their physical interaction with their environment. Although it is very simplistic and they are unable to manipulate the images, it is in the pre-operational stage that a child develops the cognitive capacity to create images and use their imagination. This is supported in developmental research by Rieser, Garing, and Young (1994) who found that preschoolers are able to use imagery to imagine the location of an object in another room. Additionally, young children were successful in using imagery in a problem solving situation (Joh, Jaswal, & Keen, 2010). As a child progresses into the concrete operational stage, they begin to develop the capacity think operationally, and to manipulate their images. However, when considering a child's imagery ability, Estes (1998) found that by six years of age, a child can successfully rotate a mental image. Molina, Tijus, and Jouen (2008) added that at age five there is no relationship between a child's images and actual action, whereas at age seven, a relationship can be found, suggesting that children are able to construct images of actual action.

Theories and Frameworks of Imagery

Throughout the years, many theories have been advanced to explain how imagery works. Some of the foundational theories of mental imagery (e.g., psychoneuromuscular, symbolic learning theory) were developed with the purpose of explaining how mental

practice may work, and therefore they are classified in a model of mental practice (Murphy, 1990). As a result, the theories and models outlined in this section will explain how imagery can influence performance and psychological variables (e.g., affect and cognition; Morris, Spittle, & Watt, 2005). The following section will describe three cognitive theories of imagery, including the bioinformational theory, the triple-code theory (ISM), and the dual-code theory.

Bioinformational theory. Lang's (1979) bioinformational theory is founded on three very diverse areas of knowledge. It draws from the fields of psychophysiology, cognitive psychology, and behavioural therapy. The field of psychophysiology provides evidence that there is a mind and body connection, whereas the fields of cognitive psychology and behavioural therapy incorporated the information processing approach. The bioinformational theory suggests that concepts are nodes linked to other concepts and therefore are not stored in isolation (Kieras, 1978). In fact, even a single word concept can lead to a network of information. Logical relationships between concepts are known as propositions, which are processed to create an image in the mind. The theory also proposes that the more elaborate a verbal description, within the processing capacity of an individual, the more vivid the image will be. Lang states that each image involves stimulus proposition and response propositions. Stimulus propositions are related to contextual or environmental characteristics. Take, for instance, a child who creates an image of playing with friends. The stimulus propositions might determine whether the image is indoors, or outdoors at a park. It may also determine how many friends are there, and whether it is raining or not. Response propositions are part of an active behavioural, cognitive, and physiological response process, whereby the individual

creating the image will elicit a response to the stimulus similar to how they would respond in the same real-life situation (e.g., a child imaging him/herself playing with friends may be sweating, or out of breath representing normal physiological response to activity). The degree to which the individual experiences a physiological response to their image, provides an estimate of image vividness. Researchers suggest that imagery scripts containing both stimulus and response propositions result in a more effective intervention (Smith, Holmes, Whitemore, Collins, & Davenport, 2001). This is believed to occur as the brain processes the response propositions, resulting in repeated access to, and therefore the strengthening of, motor programs. Supporting Lang's suggestion that the more elaborate a verbal descriptions, or the more propositions offered in a script, the more vivid the image will be. A strength of the bioinformational theory is the suggested multi-dimensionality of the images. The theory presents that images encompasses more than just contextual information. The added dimension of behavioural and affective responses has been shown to create more effective imagery interventions (Smith et al., 2001).

The triple-code theory (ISM). In Ahsen's (1984) triple-code theory, the creation of an image is an isolated event, in which three specific components are involved: the image (I) itself, the somatic response (S), and the meaning (M) of the image. First, the image, which is described as an internal consciousness that contains the same sensory activation of a real-life experience. Second, the somatic response suggests that creating an image results in a response in the nervous system, causing emotional and physical changes in the body. Finally, the meaning of the image represents the significance of the image created, to the individual. Ahsen believes that each individual has circumstances or

backgrounds that can alter the meaning of their images and ultimately influence their imagery experience. Therefore, two individuals who received the same imagery script can have entirely different experiences. Although the meaning of the image is often omitted by researchers, it is important as individuals are able to use imagery of the same activity for different purposes and achieve different outcomes. One long distance runner might image him/herself persevering through muscle fatigue or shortness of breath, resulting in enhanced performance by increasing their self-confidence. Another runner in the same discipline might image the technical aspects of the race strategy, improving their performance by improving their response readiness. The meaning component of an image is what differentiates this theory from others, and is something that must be closely monitored, as it can be problematic depending on the unique history the athlete brings into the image. According to the triple-code theory, to make scripts effective, they should be specific to the outcome and the imaged event should be significant, causing a desired behavioural response leading to enhanced performance.

The dual-code theory. Paivio's (1971) theory stems from an assumption that there are two distinct symbolic systems at work for memory and cognition. One of these systems is described as being responsible for processing verbal information, whereas the other is said to deal with nonverbal information (Paivio, 1971). Although the systems are distinct and able to work independently, it is also suggested that they are interconnected, and have the ability to work together. This suggests that stimuli activating one of the systems, may also activate the other (Paivio & Lambert, 1981). The dual-code theory suggests that images are more effective in learning because they are more likely than words, to be coded by both systems creating both, verbal traces and nonverbal codes. The

interconnectedness can be observed through cognitive processes as an individual is able to create an image and describe it in words. Thus, the interconnectedness of the symbolic systems is believed to enhance an individual's recall performance. For example, when both symbolic systems are activated by an image, it is assumed that if one code is forgotten, the individual may still recall the other code, allowing for enhanced recall. In research by Paivio and Csapo (1973), they demonstrated that recall performance was superior when participants were once-presented an image compared to those once-presented words. Furthermore, they added that there is an additional recall enhancement when the stimuli were presented in combination as image and word repetition.

Theory limitations. Although Lang's (1979) bioinformational theory, Ahsen's (1984) triple-code theory, and Paivio's (1971) dual-code theory are valuable foundations to imagery, they do present limitations. In a review of imagery theories, Hall (2001) noted that the aforementioned theories have neglected the different types of sport imagery. Additionally, Murphy and Martin (2002) reported that Lang's (1979) and Ahsen's (1984) theories fail to offer guidance to athletes on how to apply this knowledge above and beyond simple rehearsal. A major point of criticism for Paivio's (1971) dual-code theory is that it relates to a very narrow component of imagery, where situations where relational information is the focus, such as in paired associate learning (Marschark & Hunt, 1989). In these cases, individuals may be making connections between a word and its definition.

