AN INVESTIGATION OF THE ASSOCIATION BETWEEN SOURCES OF

COMPETENCE AND AFFECT IN PHYSICALLY ACTIVE COLLEGE STUDENTS


A DISSERTATION

SUBMITTED TO THE FACULTY

OF

THE GRADUATE SCHOOL OF APPLIED AND PROFESSIONAL PSYCHOLOGY

OF

RUTGERS,

THE STATE UNIVERSITY OF NEW JERSEY

BY

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IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE

OF

DOCTOR OF PSYCHOLOGY

NEW BRUNSWICK, NEW JERSEY                                    October 2013

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ABSTRACT

Harter's competence motivation theory (Harter, 1978) describes factors that can increase

motivation to enhance participation in physical activity. Important factors are sources of

competence information, perceptions of competence, and affect. As young people age,

they move from emphasizing external sources of competence information (e.g., parents

and coaches) to internal sources (e.g., effort and improvement). This study examined

sources of competence information used by young adults in college physical activity

classes and the impact of those sources on their affect. It was hypothesized that students

who used multiple sources of competence information (i.e., scored high on both internal

and external sources) would have higher positive affect than students who used only

internal sources of competence information. It was also hypothesized that perceptions of

competence would mediate the relationship between multiple sources of competence

information and positive affect. One hundred and fifty-one college students from various

physical activity classes were included in the sample. A cluster analysis was utilized to

create groups of students based on their reliance on internal and external sources. Two

distinct groups were found – Cluster 1, who favored internal sources and Cluster 2, who

preferred multiple sources (internal and external). A One-Way ANOVA was used to

compare the two clusters on positive affect. The hypothesis was not supported, as there

were no significant differences between the clusters on positive affect. A mediational

analysis was used to determine if perceptions of competence would mediate the

relationship between multiple sources of competence and affect. This hypothesis was also

not supported, signifying a direct relationship between sources of competence and

positive affect. In addition, since there was no difference between multiple and internal

sources on positive affect, it may be important for college-aged physical activity participants to focus on using internal sources of competence information to have the highest enjoyment in physical activity. Having college-aged students enjoy physical activity is an important factor for students to stay motivated to participate in physical activity during their transition into adulthood. Guidelines for personnel at colleges and universities are provided.

ACKNOWLEDGMENTS

I would first like to thank my committee chair, Dr. Charles Maher, for your advice, feedback, guidance, and encouragement on this endeavor. I am truly grateful for having the opportunity to have you as a mentor. Thank you for supporting me since the beginning of my time at GSAPP. I also owe gratitude to my committee member, Dr. Anne Gregory, for your assistance with this paper, your time, and your flexibility. I am eternally appreciative for the time and effort you dedicated to reading and reviewing my dissertation and your willingness to meet with me often. To my final committee member, Dr. Pandina, thank you for your help and support. I cannot thank you all enough.

 I would also like to express thanks to all of the GSAPP friends, faculty, and staff I have come in contact with, who have helped me on this journey, and have made GSAPP a supportive atmosphere for me to grow and prosper. I would also like to thank professors from the University of Virginia who encouraged this topic. A special thanks to the students, who inspired and participated in this study. I hope you all are continuing to enjoy physical activity!

Finally, I would like to thank my friends for their words of encouragement and my family for their love and support and for teaching me the value of education. Thank you to my siblings for your encouragement and confidence in me. To my father - thank you for encouraging me to play sports and pursue my dreams in this career field as well as for always offering wonderful advice. To my mother - thank you for being an inspiration to me through your amazing work in the field of psychology and also through your ability to empathize with me regarding this dissertation process and doctoral work in psychology. This dissertation is dedicated to you.

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CHAPTER I

INTRODUCTION

There are many benefits to engaging in physical activity throughout the lifespan. Advantages include improvement in physical and psychological health. According to Pate et al. (1995), people who are physically active have lower mortality rates than those who are sedentary. Other physical benefits consist of an increase in stamina, weight loss, and a reduced risk of developing heart disease, while possible psychological benefits include increased self-esteem and reduced feelings of depression and anxiety (Lox, Martin Ginis, & Petruzzello, 2006).

Through sport, participants are able to display competence and make friends. Reasons why people participate in sport and physical activity are to demonstrate competence, associate with others, enhance fitness, and have fun (Weiss & Petlichkoff, 1989). Despite these broad rationales for participation, individuals place different levels of importance on the major reasons for engaging in sport (Brodkin &Weiss, 1990; Klint &Weiss, 1987; McCarthy & Jones, 2007). Some people place greater value on gaining friendship, while others prefer to display physical competence.

People cease athletic activities when their needs are not being met. If athletes are not accomplishing their goals for participation, then dropout may result. In other words, if people who joined a sport to develop skills are no longer improving, or children who desire friendships are having negative experiences with peers, they will be likely to leave that activity (Scanlan, Babkes, & Scanlan, 2005).

Negative experiences can also cause people to stop being physically active. This includes a person being yelled at by a coach for a subpar performance or being rejected by teammates. These negative interactions can lead to lack of enjoyment, stress, and anxiety (Babkes & Weiss, 1999; Garcia Bengoechea & Strean, 2007; Smoll, Smith, Barnett, & Everett, 1993).

Those most prone to abandon physical activity are adolescents and young adults, especially following college graduation (Malina, 2001). Reasons for both groups include a perceived lack of time due to increasing responsibilities (Coakley & White, 1992; Malina, 2001). Overall, there is a trend towards an increased sedentary lifestyle as people age (Lox et al., 2006).

Many theories describe factors that discourage participants from engaging in physical activity while also highlighting factors that can increase motivation to enhance participation. One such theory is Harter's competence motivation theory (Harter, 1978). Simply put, people desire to master certain domains. Success at challenging activities and support from significant others (e.g., parents, coaches, peers, spouses, one's children) are factors that increase perceptions of competence and control. This will enhance positive emotions, such as enjoyment, which in turn increases motivation to continue in that domain. However, if people are unsuccessful at challenges and/or they are not supported by significant others, their perceptions of competence and control over their environment will decrease. As a result, negative affect will prevail, which will reduce motivation to continue participation in that area.

In Harter's theory, significant others influence one's perceptions of competence. Perceptions of competence affect the activities people choose (Weiss & Ferrer-Caja,

2002). If an individual believes he is competent in an area, he is more likely to continue in that domain. Additionally, that individual is less likely to discontinue physical activity if he perceives that significant others believe he is skilled. Alternatively, if a person believes that significant others do not think he is competent, that person is more prone to have low perceptions of competence and to drop out. Thus, significant others indirectly affect a person's motivation through perceptions of competence. In summary, significant others play an important role in people's perceptions of competence and, in turn, can impact whether people participate in physical activity.

Significant others can also be a critical source of competence information. Sources of competence information describe people or events used to determine levels of ability (Horn, 2004). Sources of competence change over the lifespan. People in different socio-cultural environments rely on different sources of competence information (Horn, Glenn, & Wentzell, 1993; Horn & Weiss, 1991). An example of an environmental change is the increased emphasis on competitive outcomes (as children age) by adults through performance expectations, performance feedback, and pressure to succeed from parents and coaches. As a result, a child is more likely to use external sources (such as the competitive outcome of whether her team won or lost) when she is involved in organized sport if she perceives that winning is important to significant adults.

For children, changes in sources of competence can also be correlated with cognitive maturation. As young people age, they move from emphasizing external sources of information (e.g., parents, coaches, peers) to internal sources of competence information (e.g., achievement of self-set goals and speed and ease of learning; Horn & Harris, 2002; Horn & Hasbrook, 1987). Prior to adolescence, children rely heavily on

significant others. Young children use parental feedback (Bois, Sarrazin, Brustad, Chanal, & Trouilloud, 2005; Horn & Harris, 2002). Older children favor other external sources of competence such as peers and coaches (Amorose, 2003; Black & Weiss, 1992; Horn and Weiss, 1991; Jowett & Cramer, 2010). Adolescents tend to use self-comparison (skill improvement) and internalized standards (achievement of goals) along with peers and coaches (Horn et al., 1993). Unlike younger children, teens and young adults are able to incorporate multiple sources of competence information. Older adults, usually those over the age of sixty, return to relying more on social sources of evaluation (peer comparison) than temporal or self-comparison sources (improvement) (Frey & Ruble, 1990). This phenomenon seems to relate to perceived skill level as well as age.

Frey and Ruble (1990) suggest that changes in sources of competence are correlated with changes in skill level rather than changes in age per se. People with varying abilities differ on which sources they emphasize. Those with low or declining ability rely on internal sources if they are middle aged adults and external sources if they are older adults (Frey & Ruble, 1990; Halliburton & Weiss, 2002; Sheldon, 2003). Consequently, individuals are able to use a variety of sources that best suit their circumstances.

Studies have shown that people with higher perceptions of ability prefer multiple sources, while those with low perceptions of competence rely heavily on external sources (Horn & Hasbrook, 1987; Weiss, Ebbeck, & Horn, 1997). In Weiss et al. (1997), children who preferred self-referenced (internal) sources along with parental evaluation (an external source) to determine their competence scored high on the perceived competence scale. On the contrary, those who had low perceived competence chose to rely on social

comparison. Physically active people will most likely have higher perceptions of competence if they use multiple sources, which include internal sources as opposed to solely external ones. Harter believes that humans yearn to exert some control over their environment (Harter, 1978). Internal sources increase feelings of control. People cannot control how others react to them, but they can control whether they put in effort to achieve their goals. She included perceptions of control in her model, which directly affects emotional outcomes.

In Harter's model, significant others impact emotional outcomes, or affect, indirectly through perceived competence. Affect is defined as "a general, valenced response to a stimulus that does not require thought processes to precede it" (Lox et al., 2006, p. 419). At home, parents' attitudes, beliefs, and behaviors impact their children's affect (Jones & Lagacé, 2006). In school, teachers' expectations influence children's perceptions of competence and affect (Trouilloud, Sarrazin, Bressoux, & Bois, 2006). According to Harter (1978), higher perceived competence and control will be correlated with greater enjoyment and a decrease in negative emotions (Horn & Amorose, 1998).

A positive emotional outcome due to engagement in sport is enjoyment. Scanlan et al. (2005) identify high perceptions of competence, mastery, and positive perceptions of adult influence as principle sources of enjoyment. Positive relations with external sources (significant others) such as close friendships in physical activity often increase enjoyment and positive affect. Yet, there are instances when physically active participants experience negative emotions like anxiety, such as when they fear negative evaluation from significant others. Negative interactions with significant others can decrease positive emotions (Babkes & Weiss, 1999; McCarthy & Jones, 2007; Scanlan et

al., 2005; Weiss, Smith, & Theeboom, 1996). For instance, children experience less enjoyment when their coaches do not provide social support (Price & Weiss, 2000).

One's affect impacts one's motivation. In other words, people enjoying physical activity will be more likely to continue. On the contrary, those with negative affect can be expected to experience burnout (Weiss & Petlichkoff, 1989). Hence, people may not receive the immense physical and psychological benefits of physical activity if they are also not enjoying their participation experience.

This study will examine sources of competence information used by young adults and the impact of those sources on their affect. In their conclusion, Scanlan et al. (2005) challenged researchers to examine developmental changes in sources of competence information and their impact on emotional outcomes. For the most part, studies on sources of competence information have focused on children or middle-aged adults (Frey & Rubble, 1990; Horn et al., 1993; Horn & Weiss, 1991; Sheldon, 2004; Weiss et al., 1997). Thus, for my dissertation, I will use physically active young adults in the sample to add to the current research. Unlike children, college-aged adults should not be hindered in their ability to utilize multiple sources of competence information. Moreover, since there is a large dropout rate from physical activity after college, it will be informative to determine which sources of competence information college-aged physical activity participants use and whether those sources are linked to affective reactions.

CHAPTER II

REVIEW OF RELEVANT LITERATURE

In the following sections, I will review relevant literature in relation to the link between sources of competence and affect that describes: (a) physical activity participation and dropout motives; (b) competence motivation theory; (c) developmental changes in sources of competence; and (d) the value of using multiple sources of competence information.

This review of literature will focus on the links among motivation, perceived competence, affect, and sources of competence information, particularly significant others. Motivation is important, as people will not receive physical, psychological, or health benefits if they do not participate in physical activity. Three major reasons why people are motivated to participate in physical activity are to display competence, affiliate with others, and enjoyment (Weiss & Petlichkoff, 1989). While engaging in physical activity, if an individual does not believe she is competent, is not making friends, and is not enjoying herself, she will likely drop out. Harter's competence motivation theory explains how participation behavior is affected by one's perceptions of competence, affect, and motivation, and how those perceptions and motivational outcomes are influenced by significant others (Harter, 1978). Significant others can become sources of competence information through their feedback, reinforcement, and by comparing oneself with others. Developmental differences exist in preferences for

sources of competence information. For instance, children aged 7-13 favor peer and coach evaluation and peer comparison, whereas middle age adults are apt to use self-comparison (Horn & Harris, 2002; Sheldon, 2004).

Additionally, this chapter will highlight the importance of using multiple sources of competence information to maximize positive affect. Because sources of competence information influence perceptions of competence (Harter, 1978), the sources one chooses to use will consequently influence an individual's affect (Frey & Ruble, 1990; Wang & Biddle, 2003).

