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Peer reviewed|Thesis/dissertation

UNIVERSITY OF CALIFORNIA,  
IRVINE

The Pursuit of Achievement Goals: Inter-Domain Transfer Between Sports, Music and  
Academics

DISSERTATION

submitted in partial satisfaction of the requirements  
for the degree of

DOCTOR OF PHILOSOPHY

in Psychological Science

by

Priscilla S. Yau

Dissertation Committee:  
Professor Jutta Heckhausen, Chair  
Professor Chuansheng Chen  
Professor Deborah Vandell

2023



## **DEDICATION**

To my father, who taught me how to persevere with faith through the challenges presented on  
this life-changing journey.

To my mother, a brilliant yet compassionate professor whom I strive to model after.  
And to my sister, Joanna, whose intellect and passion for research are greatly inspiring to me.

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## **ABSTRACT OF THE DISSERTATION**

The Pursuit of Achievement Goals: Inter-Domain Transfer Between Sports, Music and Academics

By

Priscilla S. Yau

Doctor of Philosophy in Psychological Science

University of California, Irvine, 2023

Professor Jutta Heckhausen, Chair

Achievement-related goal pursuits are essential for developmental regulation across the lifespan, which often leads to growth in motivational beliefs and educational attainment. Individuals pursue different achievement-related goals simultaneously during childhood and adolescence through participation in extracurricular activities. During high school, the demand and competitiveness of extracurricular activities increase (e.g., Gustafsson et al., 2017). Among the most popular extracurriculars are sports and music, which will be the focus of this study. With more than 50% of high-school students participating in these activities (e.g., NCAA, 2018), it is worthwhile to explore how the pursuit of achievement-related goals in sports and music can facilitate rather than conflict with academic goal pursuit through the transfer phenomenon. This dissertation examines transfer of goal engagement strategies directly using cross-sectional studies, and indirectly by examining longitudinal associations between participation in extracurriculars and academic performance throughout later childhood and adolescence. .



Study 1 examined the association between motivational goal engagement skills used in sports and music and academics among high-school students (N = 197). Results from regression-based analyses showed that the use of selective primary control (SPC), selective secondary control (SSC), and compensatory primary control (CPC) strategies in extracurriculars and academics were positively associated. In addition, SPC, SSC, and CPC strategies used in sports and music were positively associated with perceived transfer. In study 2, college students (N = 440) were asked to recall their use of motivational goal engagement strategies in high-school sports and music. Regression-based analyses showed that the use of high-school SSC and CPC (for sports only) strategies in sports and music were associated with perceived transfer in college academics.

Study 3 examined potential factors that could facilitate or hinder transfer using the same dataset as study 2. Using regression-based analyses (N = 281), results showed that encouragement of transfer from socialization agents and value in sports and music was positively associated with perceived transfer. As the first three studies were cross-sectional, study 4 utilized longitudinal data to examine transfer indirectly and determine whether participation in sports and music/performance arts positively predicted academic performance throughout later childhood and adolescence (N=1,132). Results from a cross-lagged model showed an association in the opposite direction which did not provide evidence of transfer, such that academic performance positively predicted sports participation for athletes. Findings also showed that parental education and home environment predicted academic performance throughout childhood and adolescence. Although findings from this study did not show evidence of transfer, overall findings of this dissertation provide direction for further examining transfer through a motivational lens. Specifically, examining the potential transfer of selective secondary control

strategies under the guidance of socialization agents may be an effective way to promote academic achievement through youth's interests.

## INTRODUCTION

Throughout their lifespan, individuals constantly regulate their development through different means. One of the major ways in which individuals do so is through long-term goal pursuits, which can lead to major developmental achievements and growth. Different types of goals are pursued at different life stages, and adolescence is a unique time period in which opportunities to highly pursue multiple achievement-related goals in different domains are present. Having achievement goals during this life stage may lead to the development of valuable academic-related skills and motivational beliefs. As education is the basis of social mobility, learning these skills and beliefs can lead to positive life outcomes. Specifically in high school, youth are often striving to achieve their goals in multiple domains such as academics and other school-based extracurricular activities simultaneously. To optimize the chances of success in multiple domains, it is important to understand processes that can facilitate inter-domain achievement. Studies have yet to examine strategies to help adolescents transfer the motivational goal engagement strategies they learn in extracurricular activities to school.