Analytic framework of imagery. A framework is an outline or plan made up of various components (Sabatier, 2007). Although a framework does not provide explanations, it is important as it is the foundation of the research area, and helps

researchers describe variables and relationships by fitting them into categories (Frankfort-Nachmias & Nachmias, 1996). The primary goal of a framework is to identify factors that may influence the outcome variable (Nilsen, 2015). In this case, the foundation of imagery research is the analytic framework. It has guided research and applied interventions for over 25 years. In Paivio's (1985) analytic framework, imagery is believed to serve two main functions: cognitive and motivational. Further, these functions operate at either a specific or general level. Cognitive specific (CS) imagery encompasses specific images about a given motor skill (e.g., free throw in basketball), whereas cognitive general (CG) imagery relates to technical aspects of a skill including strategies or routines (e.g., fast break in basketball). Motivational specific (MS) images pertain to the achievement of individual goals (e.g., winning a championship), whereas motivational general (MG) imagery refers to an individual's arousal state related to performance (e.g., excitement of scoring an overtime goal). As a result of the various functions and levels of imagery in this framework, researchers have used it as a foundation for an abundance of research on performance outcomes (Callow & Hardy, 2001; Mills, Munroe, & Hall, 2000). Furthermore, researchers have suggested that in order for imagery to be effective, the content must match the desired outcomes (Denis, 1985). Thus, an individual wanting to enhance their confidence, should image being confident (Moritz, Hall, Martin, & Vadocz, 1996).

In a review by Martin, Moritz, and Hall (1999), three significant limitations of Paivio's (1985) analytic framework were discussed. They began by suggesting that some research (Hall, Mack, Paivio, & Hausenblas, 1998; White & Hardy, 1998) points to the possibility that people are able to use more types (or functions) of imagery than the types

accounted for in Paivio's (1985) framework. They also noted that the framework fails to include personal or contextual factors such as imagery ability or environmental context which may impact the type of imagery used. Additionally, the review suggests that the framework does not provide predictions that would indicate which specific type of imagery may lead to cognitive and motivational changes. Collectively, these three significant limitations to Paivio's (1985) analytic framework discount its predictive ability, as there are no clear relationships linking imagery type to a desired performance outcome (Martin et al., 1999).

In response to the limitations outlined in Paivio's (1985) analytic framework, Hall et al. (1998) expanded the framework to include additional imagery types (see Figure 4). It is important to acknowledge the similarities between Paivio's (1985) initial framework and Hall et al.'s (1998) amended framework. The two main functions of imagery (cognitive and motivational) remain the same. The levels (specific or general) at which the cognitive function can be found remain the same. The cognitive types both CS and CG, as well as, MS are also the same. The differences arise in the motivational function of imagery at the general level where it was further divided into motivational general-arousal (MG-A) and motivational general-mastery (MG-M). MG-A images refer to images of emotional experiences, where stress or arousal may be involved. MG-M images refer to images of coping and overcoming a challenging situation.

Measurement of Imagery Use

Given that imagery is a skill that cannot be observed, researchers have aimed to develop effective measures (Perry & Morris, 1995). However, the likelihood of an all-purpose measure is limited due to the significant cognitive activity in the process of

imagery (Anderson, 1980). Despite the limitation of measuring imagery, several imagery frequency measures have strong psychometric properties (Munroe-Chandler & Morris, 2011).

Imagery frequency is one of the most commonly used imagery measures (Morris et al., 2005). Given that the majority of imagery research is based on Paivio's (1985) analytic framework, suggesting that imagery has two main functions (cognitive and motivational) and can operate at either a specific or general level, Hall et al. (1998) developed the Sport Imagery Questionnaire (SIQ) with this framework in mind. The SIQ is a measure of imagery frequency comprised of 30 items measuring each the five functions of imagery (CS, CG, MS, MG-A, MG-M; Hall et al., 1998). All items are rated on a 7-point Likert scale with 1 (*rarely*) to 7 (*often*) to describe the use of the specific imagery function. A sample item for the CS subscale reads, "I can easily change an image of a skill." A sample item for the CG subscale reads, "I make up new plans/strategies in my head." For the MS subscale, a sample item reads, "I image the audience applauding my performance." A sample item for the MG-A subscale reads, "I imagine the excitement associated with competing." A sample item for the MG-M subscale reads, "I image giving 100% during an event/game." The SIQ is a valid (Hall, Stevens, & Paivio, 2005) and reliable questionnaire with internal consistencies ranging from .70-.89 (Hall et al., 2005).

Following the research findings that have identified imagery frequency as a valuable measure of imagery use in adult athletes, Hall, Munroe-Chandler, Fishburne, and Hall (2009) developed the Sport Imagery Questionnaire for Children (SIQ-C) in order to reliably assess the frequency of imagery use in young athletes. The measure

consists of 21 items scored on a 5-point Likert scale from 1 (*not at all*) to 5 (*very often*), assessing all previously noted five functions of imagery. Acceptable internal consistencies were found for the subscales of CS (.83), CG (.73), and MG-M (.79), whereas the MS (.68) and MG-A (.69) subscales neared the acceptable range of .70 (Munroe-Chandler, Hall, & Fishburne, 2008; Nunnally & Bernstein, 1994). Example items include, for the CS subscale, "I can usually control how a skill looks in my head," for CG, "I make up new game plans or routines in my head," for MS, "I see myself doing my very best," for MG-A, "In my head, I imagine how calm I feel before I compete," and for MG-M, "I imagine myself being confident in competition."

More recently, the Children's Active Play Imagery Questionnaire (CAPIQ; see Appendix A) was developed (Cooke, Munroe-Chandler, Hall, Tobin, & Guerrero, 2014) to assess the frequency of imagery use in children during their active play, which is defined as unstructured PA that takes place in their free time (Veitch, Salmon, & Ball, 2008). The measure consists of 11 items, each rated on a 5-point Likert scale from 1 (*not at all*) to 5 (*very often*), assessing one of the three subscales (capability 4 items, fun 3 items, and social 4 items). Capability imagery is imaging movements of the body, and a sample item is, "When thinking about active play, I imagine how my body moves." Fun imagery refers to enjoyment or satisfaction with an activity, with a sample item reading, "When thinking about active play, I imagine the fun I have." Social imagery is creating images of playing alone or with others, with a sample item reading, "When thinking about active play, I imagine joining in with others." Alpha coefficients (> .70; Nunnally & Bernstein, 1994) have demonstrated acceptable internal consistencies for all three subscales (Cooke et al., 2014).