<div align="center">Participation Motivation</div>

Physical Activity Benefits

Lox et al. (2006) noted many health, psychological (such as positive affect), and social advantages to physical activity. Age group differences appear to exist in terms of the relative value placed on those benefits. For instance, young children focus on psychological and social advantages such as having fun and affiliating with friends (Weiss & Petlichkoff, 1989). College students participate for health, getting regular exercise, and fun (Savage, 1998). Participation motives for older adults include health and enjoyment, although they are less likely to engage in physical activity for social reasons (Carstensen, 1992). Having fun, or experiencing enjoyment, is a key participation motive for all age groups.

The physical and psychological advantages of physical activity include a variety of positive participation outcomes. According to Lox et al. (2006), physical activity lowers morbidity rates, reduces one's risk of developing diabetes and heart disease, reduces feelings of depression and negative affect, and provides opportunities to obtain

social contacts and develop relationships. These benefits are important to all age groups. In particular, experiencing enjoyment, or in other words, having fun (which is related to a decrease in negative affect) is a common participation motive for children, young adults, and older adults (Brodkin & Weiss, 1990; Savage, 1998).

Participation Motives

Children. Most of the research that has been conducted on participation motives has focused on children. They participate in physical activity primarily to have fun, to develop and display competence, and to acquire social relationships (Weiss & Petlichkoff, 1989). Sapp and Haubenstricker (1978) found that 93 percent of boys and 96 percent of girls participated in sports for fun, 80 percent of both boys and girls competed to enhance their sport skills, and 55 percent of boys and 50 percent of girls were involved in sport to mingle with their friends. In another study, Klint and Weiss (1987) found that gymnasts, who were high in perceived physical competence, were involved in gymnastics because their main goal was to develop skills, while the primary purpose of the athletes, who scored high in perceived social competence, was to obtain friends. Thus, this study provides evidence that, even in the same sport, athletes can have different and complex participation motives. Brodkin and Weiss (1990) studied participation rationales of swimmers aged 6-74 years. In this study, children aged 6 to 9 years swam for fun and to display competence, while athletes between the ages of 10-14 years swam to compete and display competence. Through their research, group differences were exposed.

Young adults. One would expect that since children and young adults in college are not developmentally similar they would differ on the emphasis placed on participation motives. However, few studies have included young adults in college, and therefore, not

much is known. Savage (1998) noted that participation motives for college physical education students included health, regular exercise, and fun. Brodkin and Weiss (1990) did include young adults. Unfortunately, the college age sample size was so small that they had to be grouped with adolescents. They found that swimmers aged 15-22 years swam primarily to gain social status and affiliation – they wanted others to notice them, and they wanted to connect with peers – and for health and fitness. Yet, it is unclear whether there are differences between the groups (i.e., whether teenagers and young adults differ on their use of sources). Additionally, Brodkin and Weiss (1990) found that adults between the ages of 23 and 29 years continued to swim for health and fitness.

Middle age adults. Similar to the swimmers between the ages of 23 and 29, middle age adults (ages 40-59) swam primarily for health and fitness (Brodkin & Weiss, 1990). Social affiliation is another motive that is significant for this population. Landry and Solmon (2002) noted that if women perceived a lack of relatedness from their social relationships, they were unlikely to be motivated to engage in physical activity. However, Surkan, Ryan, Bidwell, Brooks, Peterson, and Gillman (2005) found that the correlation between physical activity participation was less strong for social support as opposed to feeling healthy and satisfied with one's life.

Older adults. In Brodkin and Weiss (1990), the older adults (over age 60) did not swim for health reasons. Instead, they swam to display competence and have fun. In general, older adults are dissimilar to the other groups with regards to the need to develop friendships with others. People decrease their social networks as they age (Carstensen, 1992). Reasons include that older adults are less likely to encounter people, who can provide them with new knowledge and to regulate emotion, since they are happiest

around people they already know. Therefore, he believes many older adults are not in search of additional social contacts. Thus, providing older adults with exercise buddies or with group exercise classes may not encourage them to be physically active. Studies have shown that older adults prefer home-based exercise, which would likely include themselves only or with people they already know, and they adhere better to home-based exercise (Atienza, 2001). Furthermore, older adults enjoying themselves while being physically active increases the likelihood that they will participate in physical activity. Hence, similar to children, they will participate to display competence and have fun, but are unlikely to be physically active primarily to affiliate with unknown others.

Participation motives thus vary between age groups. The biggest difference is that young adults participate to demonstrate competence, affiliate with others, have fun, and improve health and fitness, while older adults participate for competence and fun but not primarily for new social relationships. Despite the differing emphasis on participation motives of different developmental groups, all share one thing in common – if their motives are not being fulfilled, they will drop out. For example, if a college student seeks to enjoy herself, and she does not, then she is likely to leave the activity. In the following section, motives for discontinuing physical activity will be examined.

Reasons People Discontinue Physical Activity

A range of studies have demonstrated that people leave physical activity when their needs are not fulfilled and when developmental transitions occur. If a physical activity participant is no longer able to display competence, is not having fun, or is having conflicts with others, he will probably leave physical activity (Weiss & Petlichkoff, 1989). Additionally, developmental differences exist in the rate of dropout,

as high school students and recent college graduates are prone to discontinue physical activity (Malina, 2001). The following section will highlight the major reasons why people leave physical activity – a failure to display competence, lack of enjoyment (negative affect), little affiliation prospects, and developmental transitions. Again, most of the research has focused on children and has neglected college-aged adults.

Failure to Display Competence

If children are unable to display physical competence in physical activity, many will drop out. In Coakley and White's (1992) survey of British youth, children, who did not feel capable or who were not afforded opportunities to display skill, decreased their participation. Thus, lack of competence is an essential dropout motive. With University of Rochester undergraduate students, avoidance motivation was negatively related to perceptions of competence (Elliot & Sheldon, 1997). Students desired to avoid tasks where they did not believe they were competent. People cease physical activity for the same reason, due to a desire to avoid displaying ineptitude. Ineptitude is related to a lack of enjoyment.

Lack of Enjoyment

Lack of fun (or enjoyment) is also a key dropout motive. Negative interactions with significant others can be perceived as sources of stress (instead of enjoyment) for physical activity participants (Scanlan et al., 2005). Weiss and Fretwell (2005) found that boys whose fathers were also their coaches, experienced negative affect when they believed their fathers pressured them. Other non-enjoyment sources can include a competitive orientation, overtraining, negative feedback and reinforcement, and injuries (McCarthy & Jones, 2007). Sources of stress decrease participation motivation.

A few studies have shown the link between negative affect and burnout. Burnout occurs when an individual is fatigued and apathetic towards an endeavor that she previously found enjoyable. Burnout can lead to dropout. For instance, in Cresswell and Eklund's (2001) qualitative study of New Zealand rugby players between the ages of 22 and 30 years, one player named Jack reported low enjoyment, which the authors determined was a likely symptom of burnout. Consequently, Jack changed teams midseason due to his lack of enjoyment. With elite, Division I college swimmers, swings in negative affect were related to burnout and its dimensions such as emotional and physical exhaustion, a reduced sense of accomplishment, and devaluation of the sport (Lemyre, Treasure, & Roberts, 2006). Additionally, in a study with advanced swimmers between the ages of 14 and 19 years, enjoyment was inversely related to burnout (Raedeke & Smith, 2001). Lack of social support was another variable that predicted burnout in that study.

Lack of Social Opportunities

Lack of social support has been cited as an important dropout motive influencing many domains (not only physical activity but also academics) in many studies. In a longitudinal study in the academic domain, high levels of verbal abuse by a teacher toward girls during childhood was correlated with less likelihood of graduating from high school by the age of 23 (Brendgen, Wanner, Vitaro, Bukowski, & Tremblay, 2007). Girls, who lacked teacher support, were likely to drop out of high school. For college students, perceived parental involvement indirectly affected persistence, which is an element of motivated behavior, in a science program (Ratelle, Larose, Guay, & Senécal, 2005). In other words, a lack of perceived parental involvement was correlated with a

decrease in students' feelings of relatedness in the classroom, as well as a decrease in persistence in a science curriculum. Parents are beneficial to their children's motivation in education at the college level. It is probable that their support of their college-aged children is also important in the physical domain.

Similarly if people perceive that they are not connected to significant others, they are more likely to drop out of sport. Young baseball players, who did not play for a coach trained to provide positive reinforcement, mistake-contingent encouragement, and to decrease punishment (forms of social support), had a twenty-six percent dropout rate the following year after an intervention compared to five percent for those, who played for trained coaches. Thus, if one did not play for a trained coach, one was less likely to still be in the sport a year later (Barnett, Smoll, & Smith, 1992). Those, who played for untrained coaches, also did not like their teammates as much as those who had trained coaches. In the exercise arena, a lack of a sense of affiliation was negatively related to attendance in a community-based exercise program for African-American adults (Izquierdo-Porrera, Powell, Reiner, & Fontaine, 2002). In sum, when people have a positive connection to those around them in any setting, they are less likely to leave that activity.

Developmental Shifts in Participation Rates

Besides these three primary participation motives (to display competence, for enjoyment, and for social opportunities) affecting whether people remain in physical activity, developmental transitions also cause individuals to decrease physical activity levels. Two common developmental transitions that relate to physical activity occur when people reach adolescence and when they graduate from high school. These changes are

correlated with increasing responsibilities and decreasing perceptions of free time (Weiss & Amorose, 2006).

Malina (2001) stated that physical activity increases from the ages of 5 and 6 years until early adolescence. Then, physical activity levels diminish. Many studies show that children begin to drop out of physical activity during adolescence. Sapp and Haubenstricker (1978), for instance, noted that the rate of dropout is higher for children over age 11 than those under 11. Reasons for the decline in adolescence (in addition to needs not being met and negative experiences) include other responsibilities - school, jobs, and career decisions (Malina, 2001). Adolescents do not have as much time to play as they did as young children. In addition, many do not believe that being physically active will aid them in early adulthood. Female participants in Coakley and White (1992) did not believe that sport was associated with becoming a woman, and thus many did not partake in athletics. A further reason is that youth physical activity becomes more competitive in adolescence. There are fewer opportunities available for teenagers, as few are chosen for varsity teams in high school (Horn & Harris, 2002). This change affects college graduates as well.

Another group prone to drop out is young adult, college graduates. Physical activity continues to decrease as people age further, especially between the ages of twenty and fifty years (Malina, 2001). A major reason cited is perceived lack of time (Lox el al., 2006). In general, adults do not have as much free time as children due to work and family responsibilities. Other reasons noted were physical limitations such as injury or disease and boredom while running or during vigorous aerobic activity. The

next section will focus on theoretical explanations describing why people participate and leave physical activity using Harter's (1978) competence motivation theory.

<div align="center">Competence Motivation Theory</div>

Harter's Model

Harter's competence motivation theory (1978) can be used to explain motivation to participate and drop out of physical activity. This theory represents an interactionist view of behavior, incorporating both individual and situational factors that impact one's motivation. The original model came from White (1959). As seen in Figure 1, Harter (1978) expanded on the premise that people are intrinsically motivated to master specific domains. As a consequence, they gain and display competence and control over their environment, which in turn increases pleasure (positive affect or enjoyment). If people succeed, it increases motivation to adhere to physical activity. However, if people do not believe they are competent in that domain, they will have negative affect, and this will decrease their motivation. In addition, her model incorporates the impact of significant others on one's perceptions of competence, affect, and motivation (Harter, 1978).
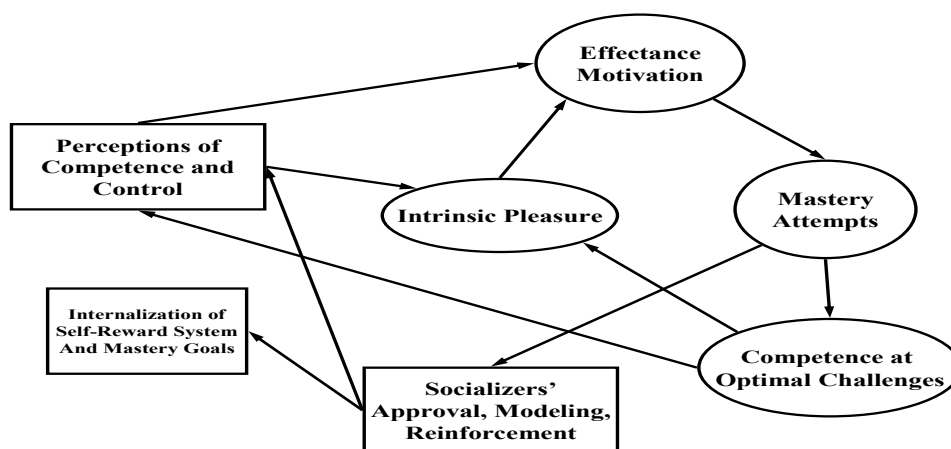


Figure 1. Harter's (1978) competence motivation theory.

According to Harter (1978), people are intrinsically motivated to master a domain that is challenging. If they are successful and they are supported, given approval, and positively reinforced by significant others, their perceptions of competence and control will increase. This will enhance intrinsic pleasure (or positive affect), which in turn increases motivation to continue to master that domain. However, if people are unsuccessful at challenges and/or they are not supported by significant others, their perceptions of competence and control will decrease. As a result, intrinsic pleasure will be low, which will reduce motivation to continue participation in that area.