The proposed dissertation will utilize four studies using one longitudinal dataset and two cross-sectional datasets to investigate ways in which adolescents' goal engagement in non-academic domains can lead to success in the academic domain. Specifically, these studies will examine the use of goal engagement strategies in high-school students' participation in extracurricular activities (i.e., sports and music) and determine whether these strategies are associated with transfer to academics. These studies will also identify factors such as motives, values, and support from others that facilitate or hinder skill transfer from one domain to the other. Ultimately, the purpose of this research is to gain a clearer understanding of how goal engagement in high-school extracurricular activities can lead to benefits in educational pursuits.

This dissertation aims to do so by assessing the following research questions: (1) Are extracurricular goal engagement strategies associated with academic goal engagement strategies and perceived transfer? (2) Which individual differences facilitate or hinder perceived transfer from skills used in extracurricular activities to academics? (3) Is participation in extracurricular activities positively associated with academic performance throughout childhood and adolescence?

### **Theoretical Context**

Two different theories will be used to provide the conceptual foundation of the proposed research, with the Motivational Theory of Lifespan Development as the general conceptual framework of individual agency in life-span development, and the Model of Life Skills Transfer as the more specific framework to understand processes of skill transfer. Within the Motivational Theory of Lifespan Development, this research will focus on the Action-Phase Model (Heckhausen et al., 2010). This model explains the different phases of the cycle of goal pursuit and the different control strategies used during those phases. Building on the Model of Life Skills Transfer (Pierce et al., 2017) which addresses the transfer process broadly, I will propose a model that captures the subset of factors addressed in this dissertation that have the potential to influence processes of transfer of motivational self-regulatory skills from extracurricular activities to academic performance.

### **The Motivational Theory of Lifespan Development**

According to the Motivational Theory of Lifespan Development, individuals are active agents in their own lives and strive to influence and regulate their own development throughout their lifespan by deciding which goals to pursue at which time points (Heckhausen et al., 2010).

Although individuals have the capability to actively pursue whichever goals they desire to achieve, these goals are often selected based on opportunities and constraints presented by societal institutions and expectations at different parts of one's life-stage (Heckhausen & Buchmann, 2018). For example, children and adolescents would most likely pursue and prioritize educational goals, while young adults may begin to transition into pursuing career- and family-related goals. These goals are known as age-graded developmental tasks, which organize individuals' life paths and determine which goals would lead to the most adaptive development (Havighurst, 1948; Heckhausen, 2010). During adolescence, youth often prioritize educational goals due to the amount of time they spend completing school-related work and the importance of academic success for postsecondary education (e.g., Galla et al., 2019; Pascoe et al., 2020). At the same time, adolescents who participate in high-school extracurricular activities experience a significant increase in the competitiveness, challenges, and demands of activities such as sports and music (e.g., Gustafsson et al., 2017). As both education and extracurricular activities play a prominent role in youth's lives during adolescence, it is promising to examine ways in which goals from both domains can be actively pursued.

Within the Motivational Theory of Lifespan Development, the action-phase model explains the process by which goals are chosen, pursued, and adjusted (*Figure 1*). This dissertation will focus on the goal engagement part of the model which is also known as the volitional phase in the action cycle, a phase during which individuals actively pursue their goals using goal engagement strategies. The rest of the model regarding goal choice and disengagement will be briefly explained in the following section.

When individuals initially decide on which goals to pursue, they are guided to select the most developmentally appropriate goal(s) by ensuring that the goal matches the opportunities

presented. In addition, they must also determine whether investing time and resources to pursue specific goals would be at the expense of investment in other potentially important goals. Furthermore, individuals must consider the negative effects of exclusively pursuing only one goal in one domain, which may lead to depletion of all energy and resources for the pursuit of a potentially futile goal.