Research Examining Children's Imagery Use

The following section provides an overview of the research examining children's imagery use. It is divided into three sections. The first provides a general overview, based on the cognitive literature, of children's imagery use in sport, whereas the second section provides an overview of children's use of imagery in active play, and the third section outlines the research on children's competence and imagery use.

Children's imagery use in sport. Imagery is one of the most frequently used psychological skills by athletes and coaches in sport (Cumming & Williams, 2013). Early imagery research in youth sport was conducted by Rodgers, Hall, and Buckolz (1991) wherein they examined the effect of a 16-week imagery training program on two groups (imagery training or verbal training) of figure skaters (M_{age} = 13.7 yrs.). Skaters in the imagery group improved in visual and kinesthetic imagery ability more than the other group. Moreover, individuals with a higher imagery ability used imagery more effectively. Conversely, those who increased their imagery use reported enhanced imagery ability. Later, Li-Wei, Qi-Wei, Orlick, and Zitzelsberger (1992) examined the appropriateness of mental training (imagery) in young (7-10 yrs.) tennis players. They found that table tennis players who used imagery reported greater increases in shot accuracy and technical quality of shots compared to the comparison groups. These findings suggest that imagery can be used appropriately as a psychological skill in young athletes.

Munroe-Chandler and her colleagues (Munroe-Chandler et al., 2007; Munroe-Chandler, Hall, Fishburne, & Strachan, 2007) were some of the first researchers to qualitatively examine children's use of imagery in sport from a developmental

perspective. Using a focus group methodology, they examined *where*, *when*, *why*, and *what* young athletes in four age cohorts (7-8 yrs., 9-10 yrs., 11-12 yrs., and 13-14 yrs.) image. Given that Piaget (1971) identified stages of cognitive development, the authors believed it possible for different age cohort of young athletes to use imagery in different situations and for different reasons. For the *where* of imagery use, athletes reported using imagery in competition and to a lesser extent in training. Further, the youngest cohort (7-8 yrs.) appeared more restricted in their imagery use than their older counterparts, as they did not report using imagery post-competition or in situations outside of practice.

The qualitative findings for *why* athletes use imagery (Munroe-Chandler et al., 2007) seem to mirror that of adults as they use imagery for all five functions (CS, CG, MS, MG-A, MG-M). These findings support the use of Paivio's (1985) framework as a guide to provide young athletes with reasons for using imagery. More specifically, although all age cohorts reported using cognitive imagery, the younger cohorts reported using less motivational imagery related to arousal or mastery than the older participants. Additionally, all participants reported using imagery for outcome and performance goals. However, the younger cohorts only reported imaging individual performance and outcome goals compared to their older counterparts who reported imagining both individual and team performance and outcome goals.

With respect to *what* athletes were imaging, or the content of their images, Munroe-Chandler and her colleagues (Munroe-Chandler et al., 2007) noted five major themes emerging from the focus groups. They included imagery sessions, the effectiveness, nature and type of imagery, as well as, the surroundings. Several age differences were noted such that the older (11-14 yrs.) participants reported all five

content categories, whereas the younger (7-10 yrs.) participants did not. Participants in the 9-10 age category failed to discuss the nature of their images. Additionally, the older (11-14 yrs.) participants reported engaging in structured or deliberate imagery sessions. Further, all participants reported using visual and auditory imagery, whereas only the older cohort (11-14 yrs.) reported using kinesthetic imagery and imagery in slow motion.

Although minimal gender differences have been noted in adult athletes' imagery use (Hall, 2001), several gender differences did emerge from Munroe-Chandler and colleagues' (Munroe-Chandler, Hall, Fishburne, O, & Hall, 2007; Munroe-Chandler, Hall, Fishburne, & Strachan, 2007) qualitative studies. Boys did not report using MG-A imagery, whereas girls reported using this function of imagery as a means to cope with arousal and anxiety, and older girls used it for relaxation and excitement. Moreover, the younger (7-10 yrs.) boys did not report any planned imagery sessions.

Based on the qualitative work suggesting that all athletes engage in cognitive and motivational imagery, and on Paivio's (1985) framework, studies have been conducted to examine the effectiveness of targeted imagery interventions in young athletes. In one study, the effectiveness of a 7-week CG intervention on elite female soccer players from an Under-13 team was examined (Munroe-Chandler, Hall, Fishburne, & Shannon, 2005). Participants reported increases in CS and CG imagery from baseline to post-intervention. A more recent study examined the effectiveness of an individualized MG-M imagery intervention on young squash players' self-efficacy (O, Munroe-Chandler, Hall, & Hall, 2014). The findings indicated that the imagery intervention had a facilitative effect on self-efficacy in three of the five athletes. Further, participants who reported the greatest

increases in self-efficacy were those who had the greatest increase in MG-M use over the intervention, suggesting the possibility of a dose-response relationship.

Investigators have also examined the effects of an MG-M imagery intervention on sport confidence in elite youth (M_{age} = 15 yrs.) badminton players (Callow, Hardy, & Hall, 2001). Over 24 weeks, the participants engaged in six imagery session. Their sport confidence data were collected prior to each badminton match, and their use of imagery was assessed before and during the study. Mixed findings were reported wherein two participants demonstrated a significant facilitative effect, one a significant debilitative effect, and one participant reported a delayed facilitative effect. In a subsequent study, Munroe-Chandler, Hall, and Fishburne (2008) found that, regardless of the level of competition, MG-M imagery accounted for between 40% and 57% of the variance in male and female youth soccer players (11-14 yrs.) and thus predicted both self-confidence and self-efficacy. This suggests that, when trying to improve their self-confidence, young athletes should consider emphasizing the MG-M function of imagery.