Different activities will not produce the same outcomes in terms of cognitions, affects, and behaviors (Weiss & Ferrer-Caja, 2002). People do not need to display competence in all domains to experience positive affect. For instance, a youth tennis player, who is motivated to play tennis, may experience high perceptions of tennis competence and control if she is supported by her parents, which will most likely lead to positive affect. However, that same girl, who does not think math is important and is only taking math because she is required to, may not have high perceptions of math competence. Due to the low importance attributed to math, she will probably not experience negative affect if she does not believe she is skilled. In addition to discounting the importance of an activity and relevant to this study, Harter noted the value of significant others in shaping the perceived competence, affect, and motivation of physical activity participants (Weiss & Ferrer-Caja, 2002). This link is reviewed in the subsequent section.

The Effect of Significant Others on Competence, Affect, and Motivation

Many studies have tested Harter's model. Most have focused on the perceived competence of children of different ages and significant others' effects on the perceived competence, affect, and motivation of youth. A few studies have included older age groups.

Perceptions of competence. Significant others impact one's perceptions of competence (Harter, 1978). This has been shown to occur in the classroom as well as the physical activity context. Feedback from teachers, coaches, parents, and peers impacts students' perceptions of competence. One study found that teacher expectations about students' future competence partly explained changes in their students' perceptions of competence (Trouilloud et al., 2006). In the physical activity arena, Bois et al. (2005) examined the effect of parents' actual beliefs on young children's perceptions of competence. Mothers' competency beliefs were positively related to children's perceptions of competence. Thus, if a mother believed her child was skilled, the child also believed he was competent. In reverse, if a mother did not think her child was skilled at physical activity, he would not believe he was skilled. For French students between the ages of 16 and 22, perceived parental autonomy support, which entailed parental encouragement of independent thinking and choice, predicted students' perceptions of competence in a science program (Ratelle et al., 2005). Hollembeak and Amorose (2005) found that positive feedback from coaches predicted perceptions of competence in college athletes. These studies, with the exception of Bois et al. (2005) were not based explicitly on Harter's (1978) model. However, they illustrate the importance of the link between significant others and perceptions of competence.

Affect. Higher perceptions of competence are predicted to increase enjoyment (Harter, 1978). Affect refers to a general positive emotional feeling (Jones & Lagacé-Séguin, 2006). Positive affect encompasses enjoyment and fun. Significant others impact one's affect indirectly through perceptions of competence in Harter's model (Harter, 1978; Horn & Amorose, 1998). Many studies have examined this relationship (e.g., Babkes & Weiss, 1999; Black & Weiss, 1992). For 10-18 year olds, coaches' behaviors impacted their swimmers' enjoyment (Black & Weiss, 1992). Behaviors such as providing information following swimmers' desirable performances and providing encouragement and information after undesirable performances were related to greater enjoyment in the swimmers. Negative feedback from and interactions with significant others are often correlated with negative emotions in physical activity participants, while positive feedback from and interactions with significant others are associated with positive emotions in physical activity participation. Sources of enjoyment for physical activity participants include fewer parental negative reactions to performance, parental and coach involvement and support, and companionship and making friends (Scanlan et al., 2005). Sources of stress for physical activity participants include negative performance feedback from parents, coaches, and teammates and parental and coach expectations to perform well.

Significant others who influence children's affect include parents, peers, and coaches. With regard to parents as significant others, parental pessimism was found to be positively related to negative emotions such as depression in their young offspring (Jones & Lagacé-Séguin, 2006). And, low levels of parental pessimism were related to children's positive affect. Weiss et al. (1996) examined positive and negative features of

peer friendship. Positive dimensions included companionship, self-esteem enhancement, and emotional support, whereas negative features included conflict and betrayal. Having a positive friendship in sport increased one's positive affect, while having more negative friendship qualities undermined enjoyment. Smith (1999) determined that peer acceptance indirectly affected positive affect. Higher perceptions of peer acceptance were related to positive affect. Weiss and Smith (2002) found that companionship, pleasant play, conflict resolution, and having things in common with a tennis friend were positively related to enjoyment. Ullrich-French and Smith (2006) examined the simultaneous impact of two significant others - parents and peers - on youth soccer players. They found that a positive parent-child relationship, positive friendship quality, and peer acceptance increased youth soccer players' enjoyment. Regarding coaches, Smoll et al.'s (1993) intervention established that athletes, who played for the trained coaches, experienced more enjoyment from pre- to post-intervention than players with control coaches. These studies show the importance of significant others on an individual's affective reactions.

Most research using Harter's model had children as study participants. However, in the academic domain, Williams and Galliher (2006) showed how social support was related to college students' affect. College students in a psychology class stated that social support and social connectedness (i.e., feelings of relatedness with others) were correlated with their psychological health in terms of less stress and anxiety. On the other hand, unsupportive relationships influenced one's feelings of social connectedness which impacted one's affect negatively. These studies support Harter's model in that significant

others play an important role on the affect and consequently motivation of physical activity participants.

Motivation. The final link in Harter's model (1978) shows how intrinsic pleasure and positive affect impact participation motivation. Quite a few studies have shown how affect and motivation are related through the influence of significant others and perceptions of competence (Babkes & Weiss, 1999; Black & Weiss, 1992; Ullrich-French & Smith, 2006; Weiss et al., 1996). In Babkes and Weiss (1992), children's perceptions of their parents' beliefs impacted the children's affect and motivation. For mothers and fathers, their perceived competency beliefs about their children, perceived positive contingent responses following their children's performances, and perceived role modeling of physical activity behavior was correlated with their children's enjoyment and motivation. An individual's motivation increases when she enjoys an activity.

A physically active person's perceptions of competence, affect, and motivation are all influenced by his perceptions of the thoughts and behaviors of significant others. Significant others are sources that physical activity participants utilize to judge their competence. Other sources of competence information will be introduced in the next section.

Sources of Competence Information

Perceptions of competence might be considered the key to Harter's competence motivation theory (Harter, 1978). The logical question is, how do people determine their perceived level of competence? Harter suggested that people utilize a variety of sources to determine their competence. Sources of competence information refer to people or events that can determine levels of ability (Horn, 2004). Internal sources of competence

information reside inside the individual and consist of self-comparison information in the

form of improvement, effort, and achievement of self-set goals. External sources of

competence information reside outside of the individual and include significant others

and their evaluative feedback (Weiss et al., 1997). According to Horn (2004), sources of

physical competence are achievement of self-set goals, attraction to sport, evaluative

feedback (from teammates, peers, etc.), physiological responses, self-comparison

information, social comparison information, speed or ease of learning, and work

ethic/practice effort. Sources change for individuals in different environments and as they

mature cognitively (Horn, 2004; Horn et al., 1993). In essence, young children value

different sources of competence information compared with adults. Additionally, those

who use multiple sources of competence information to determine their level of ability

should be more accurate in their perceptions. Next, I will discuss changes and

developmental differences in sources of competence information.

Causes of Changes in Sources of Competence Information

      Environmental changes. Children rely on different sources due to changes in their

socio-cultural environment. In school and in physical activity, adults emphasize

competition and performance outcomes as children mature (Horn et al., 1993).

Elementary school teachers and parents praise young children for effort and mastery,

while middle school teachers and parents begin to expect high grades. In other words,

they begin to emphasize performance outcomes and peer comparison. Beginning at the

ages of 6 or 7 years, children begin to compare their academic performance to other

students (Horn & Weiss, 1991). Since adults rely on those outcomes, some children learn

to incorporate external sources of competence information in order to judge their competence.

Additionally, in the physical activity context, the behaviors of significant adults such as teachers and coaches also accentuate external sources of competence information (Horn et al., 1993). For instance, coaches go from stressing fun at the younger, recreational leagues to emphasizing winning at the older, more selective levels. Horn and Harris (2002) noted that the primary purpose of physical activity programs for young children is instruction in fundamental skills. In those environments, effort (an internal source of competence information) would be highlighted. However, beginning around ages 6 or 7, similar to the school context, competition becomes increasingly important (Horn & Harris, 2002). Consequently, older children are more likely to use game outcomes (winning or losing) as sources of competence information. As sport becomes more competitive, children may be cut from teams because they do not measure up to other children in terms of performance scores. This serves to encourage young children to incorporate external sources of competence information into judgment of their ability level. However, the social environment is not the only reason why children begin to use external sources of information as they age.

Cognitive maturation. People also rely on different sources as they develop due to cognitive maturation. Overall, the maturational process includes differentiation, integration, a shift from concrete to abstract thinking, and an internalization of competence and performance standards (Horn, 2004). Differentiation refers to sources of competence information becoming distinct constructs. For example, young children cannot differentiate effort and ability (Horn & Harris, 2002). To them, if they try hard,

they think they are good. In general, young children also cannot integrate or combine multiple sources of competence information. In other words, they are unable to distinguish between the win/loss record of their team and their own personal performance outcomes. If their team wins, they think they played well and if their team loses, they believe they played poorly. They do not view team performance outcomes and individual performance statistics as two different constructs. Thus, they do not use both sources to verify their competence.

As they mature, children also move from concrete to abstract thinking. Concrete ideas are ones that can be seen or measured. An example is performance outcomes. Children can see whether they won or lost. However, as they age, they are capable of applying abstract sources of competence information, such as attraction toward sport. Children often want to participate in areas where they believe they are talented and try to avoid domains where they do not think they are skilled. Hence, a soccer player may use his desire to play the sport as an indication that he has soccer competence. On the other hand, his lack of interest in playing baseball could signify to him that he lacks competence in baseball.

Internalization of standards of performance signifies that children begin to use personal goals as sources of competence information (Horn et al., 1993). By adolescence, typically developing individuals should be cognitively mature. As children mature, they also become more accurate in determining their level of competence (Horn & Weiss, 1991). By young adulthood, most should be able to differentiate and integrate sources of competence information, to think abstractly, and to internalize competence and performance standards.

Developmental Differences in Preferences for Sources of Competence Information

Cognitive maturation is displayed in people's choice of sources. In general, theory would predict that from childhood to young adulthood, people move from using external sources of competence, to internal sources, to using multiple sources. The following paragraphs report on research examining the sources used to determine competence in the physical domain for different age groups.

Young children. The main sources of competence information for young children (4-7 years) include task accomplishment, effort, and evaluation and feedback from significant adults (Horn, 2004). With regard to task accomplishment and effort, if children complete a task or try hard, they believe they are skilled in that domain. Additionally, young children rely heavily on parental feedback (Horn & Harris, 2002). Many studies have examined the impact of parents on young children's self-perceptions. Babkes and Weiss (1999) showed that parents are used as a source of competence information for young children. They found that children's perceptions of their mothers' and fathers' competency beliefs were positively related to children's perceptions of competence, while children's perceptions of paternal pressure were negatively related to the same perception.

Older children.  The major sources of competence information for middle childhood (ages 7-12) are peer comparison, evaluative feedback from coaches, peers, parents, and spectators, internal information (perceived effort, skill improvement, speed/ease of learning), game outcome, and attraction toward sport (Horn, 2004). The three primary sources are peer comparison, evaluative feedback from peers and coaches, and actual performance outcomes. These children tend to use peers and coaches as

sources of competence information and rely less on parents (Horn and Weiss, 1991). The decreased emphasis on parental feedback occurs because older children believe that coaches and peers provide more objective feedback than their loving parents. In other words, they often assume that their parents provide praise for lack of skill as well as skill, more so than coaches and teammates. Moreover, children can determine by themselves if they are more or less capable than their peers. For example, if a peer can learn a skill in a shorter period of time, an older child will come to the conclusion that her peer has more ability in that domain.

Horn and Harris (2002) reviewed how children ages 7-12 used coaches as a source of competence information. They concluded that coaches should promote the internalization of performance standards through performance feedback. Coaches can play a role in encouraging internal sources such as effort and improvement through encouraging self-regulation strategies such as self-monitoring. As stated previously, beginning with this age group, athletics become increasingly competitive. Coaches often shift their focus from encouraging internal sources (e.g., improvement) to promoting external sources (e.g., winning) (Horn & Harris, 2002). However, after athletes do not win or perform well, coaches' reactions can become sources of competence information that impact their athletes' perceptions of competence, especially if the coaches created a climate that promoted using external sources of competence information over internal sources.

Coaches' behaviors affect older children's perceptions of competence. Horn (1985) found that with successful performances, coaches' positive reinforcement and non-reinforcement were negatively related to female softball players' perceived

competence, whereas coaches' criticism following unsuccessful performances had a positive effect on athletes' perceived competence. Horn explained these results by stating that the coaching behaviors were neither contingent nor appropriate. In other words, praise was given to low-skilled athletes for easy tasks, while the higher-skilled athletes received criticism with instruction. In addition, informational feedback was not provided for the low-skilled athletes. As a result, all the athletes perceived that if the coach criticized a player, it meant the coach believed she was competent, and if the coach praised a player it signified that she was not competent.

Black and Weiss (1992) extended Horn (1985). They studied swimmers aged 10-18. Their robust findings were that positive reinforcement and information after successful performances and encouragement after unsuccessful performances by the coaches were positively related to swimmers' perceived competence. They concluded that the coaches' behaviors in this study were contingent and appropriate.