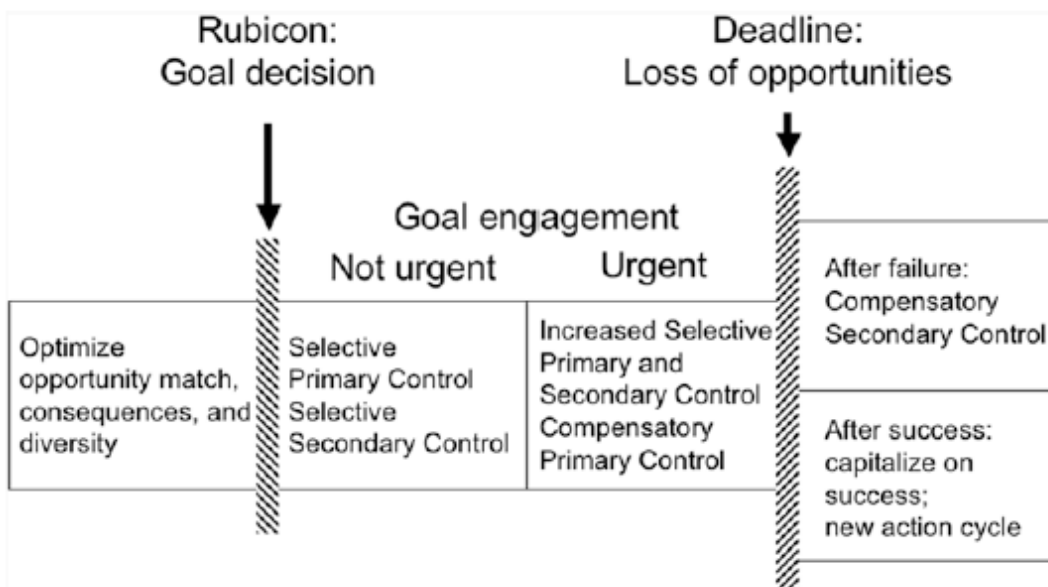


Figure 1: Action-phase model (Heckhausen et al., 2010).

After they decide on which goal(s) to actively pursue, individuals reach the “decisional Rubicon” which represents the stage between goal selection and goal pursuit. Once they pass the Rubicon, they enter into the volitional phase. At this point, individuals are heavily focused on attaining their goals. During the volitional phase, goal engagement occurs when various goal engagement

strategies are used for goal pursuit. The three different types of goal engagement strategies include selective primary control, selective secondary control, and compensatory primary control. Selective primary control is used when individuals invest time and effort into the goal. For example, a person who sets a goal to become more physically fit and exercise may set aside time to go on a run at least three times a week. Selective secondary control includes cognitive strategies and is used when individuals avoid distractions and enhance their positive perceptions of goal attainment. This strategy is used when individuals encounter challenges during goal pursuit, which enhances goal commitment and the use of selective primary control. For example, the person may eventually feel tired from running due to soreness. Although his friends suggest that he takes a long break and watch movies instead, he avoids this distraction and reminds himself how happy he will be when he becomes fit. As a result, he decides to continue taking the time to run consistently. The third goal engagement strategy is compensatory primary control, in which individuals resort to external resources or unusual means to attain the goal when only investing time and effort is not enough. One way in which a compensatory primary control strategy is used is by asking others for help. In the case of the person whose goal is to become physically fit, he may ask a friend to run with him and keep him accountable. In addition, he could see a personal trainer and seek advice on how to become fit.

While all three goal engagement strategies are often used in pursuit of challenging goals, they are used during different parts of the volitional phase. The volitional phase is separated by non-urgent and urgent goal engagement. During the non-urgent part of the volitional phase, individuals use selective primary control and selective secondary control strategies. As the developmental deadline approaches and individuals enter into the urgent part of the volitional phase, they increase the use of selective primary control and selective secondary control

strategies (Heckhausen et al., 2010). In addition, compensatory primary control strategies are utilized as part of the increased effort to attain the goal before the opportunity passes.

Opportunities for goal pursuit of many developmental goals fade away with age and time and it becomes extremely difficult or impossible to attain the goal after a certain point, constituting a *developmental deadline*. After the deadline passes it is more beneficial for the individual to disengage and preserve resources to pursue more promising goals instead. Prior studies have examined this phenomenon in domains such as childbearing, in which women who were in the urgent part of the volitional phase and were approaching the deadline to bear children exhibited and benefited from higher use of selective primary control, selective secondary control, and compensatory primary control strategies (Heckhausen et al., 2001). In contrast, women who had passed the deadline were more likely to have disengaged and benefited in their psychological well-being from disengagement.