Taken together the results from the youth sport imagery field suggest that all young athletes, regardless of age (7 yrs. and older), use imagery and that often its use is similar to their adult counterparts. Further, young athletes' ability improves with age and practice, such that those young athletes who use more imagery see more benefit than those who use less imagery.

Children's imagery use in active play. Children can accumulate PA by engaging in structured activities such as playing on a sport team or in a physical education class. They can also accumulate PA in unstructured activities. When a child engages in unstructured activities in their free time, this is known as active play (Veitch et al., 2008).

This differs from adults in that when adults engage in unstructured PA during their free time it is often referred to as exercise. Typically, children choose less structured activities than exercise and when they engage in PA, they generally do not desire an outcome of improved physical fitness (Caspersen, Powell, & Christenson, 1985; Veitch et al., 2008). In the exercise domain, the benefits of adult exercisers' imagery use have been well established (Hall, 2001; Munroe-Chandler & Gammage, 1995). However, there has been scant research examining children's imagery use during their unstructured PA (i.e., active play).

Researchers have qualitatively examined whether children use imagery during their active play, and more specifically how active play imagery was related to Deci and Ryan's (2002) three basic psychological needs (i.e., competence, relatedness, and autonomy; Tobin et al., 2013). After conducting 23 focus groups with 104 male and female participants, children reported using active play imagery, and their use of active play imagery supported the satisfaction of the three basic needs. Similar to previous research examining imagery use in young athletes (Munroe-Chandler et al., 2007), narrow and distinct age groups were employed (7-8 yrs., 9-10 yrs., 11-12 yrs., 13-14 yrs.). No age or gender differences in active play imagery emerged to satisfy the basic need of autonomy. However, age differences were found for both relatedness and competence. In terms of relatedness, the older participants (11-14 yrs.) did not always report images associated with others; at times they created images of themselves playing alone. In addition, this age group appeared to emphasize the basic need for competence, related to improving skills, strategies, and increasing their confidence in active play activities.

More recently, the relationship between the three types of active play imagery (fun, social, and capability) and the three basic psychological needs has been quantitatively examined (Tobin et al., 2017). Positive relationships between capability imagery and the need for competence, social imagery and the need for relatedness, and fun imagery and the need for competence were found. Deci and Ryan (2002) suggest that the three basic needs are vital in the psychological growth and well-being of individuals and that the satisfaction of the basic needs enhances an individual's intrinsic motivation (i.e., engaging in a behaviour due to inherent enjoyment; Deci & Ryan, 1985). Furthermore, higher levels of intrinsic motivation are associated with higher levels of PA (Sweet, Fortier, & Blanchard, 2014). These findings provide valuable information for developing imagery interventions that target the basic psychological needs to enhance intrinsic motivation, which may increase a child's desire to be active (Tobin et al., 2013).

Given that qualitative research has supported the use of the three types of active play imagery (fun, social, and capability) and the relationship between the three types of imagery and the three basic psychological needs (competence, relatedness, and autonomy), Cooke et al. (2014) developed an instrument (CAPIQ) to assess imagery use during children's active play. This newly developed 11-item measure allows for the identification of the prominent imagery types used during children's active play.

Guerrero et al. (2015) used the CAPIQ to examine the effects of a guided imagery intervention on children's active play. Following a six-week imagery intervention, significant differences in the imagery and control groups' levels of active play were found. More specifically, the control group's levels of active play significantly decreased from pre- to post-intervention whereas the imagery group's levels remained constant.

This finding suggests that active play imagery may be used as a strategy to maintain levels of active play, or to cope with barriers such as weather related variables.

The active play imagery research findings suggest that imagery is a valuable psychological skill that children report using in their free play as early as seven years old (Molina et al., 2008; Tobin et al., 2013). Further, children who engage in active play imagery are more consistently able to cope with barriers to play, more intrinsically motivated and better able to maintain their PA levels over time compared to children who do not use imagery in active play (Cooke et al., 2014; Guerrero et al., 2015). As such, imagery use in active play should be promoted, and children should be encouraged to image themselves playing, having fun, and enjoying what they are doing (Guerrero et al., 2015). Engaging in capability, fun, and social imagery can allow children to independently satisfy their basic needs (Tobin et al., 2017).

Children's imagery use and competence. Given Harter's (2012) statement that competence in children is domain specific, the relationship between imagery use and competence in various domains (e.g., learning and academics, societal and active play) has been examined. In an academic setting, Silvestri, Dantonio, and Eason (1994) examined the effects of a self-development program and relaxation/imagery training on aspects of competence in fourth grade classes of economically at-risk students. The results indicated that both the development program and the relaxation/imagery training influenced the competence scores compared to the control group. The relaxation/imagery group had high scores in sport competence and physical appearance competence, suggesting that relaxation/imagery may be an effective strategy to enhance a child's self-esteem and physical competence. Also in an academic setting, Pirrone and Di Nuovo

(2014) examined the relationship between competence in building blocks, mental imagery, and math abilities of students in grades 4 and 5. Imagery was found to be positively associated with competence in mathematics. More recently Mol, Jolles, Van Batenburg-Eddes, and Bult (2015) have expanded the literature in the academic setting by examining the relationship between imagery and reading competence in children (M_{age} = 13.4 yrs.). A positive relationship was found between perceived competence and imagery. Slight gender differences emerged as girls' reading competence was found to be related to imagery and the number of books read, whereas boys' reading competence was related to mental imagery and having a favourite book. More specifically, imagery uniquely explained 5% of the variance in perceived reading competence for girls and 10% for boys. Thus, reading competence can improve by enhancing their imagery (Mol et al., 2015).

Farrar, Stopa, and Turner (2015) examined the impact of positive and negative self-imagery on self-concept and self-esteem in individuals with high body dissatisfaction. The participants were divided into two groups where 33 (M_{age} = 19.73 yrs.) completed negative self-imagery tasks and 33 (M_{age} = 20.18 yrs.) completed positive self-imagery tasks. Positive imagery use was found to influence an individual's self-esteem, whereas negative imagery use was found to decrease self-concept. Imagery was also found to influence an individual's body satisfaction, whereby participants in the positive imagery group reported increases in body satisfaction, whereas those in the negative imagery group reported decreases. These findings suggest that imagery interventions, designed to promote positive imagery, and used in a population of young

adults with high body dissatisfaction, may enhance the working self, body satisfaction, and affect.