Adolescents. Due in part to cognitive maturation, adolescents aged 13-18 years can utilize internal information (skill improvement), competitive outcomes, evaluative feedback, peer comparison, speed or ease of learning, achievement of self-set goals, and attraction toward sport as sources of competence information (Horn, 2004). However, some research has found differences between younger and older adolescents. Horn et al. (1993) found that younger teenagers (13-15 year-olds) preferred more external sources of competence information such as peer comparison and evaluation more so than the older teens who tended to use self-comparison (skill improvement) and internalized standards (achievement of goals) along with external sources. Yet, unlike younger children, adolescents overall were likely to incorporate multiple sources of competence

information (Garcia Bengoechea & Strean, 2007; Horn & Harris, 2002). Gymnasts of all skill levels were able to use all the sources of competence information listed in Halliburton and Weiss (2002), although to differing degrees. The sources of competence information in the study included effort and enjoyment, peer comparison and evaluation, parent evaluation, learning and improving skills, feelings of nervousness, spectator feedback, and achievement of self-set goals. Little research has studied age groups besides children and adolescents.

Young adults.  Young adults, between the ages of 18 to 30 years, can incorporate both internal and external sources of competence information (Horn, 2004). Sheldon (2004) found that young adult tennis players rated family feedback and personal improvement (an external and internal source, respectively) as important, more so than the middle age and older adult groups. The study also found that younger adults valued temporal comparisons more so than older adults (Sheldon, 2004). Specifically, those in the older age group preferred comparisons with age mates (a social comparison source) as their most valued source. In a study with adult exercisers (who included either university students or members of the community) in weight training classes, males and females did not differ in their use of included instructor feedback, attraction toward activity, feedback from others not in the class, and muscle development. Hence, young adult males and females were found to use both internal and external sources of competence information. However, the author found that with the other sources, males preferred norm-referenced sources, while females preferred self-referenced (Ebbeck, 1990).

Achievement goals relate to sources of competence information, as learning goals are similar to internal sources of competence information, while performance goals are similar to valuing external sources of competence information. One study showed that younger college students were less likely than mature (i.e., non-traditional) students to value learning goals (internal standards) in the classroom (Morris, Brooks, & May, 2003). Therefore, as people age, they tend to place more value on internal goals or sources than when they were younger.

Middle age adults. Comparing young adults to middle aged adults (those aged 31 to 59), studies have shown that middle aged adults prefer more internal sources of competence information than young adults. Older students preferred learning for its own sake as opposed to getting good grades, similar to an athlete playing to develop skills as opposed to winning. Learning goals were related to an increase in age (Burley, Turner, & Vitulli, 1999). Middle age adults also valued temporal comparison more so than older adults (Sheldon, 2004).

Older adults. Older adults (over age 60), are able to use multiple sources of competence information, internal and external. Developmentally they place a different emphasis on internal and external sources compared with younger adults. Older adults tend to rely more on social sources of evaluation (e.g., peer comparison) than temporal or self-comparison sources (e.g., improvement) (Frey & Ruble, 1990). In Sheldon (2004), older adults preferred comparisons with peers to determine their tennis competence.

Using external sources of competence information is a way for older adults to preserve their self-esteem and increase motivation. If they were to use improvement or speed and ease of learning, they would frequently not have high perceptions of

competence because their physical skills are likely decreasing with age. A reason many older adults do feel competent is because they compare their skills with similar-aged peers (Frey & Ruble, 1990). Their older adult peers are good sources of information because the abilities of their peers should be similar. Thus, when an older adult knows that he is learning a skill faster than his older adult friend, he believes he is competent.

In summary, people belonging to differing developmental levels vary on the sources of competence information they utilize when participating in physical activity. A preference for internal sources of competence information increases with age but then the preference decreases when people become older adults. The next section will review reasons why sources of competence information change throughout the lifespan.

Why Do Sources of Competence Information Change?

Sources of competence information can change based on perceived ability level. Horn et al. (1993) studied high school athletes and determined that the younger adolescents preferred external sources of competence information in the form of peer comparisons, whereas older adolescents preferred internal sources of competence information. In their discussion, they suggested that changes in sources of competence information may not be as much age-related but can be ascribed to difference in ability level. Frey and Ruble (1990) would concur.

Children. Evidence has shown that low and medium ability children preferred social comparison, while high ability children preferred self-comparison information (Frey & Ruble, 1990). This can be explained because high ability children believe they are good due to using social comparison in the past. As they progress, they become more concerned with mastery than with beating others. However, Halliburton and Weiss's

(2002) results with youth diverge from those of Frey and Ruble (1990). These authors found that lower ability gymnasts preferred effort, an internal source of competence information to gauge their competence, while the high ability athletes used spectator feedback, an external source of competence information. The difference in results can be ascribed to the gymnasts' motivational climate (or environment). The high ability gymnasts were encouraged to focus on winning (an external source of information), whereas the lower level gymnasts were encouraged to have fun. Findings are mixed with regard to which sources of competence information are used by children of high and low ability levels. No research has been conducted with young adults of differing ability levels and their preferences for sources of evaluation.

Middle-age adults. Middle-age adults resemble the children in Halliburton and Weiss (2002) in terms of their preferences for sources of competence information with regards to ability level. Beginning adult tennis players valued self-comparison more than social comparison (Sheldon, 2003). Beginners received more favorable information about their competence using self-comparison information such as improvement. Since they were new to the sport, their skills were most likely increasing quickly. This result supports Frey and Ruble (1990). Contrary to the author's hypothesis, the advanced players viewed social and self-comparison as equally important sources of competence information, instead of just social comparison. For the high ability athletes, social comparison was used to determine competence through performing better than others, while self-comparison was used to determine if they were accomplishing challenging goals. Using multiple sources of competence information (social and individual sources) enables one to obtain a more accurate picture of one's competence. If a person compares

favorably in many areas, she can be more assured of her skill, as opposed to if she is only

succeeding in one area alone.

Older adults. The profiles of middle aged adults are somewhat similar to those of

older adults (Sheldon, 2003). Frey and Ruble (1990) believe that individuals use different

sources of competence information when they are developing skills versus when their

skills are declining. They noted that older adult runners who were learning relied more on

temporal (or self) comparisons because they were able to gain knowledge concerning

their ability through mastery. On the contrary, older adults with declining skills preferred

social comparison. These older adults experienced positive affect if they believed they

were better than their peers.

Outcomes Related to Utilizing Multiple Sources of Competence Information

Using multiple sources of competence information can lead to more accurate

estimates of competence, greater perceptions of competence and control, and positive

affective reactions. Young children are often inaccurate in their perceptions of

competence because they only rely on three sources of competence information – task

accomplishment, evaluative feedback from significant adults, and effort – and due to their

lack of cognitive maturity and inability to either differentiate or integrate sources (Horn

& Harris, 1996). As children age, their accuracy increases when they incorporate multiple

sources of competence information. Moreover, when one utilizes multiple sources of

competence information, one is able to generate a greater view of one's competence. For

example, if a college athlete's parents believe he is the best basketball player on the team,

but he is often on the bench, does not compare favorably to his teammates or players on

the opposing teams, and is not improving, then he can discount his parents' positive

evaluation in favor of other sources that show him he is not the most skilled player on his team. One would suppose that his affect would be more positive knowing his true ability level rather than listening solely to his parents and being frustrated by sitting on the bench.

High perceptions of competence and control are also associated with the incorporation of multiple sources of competence information. In Wang and Biddle (2003) Singaporean undergraduate and postgraduate students, who at least used internal sources, had high perceptions of competence and control. Based on their research, I would contend that physical activity participants utilizing multiple sources of competence information (both internal and external) should have higher perceptions of competence and control than those who solely use external sources.

Youth soccer players with high perceptions of competence and control applied many sources of competence information, self-referenced sources such as self-improvement and effort and norm-referenced sources such as peer comparison and peer and coach evaluation (Horn & Hasbrook, 1987). Additionally, a follow-up study found that children in clusters with low perceptions of competence rated external sources such as social comparison and evaluation highly, whereas children with high perceptions of competence rated both self-referenced and norm-referenced sources as important (Weiss et al., 1997).

Based on the research of Boyd and Kim (2007) with young adult skateboarders, people who have self-referenced goals or who at least use self-referenced sources should have more positive affect than those who rely exclusively on norm-referenced sources of competence information. Frey and Ruble (1990) noted that flexibility in choice of sources

of evaluation (i.e., using many sources of competence information) helps increase

perceptions of competence, which based on Harter (1978) is related to positive affect.

Hence, if utilizing internal sources of competence information is related to positive affect,

then the added flexibility of using multiple sources of competence information (internal

and external) should be associated with higher positive affect because physical activity

participants will be able to obtain a fuller, realistic, and more accurate view of their

competence.

## Purpose of Present Study

Sources of competence information impact perceptions of competence and

control, guide positive affect, and result in participation behavior. In the physical activity

context, many studies have examined the impact of sources of competence information

such as feedback from significant others on the perceptions of competence, affect, and

motivation of physical activity participants (Black & Weiss, 1992; Bois et al., 2005;

Garcia Bengoechea & Strean, 2007; Ratelle et al., 2005; Trouilloud et al., 2006; Williams

& Galliher, 2006). These studies have shown that, in Harter's (1978) model and with

other theories, significant others influence perceptions of competence, which in turn

impacts affect, which influences motivation. The strength of Harter's model is that it

displays the effects of both perceived positive and negative behaviors of significant

others on motivated behavior.

Significant others are external sources of competence information (Horn, 2004).

External sources of competence information are not under one's control. As a result, their

reliability is questionable (Horn & Harris, 2002). For instance, a person can be talented,

but if he is only using his win-loss record (an external source) to judge his competency,

his talent can be neglected in his determination of competence. Due to this issue of inaccuracy, it is wise for physical activity participants to use multiple sources of competence information instead of relying solely on external sources in the form of significant others and their evaluation and feedback (Horn & Harris, 1996).

In addition, developmental differences exist in one's ability to use and in one's preference for utilizing multiple sources of competence information. For example, before late adolescence, most children are unable to incorporate many internal sources of competence information such as achievement of self-set goals (Horn et al., 1993). Therefore, they are most likely to use primarily external sources. Although some accuracy is lost when they do so, it may protect their self-esteem (Frey & Ruble, 1990; Horn & Harris, 1996). Less is known about the preferences of young adults.

Ability level also impacts preferences for sources of competence information. To help ensure affect is positive, young adult, high ability athletes should use multiple sources of competence information (Frey & Ruble, 1990; Sheldon, 2003; Wang & Biddle, 2003). This will increase accuracy in perceptions of competence. In addition, it will allow participants to discount possible negative feedback from significant others if they are able to notice their own skill improvement. Thus, affect will likely be more positive (because perceptions of competence and control will be greater) than if one relies on significant others alone.

In reviewing their research in the area of sources of enjoyment and stress, Scanlan et al. (2005) called for studies that examine developmental changes in sources of competence information and their link to affect. This study will add to the knowledge base by examining the relationship between sources of competence information and

associated affect of college aged students participating in physical activity classes. This group was selected because they are cognitively mature and hence are able to utilize both internal and external sources of competence information. Additionally, physical activity classes provide a full range of choices of sources of competence information (e.g., instructor feedback, effort, improvement, and peer comparison). The participants represent an age group that has not been included in many studies.

Other studies have proven that internal sources of competence information are more related to positive outcomes such as positive affect and satisfaction than external sources of competence information (Boyd & Kim, 2007; Harwood & Biddle, 2002; Wang & Biddle, 2003). Thus, this study will determine if students, who use both internal and external sources of competence information, will have greater positive affect than those, who use internal sources of competence information alone due to the increase in flexibility that using multiple sources of competence information should provide (Horn, 2004; Horn & Harris, 2002; Horn & Hasbrook, 1987; Horn & Weiss, 1991). I hypothesize that college level physical activity participants, who rely on a combination of internal and external sources of competence information (e.g., improvement and speed and ease of learning along with peer evaluation), will have higher scores on positive affect (favorable feelings and emotions in the physical activity domain) than young adult physical activity participants, who have a greater dependence on internal sources of competence information (e.g., improvement and speed and ease of learning).

In addition, most studies using Harter's model have found that sources of competence information are related to affect through perceptions of competence (Babkes & Weiss, 1999; Black & Weiss, 1992; Smith, 1999; Weiss et al., 1992). However, these

studies solely used external sources of competence information such as parent and coach feedback and not internal sources of competence information or multiple sources of competence information. Because no studies have examined if there is a meditational relationship with multiple sources of competence information, perceptions and competence and affect, this study will attempt to discover if there is a meditational relationship or if multiple sources are directly related to affect. As such, to determine if this study supports Harter's (1978) model, I hypothesize that perceptions of competence will mediate the relationship between multiple sources of competence and affect. In essence, multiple sources of competence information should be related to higher perceptions of competence, which should correlate with positive affect.
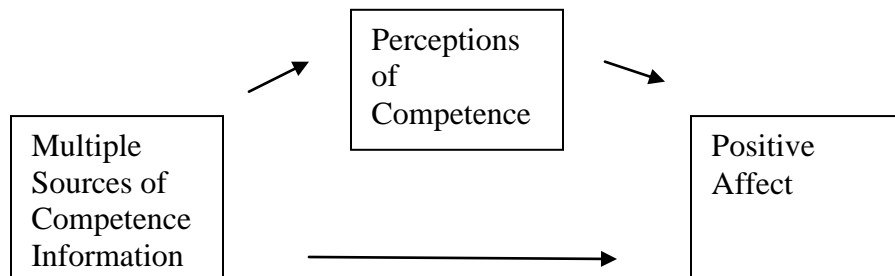
Figure 2. Mediational model.