In applying this phenomenon to the school context, deadlines occur in this domain once individuals run out of time to pursue goals in extracurricular activities and academics. This may occur for extracurricular activities such as sports and music when athletes and musicians run out of time to prepare for their competition seasons. It is possible that when the deadline to prepare for the season approaches, athletes and musicians increase the amount of time that they invest into training (selective primary control), avoid distractions and enhance their perception of goal attainment in this domain (selective secondary control), and ask others such as coaches or directors of the music program for help (compensatory primary control). This may also occur in the academic domain, when individuals approach the end of the school semester and are running out of time and opportunities (e.g., scheduled exams or other assignments) to achieve a high grade in the course. They may increase the amount of time they spend studying, continuing to



study even if they desire to watch television, and ask teachers or peers for help on coursework. Given that the increase in the use of goal engagement strategies near the deadline has not yet been explored in the school context, it would be beneficial to examine the potential change in the amount of goal engagement strategies that are used during the urgent phase in extracurricular and academic domains. Specifically, this dissertation will examine whether goal urgency in the academic domain can facilitate transfer of goal engagement strategies used in extracurricular activities to academics.

### **Goal Engagement Strategies Use in Achievement Domains**

Empirical studies have demonstrated individuals' use of goal engagement strategies in different domains such as health, career, and academics (e.g., Haase & Heckhausen, 2008; Hall et al., 2006; Hamm et al., 2015; Shane et al., 2019; Shane & Heckhausen, 2016; Wrosch et al., 2000). Within the academic domain, Hamm et al. (2015) demonstrated the importance of using goal engagement strategies such as selective primary control and selective secondary control strategies to achieve academic success. Studies have shown that for students who were struggling in their courses, interventions aimed at increasing the use of selective primary control and selective secondary control strategies were associated with improved academic performance (e.g., Hamm et al., 2019). It seems highly plausible that experiences with the effectiveness of motivational goal engagement strategies in extracurricular activities such as sports or music could have a similar promotive effect as interventions, a possibility that has not been studied so far. Thus, this dissertation aims to examine whether the use of selective primary control (SPC), selective secondary control (SSC), and compensatory primary control (CPC) strategies in high-school sports and music is associated with enhanced use of these strategies in academic activities.

## **Skill Transfer**

According to Woodworth and Thorndike (1901), skills that are acquired and learned in one domain can be applied to other domains as well. Defined as transfer, Woodworth and Thorndike (1901) first observed this phenomenon when they noticed that cognitive skill acquisition and improvement in one area led to improvement in another, positing that skills can be transferred if the domains share common elements. This led researchers to further examine different skills that can be transferred in different contexts. In doing so, researchers have differentiated between near and far transfer of various skills (e.g., Barnett & Ceci, 2002; Brown & Kane, 1988; Sala & Gobet, 2016). Researchers have defined near transfer as skill transfer that occurs within a very similar context in which the skill was originally learned, while far transfer refers to transferring skills between domains that are not similar in context (Hung, 2013; Larsen-Freeman, 2013). For example, studies have examined whether playing chess is associated with improvement of academic and cognitive skills (Aydin, 2015; Barrett & Fish, 2011; Sala & Gobet, 2016). The link between these two skills would be considered as far transfer because chess and academics are different domains, even though the skills that are transferred share common elements (e.g., problem-solving). Thus, even if the exact skills are transferred from one domain to another (e.g., problem-solving), it would be considered as far instead of near transfer if the domains are different. An example of near transfer would be children applying geometry-related stories they learned to actual geometry math problems (Casey et al., 2008). In this case, the math skills were transferred into the same domain.