Given the importance of perceived competence in children, and it's influence on their engagement and satisfaction with PA, the current study examined relationships between children's use of actve play imagery and domains of physical competence. In doing so, various domains of physical competence were assessed, with the hope of developing targeted imagery interventions.

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FIGURES

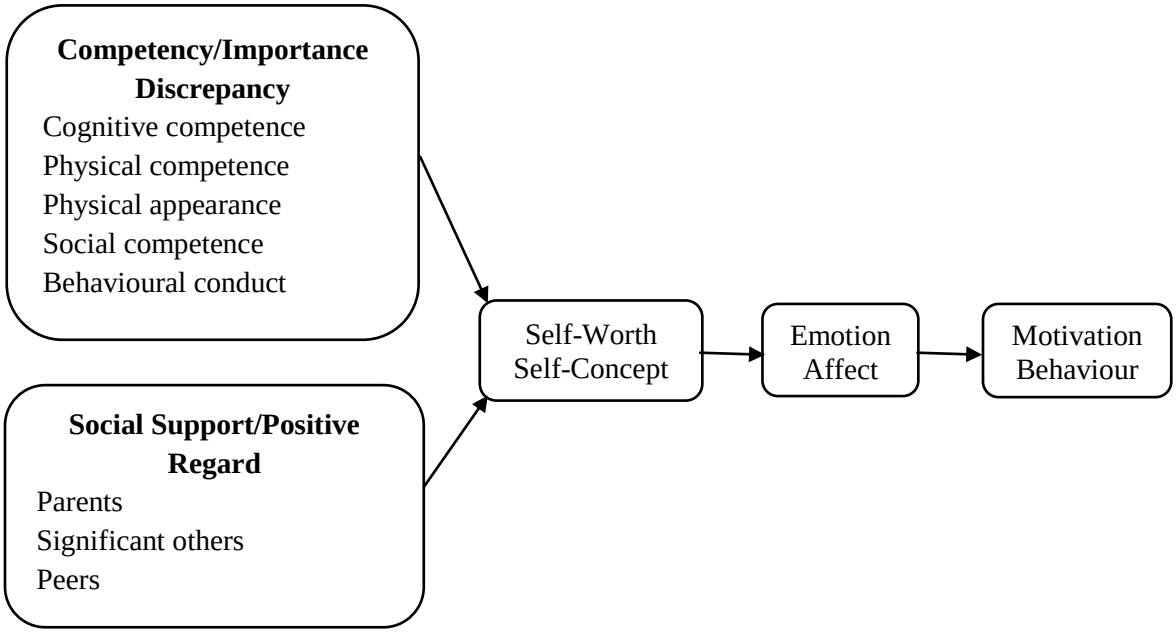

Figure 1. Mediational model of self-worth. Adapted from Harter, S. (1987), The determinants and mediational role of self-esteem in children. In N. Eisenberg (Ed.), *Contemporary topics in developmental psychology* (p. 223). New York: John Wiley & Sons, Inc. Copyright by John Wiley & Sons.

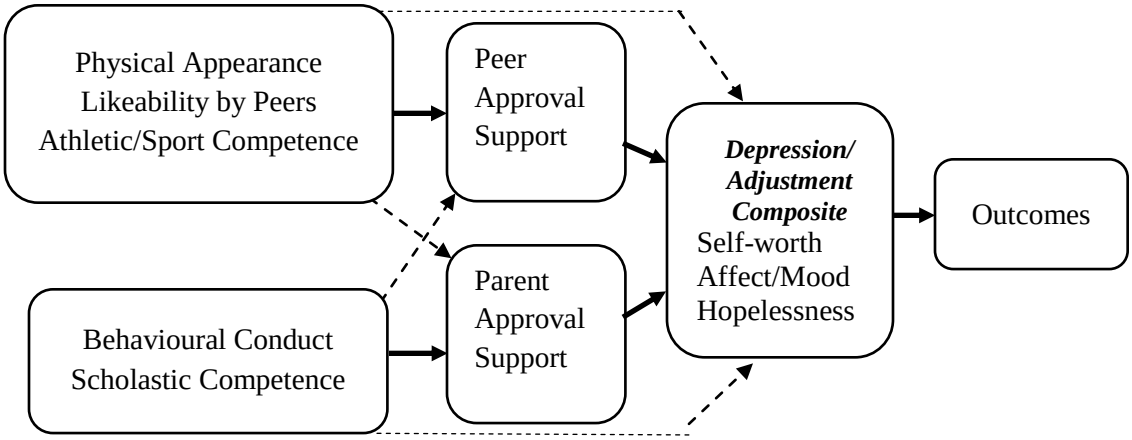

Figure 2. General model of the predictors of depression/adjustment. Adapted from Harter, S. (1999), *The construction of self: A developmental perspective.* New York: Guilford Press, p. 199. Copyright by Guilford Press.