CHAPTER III

METHOD OF INVESTIGATION

Participants

One hundred and fifty-one students ($n$=61 males and $n$=90 females) from a major

southeastern university over the age of 18 participated in this study. This age group

represents the college-age, young adult cohort. Selection criteria were (a) over the age of

18, (b) a university student, and (c) participating in at least 30 minutes of moderate

physical activity on 2 days of more per week. The rationale for choosing university

students above the age of 18 is that developmental research has shown that most are

cognitively mature and have the ability to incorporate multiple sources of competence

information. Additionally, they were involved in physical activity classes where the

environment provided multiple sources of competence information (e.g., improvement,

instructor feedback, and peer comparison). Students choose to participate in these

physical activity classes.

The average age of participants was 20.78 years ($SD$=1.63). The majority of the

student were Caucasian ($n$=96, 63.6%) followed by mixed race ($n$=17, 11.3%), Asian

($n$=12, 7.9%), Hispanic ($n$=9, 6.0%), Black ($n$=6, 4.0%), and eleven students did not

respond (7.2%). The majority of students had attended the university for about three

years ($M$=2.93, $SD$=1.07). The average days per week students spent in physical activity

was 4.05 days ($SD$=1.44), the average length of each physical activity session was one

hour (*SD*=.91), and the average intensity of self-reported physical activity (1= Light,

2=Moderate, 3=Vigorous) was between moderate and vigorous (*M*=2.55, *SD*=0.57).

A total of 160 students began the survey; however, nine cases were dropped from

the study because those students only completed demographic information and did not

begin and/or complete the sources of competence information scale or the affect scale. In

contrast, the other 151 participants completed every item of all of the scales. No

significant differences were found between those who did not complete the survey (*n*=9)

and those who did complete the survey (*n*=151) with regards to age [t(158)=-.93,

*p*=.35],ethnicity [$\chi^2(4, N=149)=2.66, p=.62$], gender [$\chi^2(1, N=160)=2.55, p=.11$], length

of attendance at the university [$\chi^2(3, N=160)=0.35, p=.95$], days per week spent in

physical activity [$\chi^2(6, N=138)=2.42, p=.88$], length of physical activity sessions [$\chi^2(8,$

$N=159)=2.62, p=.96$], intensity of physical activity [$\chi^2(2, N =160)=5.11, p=.08$] and

perceptions of competence [t (157) =-.82, *p*=.41].

## Measures

### Demographic Questionnaire

A demographic questionnaire was provided to all of the study participants to

obtain information regarding the students' ages, university affiliation, gender, race, and

physical activity participation (see Table 1). The primary purpose was to determine if the

participants were physically active young adults.

_____

Table 1.

*Demographic Questionnaire*

       Thank you for participating in this study concerning sources of competence information.

Please answer the following questions about yourself:

Are you over the age of 18? _____
Please tell us your present age: _____

Have you attended the university? _____

What is your gender? _____

Race:
| | |
|---|---|
| ____ White, Non-Hispanic | ____ Black, Non-Hispanic |
| ____ Hispanic/Latino | ____ American Indian or Alaskan Native |
| ____ Asian or Pacific Islander | ____ Other (Please specify) _____ |

How many DAYS per week do you spend in physical activity? _____

How long does YOUR AVERAGE PHYSICAL ACTIVITY SESSION last? _____ (in minutes)

Please choose the level of intensity of this activity – light, moderate, or vigorous? _____

_____

Perceived Competence

       The Self-Perception Profile for College Students (Neemann & Harter, 1986) was used to measure perceptions of competence. The subscale for athletic competence was given to the participants. Four items of the scale applied to perceived athletic competence. The questions for the subscale were displayed in a structured-alternative format, where the college students first chose if they perceived that they were more similar to the teenager described in the statement on the left or on the right (e.g., "Some students don't feel they are very athletic" versus "other students do feel they are athletic") (See Table 2). Then, they noted whether the statement that they choose was *sort of true* or *really true* for them. Neemann and Harter (1986) found good internal consistency ($\alpha$ =

.92) for the subscale. This study also found a good internal consistency ($\alpha$ = .86).

Masciuch, McRae, and Young (1990) found good validity for the measure.

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Table 2.

*Self-Perception Profile for College Students* (Neemann & Harter, 1986)

Athletic Competence Items
1.  Whether students feel they could do well at just about any new athletic activity they haven't tried before
2.  Whether students feel they are athletic
3.  Whether students feel they are better than others at athletic activity
4.  Whether students do well at activities requiring physical skill

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Sources of Competence

A modified version of Ebbeck's (1990) Sources of Competence Information Scale was utilized to examine sources of information that students use to judge their competence (Whaley & Mullen, 2008). In the questionnaire, "exercise" was substituted for "physical activity." Thirty-three items were in the questionnaire highlighting 12 sources of competence information. The sources included instructor feedback, student feedback, student comparison, changes noticed outside of physical activity, personal attraction toward the activity, degree of perceived effort, performance in physical activity, feedback from others not in the class, goal setting, fitness, physical activity improvement over time, and ease in learning new skills/knowledge. Subjects were asked to rate the importance of each source of competence information in determining their competence. An example was "what my instructor has told me." Responses were scored on a 5-point Likert scale, where (1) represented *not at all important* and (5) *extremely important* (See Table 3). Whaley & Mullen (2008) found good construct validity and

internal consistency for the sources α = .87. This study's internal consistency (α = .92)

was very good.

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Table 3

*Sources of Competence Information Scale* (Whaley & Mullen, 2008)

1. What my instructor has told me
2. The progress other physical activity participants have made relative to me
3. How much I enjoy physical activity
4. The amount of improvement in my technique
5. The effect exercising has on how my body looks
6. My ability to learn new techniques
7. How I compare myself to how I think I should be
8. How good I feel when I exercise
9. The way I perform relative to other physical activity participants
10. How much physical activity I can do relative to before
11. How readily I learn new things about physical activity
12. What my instructor thinks of me
13. The amount of change I notice in my body
14. How I can compare myself to what I want to be
15. What my mood is like when I exercise
16. How easily I can breathe
17. My ability to keep up with other physical activity participants
18. What other physical activity participants think of me
19. The amount of effort I exert
20. The way my instructor acts
21. The amount of fun I have when I am physically active
22. How I can compare myself to who I ought to be
23. What my health is like
24. The degree to which my expectations for my physical activity were met
25. The ease with which I learn new physical activity skills
26. The way other physical activity participants act toward me
27. The amount of physical activity I can do compared to before
28. The effect my physical activity has had on how my body looks
29. How much I like physical activity
30. How much I can push myself
31. The way my instructor interacts with me
32. Whether I perform as well as I expect to
33. The way my body can move

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Affect

The Physical Activity Enjoyment Scale (PACES; Molt, Dishman, Saunders, Dowda, Felton, and Pate, 2001) modified from Kendzierski and DeCarlo (1991) was used to measure positive and negative affect. An example question was "I find it [physical activity] pleasurable" (See Table 4). Responses were scored on a 5-point Likert scale where (1) represented *disagree a lot* and (5) *agree a lot.* Molt et al. (2001) found good internal consistency and validity for PACES similar to this study ($\alpha = .87$).

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Table 4

*Physical Activity Enjoyment Scale* (Molt et al., 2001)

When I am active [in my physical activity class]… (1) Disagree a lot….. (5) Agree a lot

1. I enjoy it
2. I feel bored
3. I dislike it
4. I find it pleasurable
5. It's no fun at all
6. It gives me energy
7. It makes me depressed
8. It's very pleasant
9. My body feels good
10. I get something out of it
11. It's very exciting
12. It frustrates me
13. It's not at all interesting
14. It gives me a strong feeling of success

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## Procedure

Permission to conduct the study was obtained from the Human Subjects Committee at the University of Virginia and Rutgers University (see Appendix A and Appendix B). Participants were recruited by first emailing instructors of physical activity

classes (e.g., soccer, tennis, rugby, core training, etc). Then, if the instructors agreed to let me speak with their classes, I visited the classes in order to seek participants. Those who wanted to be in the study wrote their email address on a contact sheet. An email link containing the consent form and the surveys were sent to those on the list.

Data Analysis

Descriptive statistics, internal consistency on all measures, and correlations among the major variables were analyzed. All variables were checked for assumptions to ascertain if they were normally distributed, and they were all normally distributed.

A cluster analysis was used to cluster the students into groups. Both hierarchical and non-hierarchical clustering procedures were utilized. Since there is no one correct clustering method, best practice is to use at least two methods to validate the results (von Eye, Mun, & Indurkhya, 2004). . The hierarchical method (Ward's method) was used to establish the number of clusters, while the non-hierarchical method (k-means clustering method) was used to validate the findings from Ward's method.  Then, a One-Way Analysis of Variance (ANOVA) was used to determine if the clusters differed significantly on their positive affect scores.

According to Baron and Kenny (1986), to test for mediation, a four-step multiple regression procedure was used on the multiple sources cluster group. The first step tested the direct effect of sources of competence information on perceptions of competence. The second step tested the direct effect of perceptions of competence on positive affect. The third step tested if sources of competence were directly related to positive affect. And, the purpose of the fourth step was to test if perceptions of competence fully mediated the relationship between sources of competence information and positive affect. To have full

mediation in the model, the effect of sources of competence information on positive affect when perceptions of competence were included in the model should no longer be significant.

CHAPTER IV

RESULTS

Multiple analyses were performed in order to identify the sources of competence information that undergraduate students enrolled in athletic classes use to judge their competence and the association between those sources and the affect of the students. First, descriptive statistics for each scale were calculated. The means and standard deviations of the scales (perceptions of competence, sources of competence information, and positive affect) are displayed in Table 5. All of these variables were normally distributed. Skewness close to zero (i.e., between -1 and 1) suggests normal distribution, while kurtosis of zero represents normal distribution (Bai & Ng, 2005). For all of the scales, skewness and kurtosis are close to zero: Perceived competence (skewness=-.15, kurtosis=-.23), positive affect (skewness=-.26, kurtosis=-.22), internal sources of competence information (skewness=.19, kurtosis = -.08), and external sources of competence information (skewness=-.50, kurtosis=.94).

Table 5

*Descriptive Information for the Scales*

| Scale | M | SD |
|---|---|---|
| Perceptions of Competence | 3.36 | .43 |
| Internal Sources | 3.81 | .44 |
| External Sources | 3.22 | .56 |
| Positive Affect | 4.15 | .47 |

Correlation Coefficients

A Pearson product correlation matrix was utilized to examine the inter-correlations among the scales.  The correlation coefficients ranged from $r$= -.09 to $r$=.34 (see Table 6). Correlations between external sources of competence information and perceptions of competence ($r$=.02) and external sources of competence information and positive affect ($r$=-.09) were shown to be unrelated. The significant correlations (perceptions of competence and internal sources of competence information, perceptions of competence and affect, internal sources of competence information and external sources of competence information, and internal sources of competence information and affect) were moderate (Weinberg & Abramowitz, 2008). Internal sources of competence information were correlated with positive affect, such that higher internal sources of competence information were related to higher positive affect ($r$=.34, $p$<.01). On the other hand, external sources of competence (which are part of multiple sources of competence information) were not correlated with positive affect.

Table 6

*Correlation Coefficients among Scales*

|  | 2 | 3 | 4 |
|---|---|---|---|
| 1. Perceptions of Competence | .24** | .02 | .30** |
| 2. Internal Sources of Competence |  | .34** | .32** |
| 3. External Sources of Competence |  |  | -.09 |
| 4. Positive Affect |  |  |  |

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

## Cluster Analysis

Two clustering methods were used to determine the number of clusters needed, since von Eye et al. (2004) recommended using at least two methods to increase accuracy of the findings. First, a hierarchical cluster method called Ward's method was used with the squared Euclidean distance as the similarity measure. The dendogram and agglomeration coefficient displayed that a two cluster solution was most appropriate. Second, a non-hierarchical cluster method called the k-means method was used. With the k-means method, the researcher specifies the number of groups (Mun, Windle, & Schainkler, 2008). Since two clusters emerged from the hierarchical analysis, two groups were used for the k-means analysis. Both cluster analysis methods identified that two distinct groups was the best fitting model. The two groups varied on internal and external sources of competence information. Cluster means and standard deviations are shown in Table 7.

Cluster 1 ($n$= 70) consisted of students, who scored high in internal sources of competence information but low on external sources of competence information. Hence, they were referred to as the "internal sources only" group. Cluster 2 ($n$=81) consisted of students, who scored high in both internal and external sources of competence information. Thus, they were called the "multiple sources" group.