Barnett and Ceci (2002) posited that more factors must be taken into account when determining whether a skill transferred from one domain to another is considered near or far. Two of the main factors include physical and temporal context. Physical context includes the

place in which the skill is learned such as in a research lab or at a home environment, while temporal context refers to the time it takes for the skill to transfer to another domain and how long the transfer lasts. Integrating these two contexts into defining transfer, an example of near transfer would be transferring an algebra formula that was initially learned in a classroom to solving a word-problem with the same formula within the same training session at the same place. Barnett and Ceci (2002) discussed the importance of examining far transfer as many studies have focused on near transfer, and it may be more valuable to examine whether skills that are learned can be applied in contexts other than where the skill is learned and for a long period of time. As extracurricular activities and academics are different domains, the places in which the skills may be learned are different (e.g., sports field vs. classroom), and the skills would not be applied immediately, this dissertation will examine far transfer of motivational self-regulation skills from participation in high-school sports and music to academics.

### **Participation in High-School Sports**

School-based extracurricular activities play important roles in adolescents' lives (Eccles & Roeser, 2009). Adolescents select many different extracurricular activities to participate in during high school, with sports as the most popular choice (Duffett et al., 2004). Participation in sports has been linked with many positive outcomes, especially for students who are at risk of disengaging or dropping out of school (e.g., Beal & Crockett, 2010; Dawes et al., 2015; Eccles & Barber, 1999; Vandell et al., 2020). Some academic and non-academic outcomes include a higher GPA, an increase in self-esteem, sense of belonging, persistence, concentration, and a reduction in stress and risky behaviors (e.g., Feldman & Matjasko, 2005; Fredricks & Eccles, 2006; Gadbois & Bowker, 2007; Martin et al., 2013; Van Boekel et al., 2016). Participation in

high-school sports also has long-term positive academic outcomes, such as a higher chance of attaining a college degree (Troutman & Dufur, 2007).

Furthermore, studies have shown that it is specifically participating in sports, and not merely engaging in physical activity that leads to academic success (e.g., Fox et al., 2010). In addition to playing a sport, the structure and setting of the sport may moderate the positive effects of sport participation. For example, Dawes et al. (2014) found that youth who participated either in formal or informal sports experienced an increase in their competence and developed positive motivational beliefs. However, the positive association between participation in sports and competence had a smaller effect for youth who participated in informal sports rather than formal organized sports, indicating that it may be more beneficial for adolescents to join school-based sports teams. Moreover, prior studies have demonstrated the importance of goal-setting for organized sports, which is necessary and beneficial for performing well in games and in practices (e.g., Coetzee et al., 2006; Harwood et al., 2004; Schilling & Hayashi, 2001). This implies that participation in organized sports provides opportunities for youth to learn how to effectively pursue their sports-related goals and optimize their chances of goal attainment by intentionally enhancing and adjusting their effort and engagement, which is an opportunity that may not be present or emphasized when only engaging in general physical fitness activities.

### **Skills Learned from Sports**

Past studies have found that through participation in sports, athletes learn the necessity of effort and time investment in achieving success (e.g., Gould & Carson, 2008; Harwood et al., 2004). The time and effort that is needed for high performance should be invested strategically and intentionally, as McCormick et al. (2019) discussed the importance of using self-regulation strategies during training. Examples of self-regulation include planning or goal-setting before

practicing, and strategically focusing attention on certain skills during practice. Results from these studies demonstrate the use of selective primary control strategies. These studies also imply the goal-oriented nature of participating in organized sports, such that athletes must intentionally modify their effort and engagement in practice and competition to achieve success. Furthermore, research has shown that adolescents can learn to use selective secondary control strategies through participating in sports, which includes cognitive strategies such as avoiding distractions or enhancing the perception and value of goal attainment. For example, Englert et al. (2012) demonstrated the importance of using self-control skills during competition, and Crust and Clough (2011) posited that athletes must effectively learn to avoid distractions and concentrate during practice and competition to perform successfully.