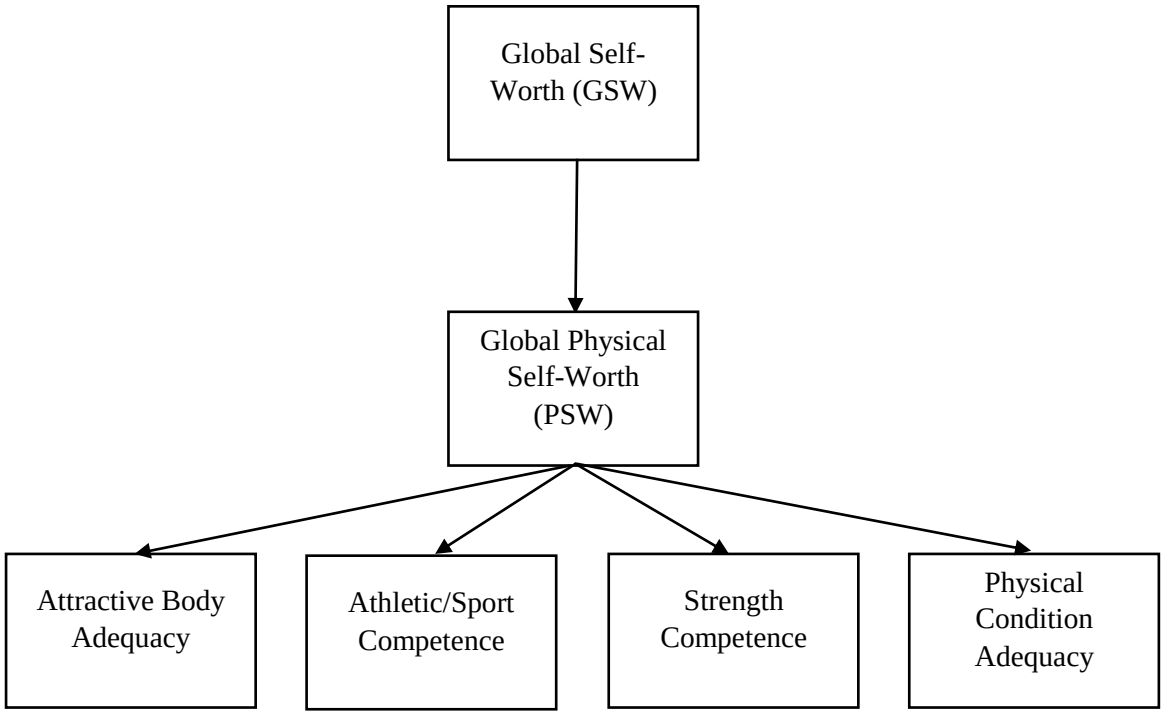

Figure 3. Structural models of the CY-PSPP. Adapted from "Validity of the Children and Youth Physical Self-Perception Profile: A Confirmatory Factor Analysis," by R. C. Eklund, J. R. Whitehead, and G. J. Welk, *Research Quarterly for Exercise and Sport, 68,* p. 250.

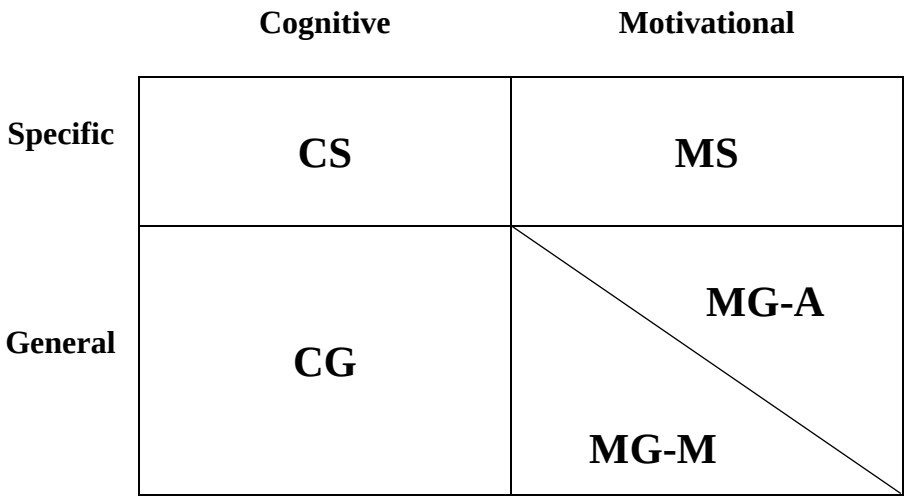

Figure 4. Paivio's analytic framework, amended by Hall. Adapted from Hall, C. R., Mack, D. E., Paivio, A., & Hausenblas, H. A. (1998). Imagery use by athletes: Development of the Sport Imagery Questionnaire. *International Journal of Sport Psychology, 29*(1), p. 74.

APPENDIX A

Children's Active Play Imagery Questionnaire

(Cooke, Munroe-Chandler, Hall, Tobin, & Guerrero, 2013)

Remember: *Active play* is something you do during your free time. For example, *active play* can be riding your bike, ice skating, dancing, playing tag, tobogganing, kicking a ball, or going swimming.

Statement	Not at All	A Little Bit	Sometimes	Often	Very Often
1) When thinking about active play, I imagine the moves that are needed	1	2	3	4	5
2) When thinking about active play, I imagine joining in with others	1	2	3	4	5
3) When thinking about active play, I picture myself having fun.	1	2	3	4	5
4) When thinking about active play, I imagine the positions of my body.	1	2	3	4	5
5) When thinking about active play, I see myself with my friends.	1	2	3	4	5
6) When thinking about active play, I imagine the fun I have.	1	2	3	4	5
7) When thinking about active play, I picture myself doing it in a group.	1	2	3	4	5
8) When thinking about active play, I imagine enjoying myself.	1	2	3	4	5
9) When thinking about active play, I imagine the movements that my body makes.	1	2	3	4	5
10) When thinking about active play, I imagine my friends with me.	1	2	3	4	5
11) When thinking about active play, I imagine how my body moves.	1	2	3	4	5

Appendix B

Children and Youth Physical Self-Perception Profile

(Whitehead, 1995)

Instructions

First, read the two statements and pick one that ***best*** describes you. When you've done that, then select the response that is most right for you – really true for me or sort of true for me.

So for each item you have four choices. After you have made your choice, you will have ticked **only one box per item**. For example,

	Really True for me	Sort of True for me	*SAMPLE SENTENCE*			Sort of True for me	Really True for me
a			Some kids would rather play outdoors in their spare time.	BUT	Other kids would rather watch T.V.		
1			Some kids do very well at all kinds of sports.	BUT	Other kids ***don't*** feel that they are very good when it comes to sports.		
2			Some kids don't feel that they are very physically fit.	BUT	Other kids feel that they always have excellent fitness.		
3			Some kids feel that they have a good looking body compared to other kids.	BUT	Other kids feel that compared to most their body ***doesn't*** look so good.		
4			Some kids feel that they are stronger than other kids of their age.	BUT	Other kids feel that they ***lack*** strength compared to others of their age.		
5			Some kids are ***proud*** of themselves physically.	BUT	Other kids don't have much to be proud of physically.		
6			Some kids wish they could be a lot better at sports.	BUT	Other kids feel that they are good enough at sports.		
7			Some kids try to take part in energetic physical exercise whenever they can.	BUT	Other kids try to ***avoid*** doing exercise if they can.		
8			Some kids think that it's ***hard*** to keep their bodies looking fit and in good shape.	BUT	Other kids find it easy to keep their bodies looking fit and in good shape.		