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Table 7

*Cluster Group Means*

| Variable | Cluster 1 (*n*=70) *M* | Cluster 2 (*n*=81) *M* |
|---|---|---|
| 1.Internal Sources | 3.56 | 4.01 |
| 2.External Sources | 2.78 | 3.60 |

## One-Way ANOVA

A One-Way Analysis of Variance (ANOVA) was conducted to investigate differences between clusters on positive affect (see Table 8 and Figure 3). Assumptions were tested which included Levene's Test of Homogeneity of Variance ($p$=.42) which was good and the Shapiro-Wilk Test of Normality ($p$=.03 for cluster 1 and $p$=.13 for cluster 2). With regards to the ANOVA, while Cluster 2 (the multiple sources group) scored higher on positive affect than Cluster 1 (the internal sources only group), Cluster 2 did not have significantly higher scores on positive affect than cluster 1 ($p$>.05). $F(1,149)$=.91, $p$=.34; $\eta p^2$= .01. Thus, the hypothesis that multiples sources of competence

information would be more correlated to positive affect than internal sources of

competence information alone was not supported.

Table 8

*Cluster Means and Standard Deviations on Affect*

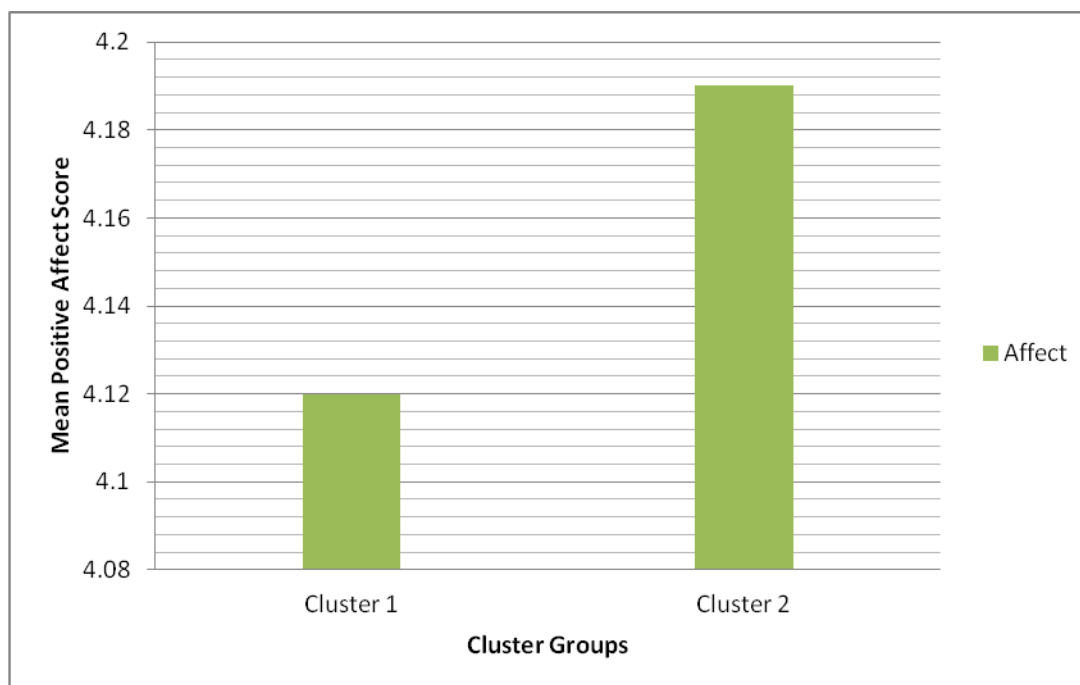| Variable | Cluster 1 (n=70) | | Cluster 2 (n=81) | |
|---|---|---|---|---|
| | M | SD | M | SD |
| Positive Affect | 4.12 | .46 | 4.19 | .49 |



Figure 3. *Cluster group patterns on positive affect.*

Mediation Regression Analyses

Mediation was tested using multiple regressions. It was tested for cluster 2. Step 1 did not find a significant relationship between sources of competence information and perceptions of competence ($\beta = .19$, $p = .13$; $R^2 = .04$). According to Baron and Kenny (1986), no mediation occurred for cluster 2 because the first step was not significant. In order to have mediation, there needs to be a significant relationship between sources of competence information and perceptions of competence. No further steps were necessary, since the first step was not significant (Gregory & Ripski, 2008). Thus, perceptions of competence do not mediate the relationship between multiple sources of competence information and positive affect in this study.

CHAPTER V

DISCUSSION AND CONCLUSION

Being engaged in physical activity is important throughout the lifespan. According to Lox et al. (2006), physical activity provides health benefits such as a decreased risk of heart disease and psychological benefits such as an enhanced mood. Many people participate in physical activity for fun and enjoyment (Babkes & Weiss, 1999; Klint & Weiss, 1987). On the other hand, people stop participating in physical activity when they are not having fun (Babkes & Weiss, 1999; Garcia Bengoechea & Strean, 2007; Smoll et al., 1993). Those most prone to drop out from physical activity are young adults after college graduation due to perceived lack of time and lack of enjoyment (Coakley & White, 1992; Scanlan et al., 2005; Weiss & Amorose, 2006).

Harter's (1978) Competence Motivation Theory has provided a model that displays how a lack of enjoyment leads to a lack of motivation. And, a lack of motivation causes one to drop out of physical activity. Because of the immense benefits of physical activity, it is important to determine factors related to enjoyment in sport. One such factor is sources of competence information. Sources of competence information include internal sources, which come from within the individual, and external sources, which come from outside of the individual. Scanlan et al. (2005) challenged researchers to examine the link between sources of competence information and affect in physical activity participants. The purpose of this study was to describe the influence of sources of

competence information on the affect of college student physical activity participants. College students, excluding student-athletes, were included in the sample because young adults are most prone to drop out of physical activity and because most have reached a cognitive maturation stage to incorporate both internal and external sources of competence information (Amorose, 2003; Bois et al., 2002; Horn & Harris, 2002).

Hypothesis 1: Are Multiple Sources More Related to Positive Affect?

A One-Way ANOVA was conducted to determine if the multiple sources of competence information group (Cluster 2) scored significantly higher on positive affect than the high internal sources of competence information group (Cluster 1). One group was high in internal and high in external sources of competence information (Cluster 2). The other group was high in only internal sources of competence information (Cluster 1). However, in this study, while the positive affect scores of the multiple sources of competence information group (Cluster 2) was overall greater than the high internal sources of competence information group (Cluster 1), it was not significantly higher. The hypothesis that multiple sources of competence information would have a significantly greater relationship to positive affect than internal sources of competence information was not supported. Statistically, there was no difference in positive affect between the two cluster groups. A common variable, however, between the two cluster groups was the high reliance on internal sources of competence information. Thus, it is likely that since both groups were high on internal sources of competence information, internal sources of competence information may well be a major factor related to positive affect, especially since external sources of competence information was not correlated with positive affect ($r=-.09$). On the other hand, the correlation between internal sources of competence

information and positive affect was significant ($r$=.32). For the multiple sources of competence information group, the internal sources of competence information may have overridden the negative effect of the external sources on affect enabling the multiple sources group to have high positive affect overall. The results of this study showed that internal sources of competence information (and not multiple or external sources of competence information) was the determining factor influencing positive affect in university students involved in physical activity.

Some studies have postulated that multiple sources of competence information should be more related to positive outcomes such as positive affect, when compared with one source of competence information alone due to the belief that multiple sources increase perceptions of flexibility, accuracy, and control (Horn, 2004; Horn & Harris, 2002; Horn & Hasbrook, 1987; Horn & Weiss, 1991). Other studies have shown that use of only internal sources of competence information is associated with positive outcomes (Boyd & Kim 2007; Frey & Ruble, 1990; Harwood & Biddle, 2002; Wang & Biddle, 2003). This study showed that the use of internal sources of competence information was correlated with positive affect. In this study, both multiple and internal sources of competence information were related to positive affect. But, adding external sources of competence information to internal sources of competence information (thereby creating multiple sources of competence information) may be unnecessary in terms of increasing positive affect. In order words, college students may not need to use multiple sources of competence information in order to achieve positive psychological outcomes from participating in physical activity. As long as they use internal sources, they should have high positive affect while participating in physical activity.

Numerous scholars (e.g., Boyd & Kim 2007; Frey & Ruble, 1990; Harwood & Biddle, 2002; Wang & Biddle, 2003) have postulated that internal sources of competence information are more related to positive outcomes than external sources because internal sources are related to greater control over one's beliefs about competency and emotions. In other words, physical activity participants feel better when they decide their own competence versus having peers or coaches decide for them. External sources have been shown to be related to more negative outcomes than internal sources of competence information (Babkes & Weiss, 1999; Bois et al., 2005). Thus, when students utilize multiple sources (i.e., both internal and external sources), the internal sources of competence information have a greater contribution to positive affect than the use of external sources. This study suggests that external sources of competence information, when used with internal sources of competence information, do not significantly improve or decrease positive affect. For instance, for a student, who wants to participate in physical activity because he likes being active and thus enjoys the activity, having an instructor tell him that he is good at that activity or comparing himself to other students in the class may not influence his positive affect more than the fact that he likes being active.

Hypothesis 2: Do Perceptions of Competence Serve as a Mediator?

In Harter's (1978) model, sources of competence information are often related to perceptions of competence, which are then associated with affect. To determine if perceptions of competence served as a mediator between multiple sources of competence information and positive affect in this study, a meditational analysis was conducted for Cluster 2. The mediation was not significant, revealing that perceptions of competence

were not a significant factor in the relationship between multiple sources of competence information and positive affect. The hypothesis that perceptions of competence would mediate the relationship between multiple sources of competence information and affect was not supported. Multiple sources of competence information were not significantly related to perceptions of competence. In other words, physical activity participants in college, who use multiple sources of competence information, may not use perceptions of competence in order to achieve positive affect.

The current findings do not corroborate previous research. Other studies have found a relationship between perceptions of competence and sources of competence information. Unlike this study, these studies utilized populations that rely heavily on external sources of competence. For example, Babkes and Weiss (1999) and Black and Weiss (1992) conducted studies which focused on children. And, young children rely heavily on external sources of competence information (Horn, 2004). These studies with children have also shown the link between external sources of competence information - in the form of parent, peer, and coach feedback - and perceptions of competence and affect (Smith, 1999; Weiss et al., 1996). However, these studies did not examine the association between internal or multiple sources of competence information, perceptions of competence, and affect. There are no studies utilizing college students showing a link between multiple or internal sources of competence information and affect through perceptions of competence. Consequently, perceptions of competence may be a mediator for external sources of competence information and affect with children, but multiple and internal sources of competence information may be directly related to positive affect in college students. Horn (2004) reported that there is a transition point during adolescence

when people move from focusing on external sources of competence information to internal sources of competence information. As a result, those former studies, which focused on children, could not examine the relationship between multiple sources of competence or internal sources of competence information, perceptions of competence, and affect.

Based on the results of this study and previous studies cited above, perceptions of competence appear to have a basis in external sources of competence information. To have perceptions of competence, an external system of comparison (e.g., coach feedback) that provides people with guidance about their ability level may be necessary. In other words, how a person perceives his skill level is often based on external sources such as comparison to peers and coach feedback. Thinking he is better than his peers in soccer and receiving positive feedback from his coach will probably lead to high perceptions of competence and positive affect. For example, "I think I am a good soccer player because I am better than my peers, and my coach tells me I am a good player," and "I enjoy playing soccer because I am good at it." On the other hand, someone, who received enjoyment simply by participating in physical activity, utilizes internal sources of competence information such as improvement. For instance, "I enjoy playing soccer because I am improving, not because I think I am a highly skilled player." In essence, this person does not have to use external sources of competence information or have high perceptions of competence in order to enjoy participating in physical activity. This person probably does not care if he is competent in soccer because his enjoyment is not based on being highly skilled but on improvement.

The results of this study hint that those, who use multiple sources of competence information, are more like the profile of those, who use internal sources of competence information alone over those, who use external sources of competence information. An example is the finding from the first hypothesis that there was no difference in positive affect between the multiple sources and internal sources of competence information groups. In addition, from the mediation, multiple sources of competence information were not related to perceptions of competence, unlike studies using external sources (Smith, 1999; Weiss et al., 1992). Consequently, unlike external sources of competence information which are associated with affect through perceptions of competence, internal and multiple sources of competence information may be directly related to positive affect; perceptions of competence may be irrelevant for those students, who use internal sources of competence information at all.

Limitations

The findings of this study should be considered in light of several considerations. The use of internal sources of competence information by these students could be related to the nature of the students and their physical activity courses. At the university, these courses are not required. Thus, students chose to enroll. This could represent a "selection effect." It is possible that student enroll because they are motivated internally to register in order to have fun, get exercise, learn how to play a new sport, or improve their skills. In essence, there is no external pressure from the university to enroll for required credit. And, in most classes (e.g., basketball, rugby, and core training), no performance evaluation existed because there were often no competitive games or matches providing some external reward, such as a trophy. Students were not graded based on how well they

performed in competition, which is an external source of competence information. Moreover, the physical activity courses were established to provide students with exercise, fun, and an opportunity to learn new skills, or improve skills utilizing internal sources of competence information. The sample in the study included university students enrolled in optional physical activity courses. Thus, this study cannot generalize to other groups, including college athletes.