According to Kuhl's Theory of Action Control, both self-regulation and self-control are necessary to maintain or increase motivation in goal achievement. Self-regulation refers to the use of motivational, affective, and cognitive systems to influence behavior that leads to goal achievement (Kuhl 1983, 2001). On the other hand, self-control is defined as the inhibition of distracting thoughts and behaviors that would prevent the individual from achieving the desired goal. These two processes are known as volitional processes, and they are especially crucial when obstacles occur during goal pursuit. Both self-regulation and self-control play an important role in sports (Beckmann, 1999), although self-regulation strategies lead to more long-term benefits due to their reliance on motivational incentives to regulate behavior rather than on the suppression of desired alternative options (Kuhl & Beckmann, 1994). An example of an athlete using self-regulation skills would be to incorporate parts of training during practice that he enjoys, while an athlete who forces himself to continue training even though he would rather spend time with friends would be considered as engaging in self-control. In one study,

Beckmann et al., (2006) found that high school athletes who attended a school that focused on sports developed more volitional skills than adolescent athletes who attended a school without an emphasis on sports. Finally, Weiss et al. (2013) indicated that one of the skills learned through participation in sports is to ask others for help (i.e., compensatory primary control) when experiencing challenges in learning skills, which is considered a compensatory primary control strategy. Collectively, these research findings suggest that athletes learn valuable goal engagement strategies through sports.

### **Transfer of Skills Learned from Sports**

In recognizing the valuable skills that are learned through participation in sports, studies have examined whether skills learned from sports can transfer into other domains (e.g., Gould & Carson, 2008; Pierce et al., 2017). For example, a case study of a high school boys' soccer team found that the athletes learned and transferred skills such as teamwork and leadership into the classroom and in the workplace (Holt et al., 2008). This finding demonstrates the value of these skills because they can be transferred and retained many years after they are learned. Kendellen and Cameríe (2007) corroborated this finding by showing that former high-school athletes transferred interpersonal skills and self-regulation skills learned from sports into their workplace several years after graduating high school.

While most studies have identified transfer of general life skills into various domains, Bradley and Conway (2016) focused on the transfer of skills learned from sports specifically into academics. This review study highlighted the transfer of so-called non-cognitive skills into academics, which include motivational skills such as self-efficacy and perseverance (Gutman & Schoon, 2013). The “non-cognitive skills” defined by Gutman and Schoon (2013) also include self-regulation and self-control, which are volitional processes that are necessary to increase

motivation to overcome obstacles in both sports and academics (e.g., Beckmann, 2006; Schwinger et al., 2012). The transfer of these motivational self-regulation skills was demonstrated through a case study of a high-school tennis player (Jones & Lavalley, 2009). The tennis player transferred learned time management skills, organizational skills, and confidence (i.e., self-efficacy) from tennis into academics. Altogether, these skills may be categorized as selective secondary control strategies, which can be developed through sports and transferred into academics.

### **Participation in Music**

In addition to sports, past research has demonstrated the importance of goal engagement strategies that can be learned from involvement in music activities, (e.g., Hatfield et al., 2017; McPherson et al., 2019) which is the second-most popular choice of extracurricular activity after sports (Martinez et al., 2016). Findings from prior studies have emphasized the need to examine music students' use of self-regulatory strategies when practicing their musical instruments (e.g., Bonneville-Roussy & Bouffard, 2015; McPherson & Renwick, 2001). In assessing specific self-regulatory strategies in practices, Varela et al. (2016) found that making practice more enjoyable by selecting one's own song may increase motivation to practice. Results from this study also showed a positive association between self-efficacy and the use of self-regulatory strategies, demonstrating the positive effect of one's belief that investing time and effort into mastering a difficult skill can lead to achievement of the music-related goal. Hatfield et al. (2017) found that more advanced musicians used more self-regulatory strategies during practice. Furthermore, Ericsson et al. (1993) showed that highly skilled musicians used self-regulatory skills to optimize the quality and productivity of practices. All in all, these studies support the notion of developing goal engagement strategies when participating in music.

In recognizing the ability of individuals to learn valuable skills from musical practice, studies have also examined whether these acquired skills can transfer into other domains (e.g., Cohrdes et al., 2016; Corrigan & Trainor, 2011; Gordon et al., 2015). Many studies have focused on the cognitive changes in children's brain due to involvement in music, leading to an increase in intellectual ability (e.g., Moreno et al., 2011; Schellenberg, 2005). However, it is also important to examine the positive non-cognitive effects of participation in music which musicians could apply to other domains in a shorter amount of time. Regarding the transfer of non-cognitive skills to academics, studies have found a positive association between training in music and academic performance (e.g., Gouzouasis, 2007; Wetter et al., 2009). Conversely, a more recent meta-analysis found a lack of association between participation in music and academic achievement, positing that prior studies' significant findings are statistically flawed or biased (Sala & Gobet, 2020). In addition to shedding light on the conflicting results, the current dissertation will examine whether specific goal engagement strategies (i.e., selective primary control, selective secondary control, compensatory primary control) learned from adolescents' participation in high-school music activities can transfer to academics.