	Really True for me	Sort of True for me				Sort of True for me	Really True for me
9			Some kids think they have stronger muscles than other kids their age.	BUT	Other kids feel that they have weaker muscles than other kids their age.		
10			Some kids are *happy* with how they are and what they can do physically.	BUT	Other kids are ***unhappy*** with how they are and what they can do physically.		
11			Some kids think they could do well at just about any new sports activity they haven't tried before.	BUT	Other kids are afraid they might ***not*** do well at sports they haven't ever tried.		
12			Some kids ***don't*** usually have much fitness and endurance.	BUT	Other kids always have lots of fitness and endurance.		
13			Some kids think that their bodies ***don't*** look good in just shorts and t-shirt.	BUT	Other kids feel that their bodies look fine in just short and t-shirt.		
14			When strong muscles are needed, some kids are the ***first*** to step forward.	BUT	Other kids are the ***last*** to step forward when strong muscles are needed.		
15			Some kids ***don't*** feel very confident about themselves physically.	BUT	Other kids really feel good about themselves physically.		
16			Some kids feel that they are ***better*** than others their age at sports.	BUT	Other kids don't feel that they can play so well.		
17			Some kids feel ***uneasy*** when it comes to exercising for fitness.	BUT	Other kids feel confident when it comes to doing fitness exercises.		

	Really True for me	Sort of True for me				Sort of True for me	Really True for me
18			Some kids feel that they are ***often*** admired for their fit, good-looking bodies.	BUT	Other kids feel that they are ***rarely*** admired for the way their bodies look.		
19			Some kids *lack* confidence when it comes to strength activities.	BUT	Other kids are very confident when it comes to strength activities.		
20			Some kids have a positive feeling about themselves physically.	BUT	Other kids feel somewhat negative about themselves physically.		
21			In games and sport some kids usually watch instead of play.	BUT	Other kids usually ***play*** rather than watch.		
22			Some kids feel confident about being able to do enough exercise to stay very fit.	BUT	Other kids ***don't*** feel confident about doing enough exercise to keep fit.		
23			Some kids think that compared to others their bodies ***don't*** look in good shape physically.	BUT	Other kids feel that their bodies look in great shape compared to others.		
24			Some kids think that they are strong, and have good muscles compared to other kids their age.	BUT	Other kids feel that they are weaker, and don't have such good muscles as other kids their age.		
25			Some kids wish that they could feel better about themselves physically.	BUT	Other kids ***always*** seem to feel good about themselves physically.		
26			Some kids ***don't*** do well at new outdoor games.	BUT	Other kids are good at new games right away.		

	Really True for me	Sort of True for me				Sort of True for me	Really True for me
27			Some kids think that they can always do more exercise than other kids their age.	BUT	Other kids feel that they ***couldn't*** do as much exercise as other kids their age.		
28			Some kids are ***happy*** about the appearance of their bodies.	BUT	Other kids wish that their bodies looked in better shape.		
29			Some kids feel that they are ***not*** as good as others when physical strength is needed.	BUT	Other kids feel that they are among the ***best*** when physical strength is needed.		
30			Some kids are very ***satisfied*** with themselves physically.	BUT	Other kids are often ***dissatisfied*** with themselves physically.		
31			Some kids are often unhappy with themselves.	BUT	Other kids are pretty ***pleased*** with themselves.		
32			Some kids ***don't*** like the way they are leading their life.	BUT	Other kids ***do*** like the way they are leading their life.		
33			Some kids are ***happy*** with themselves as a person.	BUT	Other kids are often ***not*** happy with themselves as a person.		
34			Some kids ***like*** the kind of person they are.	BUT	Other kids often wish they were someone else.		
35			Some kids are very ***happy*** being the way they are.	BUT	Other kids wish they were different.		
36			Some kids are not very happy with the way they do a lot of things.	BUT	Other kids think the way they do things is *fine*.		

APPENDIX C

Letter of Permission for Conducting Research (YMCA)

Examining the Relationship between Active Play Imagery and Physical Competence in Children

PURPOSE OF THE STUDY
The purpose of the present study is to: a) examine the relationship between active play imagery and physical competence and, b) investigate the relationship between active play imagery and the domains of self-concept with children 9-12 years old.

POTENTIAL RISKS AND DISCOMFORTS
There are no perceived risks associated with participation in this study.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY
The information gained from this study may be used in further research studies exploring children's imagery of active play. Further, the researchers may gain valuable insight regarding how children's active play imagery is related to their physical competence and self-concept.

RIGHTS OF RESEARCH SUBJECTS
The parent and/or child may withdraw their consent at any time and discontinue participation without penalty. If you, the child and/or parent(s) or guardian(s) have any questions regarding the rights as a research subject, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario, N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

SIGNATURE OF VENUE CONTACT/LOCATION REPRESENTATIVE
I understand the information provided and purpose for the study, **to a) examine the relationship between active play imagery and physical competence and, b) investigate the relationship between active play imagery and the various domains of self-concept with children 9-12 years old,** as described herein. I permit the use of my facility for the recruitment of participants and agree to support my consent to potential subjects. I understand I have the right to discontinue involvement in the study, and the researcher will no longer utilize my venue. I have been given a copy of this form.

Catherine Scandale
Name of Venue Contact

Telephone Number

Signature of Venue Contact

25 May 16.
Date

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

Signature of Investigator

May 25, 2016
Date

APPENDIX D

Letter of Permission for Conducting Research (Lancer Camps)

Examining the Relationship between Active Play Imagery and Physical Competence in Children

PURPOSE OF THE STUDY
The purpose of the present study is to: a) examine the relationship between active play imagery and physical competence and, b) investigate the relationship between active play imagery and the domains of self-concept with children 9-12 years old.

POTENTIAL RISKS AND DISCOMFORTS
There are no perceived risks associated with participation in this study.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY
The information gained from this study may be used in further research studies exploring children's imagery of active play. Further, the researchers may gain valuable insight regarding how children's active play imagery is related to their physical competence and self-concept.