Other demographic groups to whom this study cannot generalize are same-aged students not enrolled in universities and of differing socio-economic status and race than the majority of participants in this study. Differences in preference for sources of competence information may exist between university students and young adults not enrolled in college. In general, college students have a lot of access to physical activity, as most students are required to pay for access to their schools' gyms through student fees, for example. Non-college students may have less access to physical activity than college students. Also, physical activity tends to be less available for people of lower socio-economic status, especially those who live in un-safe communities without parks and sidewalks (Molnar, Gortmaker, Bull, & Buka, 2004). It is likely that the majority of college students in this study were middle-class. The sources favored by those with less access to physical activity may or may not differ from those of middle-class, college students. Maybe lower-income individuals may prefer external sources such as income or scholarships in order to participate in athletics.

With regards to race, the overwhelming majority of studies that have focused on sources of competence information have included majority Caucasian-American samples, including the sample in this study which was 96 percent Caucasian. Tafarodi and Swann

(1996) reported that individualistic cultures emphasize independence and the self whereas collectivist cultures promote relationships and communities. It is possible that people from a collectivist culture may favor external sources of competence information such as the influence of parents and peers, whereas people from individualist cultures such as Caucasian-Americans may prefer internal sources of competence information such as effort. In essence, this study can only generalize to Caucasian, middle-class young adult university students enrolled in physical activity classes.

The majority of the sample was female (60%). The findings of this study may represent a female orientation towards internal sources of competence information. Ebbeck (1990) found that females preferred internal sources of competence information and males preferred external sources of competence information. Females may have higher affect when using internal sources of competence information, and males may have higher affect when using external sources of competence information (Ebbeck, 1990). Future studies can examine gender differences in the preferences for sources of competence information to confirm the findings from Ebbeck (1990).

Another limitation is that the results of the surveys could be explained partly by shared method variance. Students reported on their own reliance of sources of competence information, perceptions of competence, and positive affect. This is a single source of information and implies that rater bias may exist. For instance, students could have been inflated raters, who rated most items positively. Thus, they would have inflated scores on the scales. Furthermore, the students may have been influenced by the social desirability bias. They may have wanted to appear healthy and happy and thus rated themselves highly in positive affect. In addition, there could have been a selection bias,

suggesting that students, who were internally motivated (since they were not compensated for participation in this study) and who were happier, participated in the study. Selection bias is an internal threat to validity (Cooke & Campbell, 1979). According to Herrald & Lucker (1995), self-selection into a study can impact one's self-evaluation responses. It is unknown how much of the results stem from the shared method variance, social desirability bias, and selection bias. To decrease the effect of these biases, students could have been randomly selected to participate in the study, and outside raters (e.g., instructors and parents) might have comments on students' perceptions of their sources of competence, perceptions of competence, and affect. It would be informative to examine if outside raters' perceptions of students' preferences for sources of competence information were similar or different to those that the students reported.

Finally, the students were only measured at one point in time (after two months of being enrolled in their classes). What is not known is the true temporal direction of the relationship between sources of competence information and positive affect. The students at that point in time could have had high positive self-awareness, which could have influenced the outcome. Or, their high positive affect could have led them to select internal and multiple sources of competence information over external sources of competence information. A more rigorous method of measurement could have been to test the students at multiple time points to determine the consistency of their responses.

## Future Studies

Future studies could include students at other universities enrolled in optional physical activity classes to confirm these findings. In addition, college athletes, youth

athletes, and older adult physical activity participants could be used in samples to help determine if the use of internal sources compared with multiple sources has the same influence on positive affect with these other populations. Moreover, studies could compare university students with same-aged, non-university students. And, future research can examine if there are differences in sources of competence information and affect based on socio-economic status, race, and gender.

Perspective studies, following individuals from childhood through adulthood, would also be relevant to positive affect, since people rely on different sources as they age (Horn, 2004). And, the major transition is from reliance on external sources (e.g., young children) to internal sources (e.g., adolescents). In other words, young children, who rely on external sources of competence information, may high positive affect. However, when they become adolescents, their affect may be higher using internal sources of competence information.

In addition, future studies can examine difference in ability levels of students and preferences for sources of competence information and the relation to positive affect. Findings are mixed as to whether people with higher or lower ability prefer internal, external, or multiple sources of competence information (Frey & Ruble, 1990; Halliburton & Weiss, 2002). Finally, students in different types of classes can be compared with regards to their reliance on certain sources of competence information and its relation to positive affect. For example, students in classes with a performance component (e.g., basketball) can be compared to students in classes without a performance component (e.g., yoga). It could be assumed that students in classes with a performance component may prefer external and/or multiple sources of competence

information than those in classes without a performance component, which is an external source of competence information.

Guidelines for Colleges and Universities

The psychological effects of participating in physical activity are important, since negative outcomes such as lack of enjoyment and stress can lead to burnout and dropout. And, not being physically active is related to depression, anxiety, obesity, and heart disease (Lox et al., 2006). College is a significant time which can determine if students will drop out of physical activity or continue to participate throughout their life spans (Malina, 2001). To promote physical activity, colleges and universities should provide programs for university students to participate in physical activity. However, colleges and universities should be careful not to provide external pressure for students to enroll in these courses, as compelling students, who have no interest and a lack of time, could lead to negative affect. For example, forcing a student, who is taking a lot of credits to sign-up for a course can lead to the student feeling resentful and unhappy; whereas, that same student may decide to register for a physical activity course another semester when she is taking less credits and will likely enjoy the course more at that time. Essentially, physical activity classes should be optional for students. They should also be publicized, so students are aware of them. Many different physical activity course options should be offered.

The goal of these classes should be to help foster positive affect in students, while they participate in physical activity. Physical activity instructors may have a lot of technical knowledge and skills but often do not receive training in the psychological aspects of physical activity. Hence, colleges and universities are encouraged to provide

instructors with guidelines on how to work with the students. This would include

teaching the instructors how to treat most of the students in their classes as if they are

internally motivated. In other words, instructors should not expect that competition, peer

comparison, praise, and criticism, which are all external sources, will make a difference

in students' affect or participation levels. Thus, instructors should not include a lot of

competition in their courses and should not provide a lot of criticism. They should also be

aware that because most students are probably internally motivated, their feedback will

likely not have a big impact on most of their students' affect and motivation.

However, since not all students are the same, instructors can provide students with

a self-assessment rating scale at the beginning of the semester to determine their

preference for sources of competence information. The assessment instruments can be

scored and interpreted by graduate students in psychology programs, who are trained in

these scales. Based on the results of the scales, instructors should preferably emphasize

relevant sources of competence information for each student to increase each student's

motivation, adherence, and interest in physical activity (Herrald & Lucker, 1995).

Moreover, students can be given pre-and post-affect rating scales to analyze the

effectiveness of the school's physical activity program. If affect scores have improved

over the semester and a majority of students are experiencing positive affect, then the

program is effective in encouraging positive affect and likely also helping increase

motivation for students to continue participation in physical activity.

## Conclusion

The purpose of this study was to examine the sources of competence information

that college student, physical activity participants display. Internal sources of competence

information in university student, non-student athletes, are the determining factor influencing positive affect relating to participation in physical activity. It is important for college students to continue to participate in physical activity to receive psychological and physical health benefits. College students, who are not student-athletes, should be encouraged to utilize internal sources of competence information, which should provide them with positive affect. They may not need to use any external sources of competence information or acquire high perceptions of competence in order to derive physical and or psychological benefits from physical activity.

REFERENCES

Amorose, A.J. (2003). Reflected appraisals and perceived importance of significant others' appraisals as predictors of college athletes' self-perceptions of competence. *Research Quarterly for Exercise and Sport, 74(1),* 60-70.

Atienza, A.A. (2001). Home-based physical activity programs for middle-aged and older adults: Summary of empirical research. *Journal of Aging and Physical Activity,* 9, S38-S58.

Babkes, M.L., & Weiss, M.R. (1999). Parental influence on cognitive and affective responses in children's competitive soccer participation. *Pediatric Exercise Science, 11,* 44–62.

Bai, J., & Ng, S. (2005). Tests for skewness, kurtosis, and normality for time series data. *Journal of Business and Economic Statistics, 23(1),* 49-60. doi 10.1198/073500010400000027

Barnett, N.P., Smoll, F.L., & Smith, R.E. (1992). Effects of enhancing coach-athlete relationships on youth sport attrition. *The Sport Psychologist, 6(2)*, 111-127.

Baron, R.M., & Kenny, D.A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51(6),* 1173-1182.

Black, S. J., & Weiss, M. R. (1992). The relationship among perceived coaching behaviors, perceptions of ability, and motivation in competitive age-group swimmers. *Journal of Sport and Exercise Psychology, 14,* 309-325.

Bois, J.E., Sarrazin, P.G., Brustad, R.J., Chanal, J.P., & Trouilloud, D.O. (2005). Parents' appraisals, reflected appraisals, and children's self-appraisals of sport competence: A yearlong study. *Journal of Applied Sport Psychology, 17,* 273-289.

Boyd, M.P., & Kim, M. (2007). Goal orientations and sensation seeking in relation to optimal mood states among skateboarders. *Journal of Sport Behavior, 30(1),* 21-35.

Brendgen, M., Wanner, B., Vitaro, F., Bukowski, W.M., & Tremblay, R.E. (2007). Verbal abuse by the teacher during childhood and academic, behavioral, and emotional adjustment in young adulthood. *Journal of Educational Psychology, 99(1),* 26-38.

Brodkin, P., & Weiss, M.R. (1990). Developmental differences in motivation for participating in competitive swimming. *Journal of Sport and Exercise Psychology, 12,* 248-264.

Burley, R.C., Turner, L.A., & Vitulli, W.F. (1999). The relationship between goal orientation and age among adolescents and adults. *Journal of Genetic Psychology, 160, 84-89.*

Carstensen, L.L. (1992). Motivation for social contact across the life span: A theory of sociemotional selectivity. In J.E. Jacobs (Ed.), *Nebraska Symposium on Motivation: Vol. 40. Developmental perspectives on motivation - Current theory and research in motivation* (pp. 209-254). Lincoln, Nebraska: University of Nebraska Press.

Coakley, J.J., & White, A. (1992). Making decisions: Gender and sport participation among British adolescents. *Sociology of Sport Journal, 9,* 20–35.

Cresswell, S.L., & Eklund, R.C. (2007). Athlete burnout: A longitudinal qualitative study. *The Sport Psychologist, 21,* 1-20.

Ebbeck, V. (1990). Sources of performance information in the exercise setting. *Journal of Sport and Exercise Psychology, 12,* 56-65.

Elliot, A.J., & Sheldon, K.M. (1997). Avoidance achievement motivation: A personal goal analysis. *Journal of Personality and Social Psychology, 73(1),* 171-185.

Frey, K.S., & Ruble, D.N. (1990). Strategies for comparative evaluation: maintaining a sense of competence across the life span. In R. Sternberg & J. Kolligian, Jr. (Eds.), *Competence considered* (pp. 167-189). New Haven: Yale University Press.

Garcia Bengoechea, E., & Strean, W.B. (2007). On the interpersonal context of adolescents' sport motivation. *Psychology of Sport and Exercise, 8,* 195-217.

Gregory, A., and Ripski, M.B. (2008). Adolescent trust in teachers: Implications for behavior in the high school classroom. *Social Psychology Review, 37(3),* 337-353.

Grodesky, J.M., Kosma, M., & Solmon, M.A. (2006). Understanding older adults' physical activity behavior: A multi-theoretical approach. *Quest, 58,* 310-329.

Halliburton, A.L. (2000). *Sources of competence information and perceived motivational climate: Differences among adolescent female gymnasts.* Unpublished master's thesis, University of Virginia, Charlottesville, Virginia.

Halliburton, A.L., & Weiss, M.R. (2002). Sources of competence information and perceived motivational climate among adolescent female gymnasts varying in skill level. *Journal of Sport and Exercise Psychology, 24,* 396-419.

Harter, S. (1978). Effectance motivation reconsidered. *Human Development, 21,* 34-64.

Harwood, C., & Biddle, S. (2002). The application of achievement goal theory in youth sport. In I. Cockerill (Ed.), *Solutions in sport psychology*. LondonLThomson.

Herrald, M.M, & Lucker, G.W. (1995). Ethnic and gender variations in the sources of information used to evaluate performance in the exercise setting. *Journal of Social Psychology, 25(24),* 2180-2191.

Hollembeak, J., & Amorose, A.J. (2005). Perceived coaching behaviors and college athletes' intrinsic motivation: A test of self-determination theory. *Journal of Applied Sport Psychology, 17,* 20-36.

Horn, T.S. (2004). Developmental perspectives on self-perceptions in children and adolescents. In M.R. Weiss (Ed.), *Developmental sport and exercise psychology: A lifespan perspective* (pp. 101-144). Morgantown, WV: Fitness Information Technology.

Horn, T.S., & Amorose, A.J. (1998). Sources of competence information. In J.L. Duda (Ed.), *Advances in sport and exercise psychology measurement* (pp. 49–64). Morgantown, WV: Fitness Information Technology.

Horn, T.S., Glenn, S.D., & Wentzell, A.B. (1993). Sources of information underlying personal ability judgments in high school athletes. *Pediatric Exercise Science, 5,* 263–274.

Horn, T.S., & Harris, A. (2002). Perceived competence in young athletes: Research findings and recommendations for coaches and parents. In F.L. Smoll & R.E. Smith (Eds.), *Children and youth in sport: A biopsychosocial perspective* (2nd ed.) (pp.435-464). Dubuque, IA: Kendall/Hurt.

Horn, T.S., & Hasbrook, C.A. (1987). Psychological characteristics and the criteria children use for self-evaluation. *Journal of Sport Psychology, 9,* 208–221.

Horn, T.S., & Weiss, M.R. (1991). A developmental analysis of children's self-ability judgments. *Pediatric Exercise Science, 3,* 312–328.

Izquierdo-Porrera, A.M., Powell, C.C., Reiner, J., & Fontaine, K.R. (2002). Correlates of exercise adherence in an African-American church community. *Cultural Diversity and Ethnic Minority Psycholoyg, 8(4),* 389-394.

Jones, S., & Lagacé-Séguin, D.G. (2006). I think I can't, I think I can't: Associations between parental pessimism, child affect, and children's well-being. *Early Child Development and Care, 176(8),* 849-865.

Jowett, S., & Cramer, D. (2010). The prediction of young athletes' physical self from perceptions of relationships with parents and coaches. *Psychology of Sport and Exercise, 11,* 140-147.

Kendierski, D., and DeCarlo, K.J. (1991). Physical activity enjoyment scale. *Journal of Sport and Exercise Psychology, 13,* 50-64.

Klint, K.A., & Weiss, M.R. (1986). Dropping in and dropping out: Participation motives of current and former youth gymnasts. *Canadian Journal of Applied Sport Sciences, 11,* 106-114.

Landry, J.B., & Solmon, M.A. Self-determination theory as an organizing framework to investigate women's physical activity behavior. *Quest, 54,* 332-355.

Lemyre, P., Treasure, D.C., & Roberts, G.C. (2006). Influence of variability in motivation and affect on elite athlete burnout susceptibility. *Journal of Sport and Exercise Psychology, 28,* 32-48.

Lox, C.L., Martin Ginis, K.A., & Petruzzello, S.J. (2006). *The Psychology of Exercise: Integrating theory and practice* (2nd ed.). Scottsdale, AZ: Holcomb Hathaway.

Malina, R.M. (2001). Adherence to physical activity from childhood to adulthood: A perspective from tracking studies. *Quest, 53*, 346-355.

Masciuch, McRae, & Young. (1990). The Harter self-perception profile: Some normative and psychometric data. *Psychological Reports, 67,* 1299-1303. doi:10.1371/journal.pbio.0050289

McCarthy, P.J., & Jones, M.V. (2007). A qualitative study of sport enjoyment in the sampling years. *The Sport Psychologist, 21,* 400-416.

Molnar, B.E., Gortmaker, S.L., Bull, F.C., & Buka, S.L. Unsafe to play? Neighborhood disorder and lack of safety predict reduced physical activity among urban children and adolescents. *American Journal of Health Promotion (4),* 378-386.

Morris, E.A, Brooks, P.R., & May, J.L. (2003). The relationship between achievement goal orientation and coping style: Traditional vs. nontraditional college students. *College Student Journal, 37(1,* 3-8.*)*

Motl, R.W., Dishman, R.K., Saunders, R., Dowda, M., Felton, G., and Pate, R.R. (2001). Measuring enjoyment of physical activity in adolescent girls. *American Journal of Preventive Medicine, 21(2),* 110-117.

Mun, E.Y., Windle, M., & Schainker, L. (2008). A model-based cluster analysis approach to adolescent problem behaviors and young adult outcomes. *Development and Psychopathology, 20,* 291-318. doi: 10.1017/S095457940800014X

Neemann, J. and Harter, S. (1986). *Manual for the Self-Perception Profile for College Students.* Denver, CO: University of Denver Press.

Pate, R. R., Pratt, M., Blair, S.N., Haskell, W.L., Macera, C.A., Bouchard, C., Buchner, D., Ettinger, W., Heath, G. W., King, A.C., Kriska, A., Leon, A.S., Marcus, B.H., Morris, J., Paffenbarger, R.S., Jr., Patrick, K., Pollock, M.L., Rippe, J.M., Sallis, J., & Wilmore, J.H. (1995). Physical activity and public health. *Journal of the American Medical Association, 273*, 402-407.

Price, M.S., & Weiss, M.R. (2000). Relationships among coach burnout, coach behaviors, and athletes' psychological responses. *The Sport Psychologist, 14,* 391-409.

Raedeke, T.D., & Smith, A.L. (2001). Development and preliminary validation of an athlete burnout measure. *Journal of Sport and Exercise Psychology, 23(4),* 281-306.

Ratelle, C.F., Larose, S., Guay, F., & Senécal, C. (2005). Perceptions of parental involvment and support as predictors of college students' persistence in a science cirriculum. *Journal of Family Psychology, 19(2),* 286-293.

Sapp, M., & Haubenstricker, J. (1978, April). *Motivation for joining and reasons for not continuing in youth sport programs in Michigan.* Paper presented at the American Alliance for Health, Physical Education, Recreation, and Dance annual conference, Kansas City, MO.

Savage, M.P. (1998). University students' motivation for participation in basic instruction program. *College Student Journal, 32(1),* 58-65.

Scanlan, T.K., Babkes, M.L., & Scanlan, L.A. (2005). Participation in sport : A developmental glimspe at emotion. In J.L. Mahoney, R.W. Larson & J.S. Eccles (Eds). Organized activities as contexts of development ; Extracurricular activities, after-school and community programs (pp. 275-309). Mahway, NJ : Lawrence Erlbaum & Associates.

Sheldon, J.P. (2003). Self-evaluation of competence by adult athletes: Its relation to skill level and personal importance. *The Sport Psychologist, 17,* 426-443.

Sheldon, J.P. (2004). Age and gender differences in the sources of self-evaluation valued by adult athletes. *Journal of Adult Development, 11(1),* 47-54.

Smith, A.L. (1999). Peer relationships and physical activity participation in early adolescence. *Journal of Sport & Exercise Psychology, 21,* 329-350.

Smoll, F.L., Smith, R.E., Barnett, N.P., & Everett, J.J. (1993). Enhancement of children's self-esteem through social support training for youth sport coaches. *Journal of Applied Psychology, 78*, 602-610.

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological Methodology,13*, 290-312.

Soper, D.S. (2011). Sobel test calculator for the significance of mediation: Online software). Retrieved from http://www.danielsoper.com/statcalc3.

Steinberg, L, & Monahan, K.C. (2007). Age differences in resistance to peer influence. *Developmental Psychology, 43(6),* 1531-1543.

Surkan, P.J., Ryan, L.M., Bidwell, H.W., Brooks, D.R., Peterson, K.E., & Gillman, M.W. (2005). Psychosocial correlates of leisure-time physical activity in urban working-class adults. *Journal of Physical Activity and Health, 2,* 397-411.

Tafarodi, R.W., & Swann, W.B. (1996). Individualism-collectivism and global self-esteem: Evidence for a cultural trade-off. *Journal of Cross-Cultural Psychology,27(6),* 651-672.

Trouilloud, D., Sarrazin, P., Bressoux, P., & Bois, J. (2006). Relation between teachers' early expectations and students' later perceived competence in physical education classes: Autonomy-supportive climate as a moderator. *Journal of Educational Psychology, 98,* 75-86.

Ullrich-French, S., & Smith, A.L. (2006). Perceptions of relationships with parents and peers in youth sport: Independent and combined prediction of motivational outcomes. *Psychology of Sport and Exercise, 7,* 193-214.

Von Eye, A., Mun, E.Y., & Indurkhya, A. (2004). Typifying developmental trajectories – a decision making perspective. *Psychology Science, 46(1),* 65-98.

Wang, C.K., & Biddle, S.J. (2003). Intrinsic motivation towards sports in Singaporean students: The role of sport ability beliefs. *Journal of Health Psychology, 8(5),* 515-523.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. Journal of Personality and Social Psychology, 54(6), 1063-70.

Weinberg, S.L., & Abramowitz, S.K. (2008). *Statistics using SPSS: An integrative approach.* Cambrigde, MA: Cambridge University Press.

Weiss, M.R., & Amorose, A.J. (2006). Motivational orientations and sport behavior. Chapter to appear in T.S. Horn (Ed.), *Advances in sport psychology* (3rd ed.). Champaign, IL: Human Kinetics.

Weiss, M.R., Ebbeck, V., & Horn, T.S. (1997). Children's self-perceptions and sources of competence information: A cluster analysis. *Journal of Sport & Exercise Psychology, 19,* 52–70

Weiss, M. R., & Ferrer Caja, E. (2002). Motivational orientations and sport behavior. In T.S. Horn (Ed.), *Advances in sport psychology* (2$^{nd}$ ed., pp. 101-184). Champaign, IL: Human Kinetics.

Weiss, M.R., & Fretwell, S.D. (2005). The parent-coach/child-athlete relationship in youth sport: Cordial, contentious, or conundrum? *Research Quarterly for Exercise and Sport, 76,* 286-305.

Weiss, M.R., & Petlichkoff, L.M. (1989). Children's motivation for participation in and withdrawal from sport: Identifying the missing links. *Pediatric Exercise Science, 1,* 195–211.

Weiss, M.R., & Smith, A.L. (2002). Friendship quality in youth sport: Relationship to age, gender, and motivation variables. *Journal of Sport & Exercise Psychology, 24,* 420-437.

Weiss, M.R., Smith, A.L., & Theeboom, M. (1996). "That's what friends are for": Children's and teenagers' perceptions of peer relationships in the sport domain. *Journal of Sport & Exercise Psychology, 18,* 347–379.

Whaley, D.E., & Mullen, S.P. (in press). Sources of competence information used by adult exercisers.

Whaley, D. E., & Mullen, S. P. (September, 2008). *Sources of competence information used by adult exercisers.* Presented at the Association of Applied Sport Psychology (AASP) conference. St. Louis, MO.

White, R.W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review, 66,* 297-330.

Williams, K.L, & Galliher, R.V. (2006). Predicting depression and self-esteem from social connectedness, support, and competence. *Journal of Clinical Psychology, 25(8),* 855-874.

APPENDIX A

In reply, please refer to: Project # 2008-0067-00

March 5, 2008

Jenya Gaskin
Leadership, Foundations & Policy
301 15th St., N. W.
Apt. 4003 D
Charlottesville, VA  22903

Dear Jenya Gaskin:

Thank you for submitting your project entitled: "Sources of Competence in Physically Active College Students" for review by the Institutional Review Board for the Social & Behavioral Sciences.  The Board reviewed your Protocol on March 5, 2008.

The first action that the Board takes with a new project is to decide whether the project is exempt from a more detailed review by the Board because the project may fall into one of the categories of research described as "exempt" in the Code of Federal Regulations.

Since the Board, and not individual researchers, is authorized to classify a project as exempt, we requested that you submit the materials describing your project so that we could make this initial decision.

As a result of this request, we have reviewed your project and classified it as exempt from further review by the Board for a period of four years.  This means that you may conduct the study as planned and you are not required to submit requests for continuation until the end of the fourth year.  Please use the submitted Online Consent Form.

This project # 2008-0067-00 has been exempted for the period March 5, 2008 to March 4, 2012.  If the study continues beyond the approval period, you will need to submit a continuation request to the Board.  If you make changes in the study, you will need to notify the Board of the changes.

Sincerely,


Tonya R. Moon, Ph.D.
Chair, Institutional Review Board for the Social and Behavioral Sciences

# APPENDIX B

**RUTGERS UNIVERSITY**
**Office of Research and Sponsored Programs**
**ASB III, 3 Rutgers Plaza, Cook Campus**
**New Brunswick, NJ 08901**

March 23, 2011
**P.I. Name:**  Gaskin
**Protocol #:** E11-438

Jenya  Gaskin
102 Montgomery St, Apt 1F
Highland Park NJ 08904

Dear Jenya Gaskin:

### Notice of Exemption from IRB Review

**Protocol Title:** "Sources of Competence in Physically Active College Students"

The project identified above has been approved for exemption under one of the six categories noted in 45 CFR 46, and as noted below:

**Exemption Date:**     2/16/2011               **Exempt Category:**     4

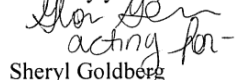This exemption is based on the following assumptions:

- **This Approval** - The research will be conducted according to the most recent version of the protocol that was submitted.

- **Reporting** – ORSP must be immediately informed of any injuries to subjects that occur and/or problems that arise, in the course of your research;

- **Modifications** – Any proposed changes MUST be submitted to the IRB as an amendment for review and approval prior to implementation;

- **Consent Form (s)** – Each person who signs a consent document will be given a copy of that document, if you are using such documents in your research. The Principal Investigator must retain all signed documents for at least three years after the conclusion of the research;

**Additional Notes:**            None

**Failure to comply with these conditions will result in withdrawal of this approval.**

The Federalwide Assurance (FWA) number for Rutgers University IRB is FWA00003913; this number may be requested on funding applications or by collaborators.

Sincerely yours,

*acting for –*

Sheryl Goldberg
Director of Office of Research and Sponsored Programs
gibel@grants.rutgers.edu

cc: Dr. Charles  Maher