RIGHTS OF RESEARCH SUBJECTS
The parent and/or child may withdraw their consent at any time and discontinue participation without penalty. If you, the child and/or parent(s) or guardian(s) have any questions regarding the rights as a research subject, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario, N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

SIGNATURE OF VENUE CONTACT/LOCATION REPRESENTATIVE
I understand the information provided and purpose for the study, **to a) examine the relationship between active play imagery and physical competence and, b) investigate the relationship between active play imagery and the various domains of self-concept with children 9-12 years old,** as described herein. I permit the use of my facility for the recruitment of participants and agree to support my consent to potential subjects. I understand I have the right to discontinue involvement in the study, and the researcher will no longer utilize my venue. I have been given a copy of this form.

Josh Leeman
Name of Venue Contact

519-253-3000 ext. 2455
Telephone Number

Signature of Venue Contact

May 24, 2016
Date

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

Signature of Investigator

May 24, 2016
Date

APPENDIX E

Parent/Guardian Letter of Information

Examining the Relationship between Active Play Imagery and Physical Competence in Children

Your child is being asked to participate in a research study conducted by Jesse Martin, a first year Masters student, from the Faculty of Human Kinetics at the University of Windsor. Imagery use in leisure time physical activity (active play) will be investigated. If you have any questions or concerns about the research, please feel free to contact Jesse Martin (519) 253-3000 ext. 4997, Martin29@uwindsor.ca or Dr. Krista Chandler (519) 253-3000 X 2446, Chandler@uwindsor.ca.

PURPOSE OF THE STUDY

The purpose of the present study will be to: a) examine the relationship between active play imagery and physical competence and, b) investigate the relationship between active play imagery and the domains of self-concept (Global self-esteem, Physical self-worth, Sport competence, Body attractiveness, Physical strength, and Physical conditioning) with children 9-12 years old.

PROCEDURES

If you volunteer your child to participate in this study, and if your child agrees, we would ask he/she to complete two questionnaires. The first questionnaire is the Children's Active Play Imagery Questionnaire (11 questions), which assesses how frequently children image their active play (unstructured leisure-time physical activity). The second questionnaire is the Children and Youth Physical Self-perception Profile (36 questions), which assesses a child's self-perception in multiple domains (global self-esteem, physical self-worth, sport competence, body attractiveness, physical strength, and physical conditioning). All of the consented participants will gather with the investigator for 20 minutes (sufficient time needed to complete the questionnaires) when they have finished their lunch on a predetermined day to complete the two surveys. . The completed surveys will be submitted to the investigator and the participants will return to the camp activities.

POTENTIAL RISKS AND DISCOMFORTS

There are no known risks associated with taking part in this study. The questionnaires that will be administered have been employed in the past and we have received no indication of any reported discomfort.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

The information gained from this study may be used in further research studies exploring children's imagery of active play. Further, the researchers may gain valuable insight regarding how children's active play imagery positively influences important life skills and confidence.

COMPENSATION FOR PARTICIPATION

Upon completion of the surveys, your child will have his/her name entered into a draw to have the chance to win one of four $25 gift certificates to the Devonshire Mall. Should your child withdraw from the study prior to completing and submitting the surveys, his/her name will not be entered in the draw. There will be a one ballot and one prize per person maximum. The winners will be selected in a random drawing, and their names will be removed after being selected. They will be contacted by phone following the draw.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with your child will remain confidential and will be disclosed only with your permission. All responses from the questionnaires will be kept in strict confidentiality. The only exception is if the researchers are made aware that someone has been hurting your child. If they believe your child is in danger, or being harmed the researcher will inform you or the appropriate authorities. The questionnaires will be kept in a locked cabinet in the investigator's office. There is no access to this cabinet by anyone other than the investigator. The information obtained from the study will not be used for any purpose other than the research and the communication of the results.

PARTICIPATION AND WITHDRAWAL

Participation in this study is voluntary. Your child can choose whether to be in this study or not. If your child volunteers to be in this study, he/she may withdraw at any time. You may remove your child and your child's data from the study at any point before September 1st, 2016. Your child may also refuse to answer any questions he/she doesn't want to answer and still remain in the study. Should your child withdraw from the study prior, to completing the surveys, his/her name will be removed from the draw. If your child has already participated in our study, your cooperation is not required.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS

The investigator will provide a written summary of the study's findings to you upon request. If you have any additional concerns or questions you can email or call the investigator(s) at the address or number provided above. Please keep this Letter of Information.

SUBSEQUENT USE OF DATA

These data may be used in publications and in presentations.

RIGHTS OF RESEARCH PARTICIPANTS

If you have questions regarding your rights as a research participant, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

_____ _____

Signature of Investigator Date

APPENDIX F

Parent/Guardian Consent Form

Examining the Relationship between Active Play Imagery and Physical Competence in Children

I have read the Letter of Information, have had the nature of the study explained to me and I agree to allow my child to participate. All questions have been answered to my satisfaction.

I consent to my child participating in the study: Yes No

_____
Name of Child

_____
Name of Parent/Guardian

_____ _____
Signature of Parent/Guardian Date

_____ _____
Signature of Person Obtaining Consent Date

_____
Name (in print) of Person Obtaining Consent

APPENDIX G

Assent Form

I am a student researcher, and I am doing a study on the pictures you create in your mind about active play. Active play can be riding your bike, dancing, playing tag, kicking a ball, going swimming with friends, or ice-skating. It makes you sweat, makes your legs feel tired, or makes you breathe harder. I would first ask you to meet with me to fill out two (2) short questionnaires. The first questionnaire will ask you about the pictures you create in your mind about active play. The second questionnaire will ask you what you think about yourself in different areas of your life. I will ask that you meet with me once to fill out the questionnaires.

I want you to know that I will not be telling your camp instructors or parents or any other kids what you answer. The only exception is if you tell me that someone has been hurting you. If I think that you are being hurt or abused I will need to tell your parents or someone else who can help you. Otherwise, I promise to keep everything that you tell me private.

Your mom and/or dad have said it is okay for you to answer my questions on the pictures you create in your mind about active play. Do you think that you would like to answer them? You won't get into any trouble if you say "no". If you decide to answer the questions you can stop answering them at any time, and you don't have to answer any question you do not want to answer. It is entirely up to you. Would you like to participate in my study?

I understand what I am being asked to do to be in this study, and I agree to be in this study.

_____ _____

Signature Date

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Witness

VITA AUCTORIS

NAME:	JESSE D. MARTIN
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