### **Factors that Potentially Facilitate or Hinder Transfer**

Prior studies have shown that when examining transfer, individual differences in the learner play a role in transfer (Gould & Carson, 2008; Pierce et al., 2017). Pierce and colleagues reported that some of the individual differences include athletes' past sports involvement and their physical capabilities for the sport (Pierce et al., 2017). Other studies have found that athletes who have a greater desire to develop certain learned skills are more likely to report transfer from sports to other domains (e.g., Holt et al., 2008). The desire to learn and develop skills may result from having a high achievement motive, in which individuals have a strong



desire to master tasks through reaching a standard of excellence (McClelland et al., 1953). On the other hand, having a high affiliation motive may not facilitate transfer to academics. Previous studies have found that athletes often engage in behaviors such as partying (Eccles et al., 2003), which may fulfill the motive to belong and build relationships. In addition to differences in the individual learner, external factors including the inherent demands of the sport and support for transfer from socializing agents may also affect athletes' perceived transfer (Pierce et al. 2017). Studies have shown that the degree to which athletes learn skills that they can transfer from sports to other domains depends on the type of sport they are involved in (e.g., Howard et al., 2018; Jonker et al., 2010).

Findings from prior studies indicated that individual-sport athletes have more opportunities to develop skills useful for school than team-sport athletes (e.g., Jonker et al., 2010). Another external factor that may play a role in transfer is support for transfer from parents, coaches, and peers, as prior studies have shown the influential role that each socialization agent plays in athletes' transfer of skills from sports to other life domains (e.g., Allen et al., 2015; Weiss et al., 2013). Hence, it is important to examine how each of these socialization agents is involved in athletes' experience of transfer and how they can increase athletes' awareness of the possibility of transfer (Pierce et al., 2017). Goal urgency in the academic domain may also facilitate transfer, as prior studies have demonstrated the increased use of goal engagement strategies once time is running out to achieve goals (Heckhausen et al., 2010). Taking all these findings regarding individual differences in transfer together, this dissertation will examine individual differences in athletes' and musicians' experience and skill levels, implicit motives, values placed in extracurriculars, type of sport, awareness of the

possibility of transfer, and the social support they receive for transfer from parents, peers, and coaches.

**Experience and skill level.** As discussed in the previous sections, athletes and musicians learn and develop motivational self-regulation skills through engagement in their respective extracurricular activities (e.g., McCormick et al., 2019; Varela et al., 2016; Weiss et al., 2013). Thus, it is possible that athletes and musicians who have been participating in sports and music longer have acquired more motivational self-regulation skills through multiple seasons of practice and competition. In addition, prior studies have distinguished between highly skilled athletes and musicians and those who do not perform at the same elite level (e.g., Ericsson et al., 1993; Harwood et al., 2004). Given that this research has shown that highly skilled athletes and musicians exhibit higher use of motivational self-regulation strategies, it can be expected that individuals who perform at a higher level are more likely to acquire elaborate selective primary control, selective secondary control, and compensatory primary control strategies that could later be transferred to the academic domain.

**Values Associated with Achievement Domains.** Another individual difference within learners that may affect transfer from extracurricular activities to academics is the value they associate with the extracurricular domains. According to the expectancy-value theory, an individual's level of attainment value (i.e., engaging in this task is central to one's self-image) in the task or activity can predict selection and persistence of the task (Wigfield & Eccles, 2000). When individuals value the goal, they are more likely to pursue it (Eccles, 2009). This implies that athletes and musicians who place greater value on sports may invest more time and effort into these activities, selecting more challenging tasks within these activities and persisting through challenges. Although motivational goal engagement strategies have not yet been

examined in an extracurricular context, it is likely that selective secondary control and compensatory primary control strategies would be utilized during challenging situations in sports and music. As a result, athletes and musicians may be more equipped to transfer these strategies to other domains. Thus, it is possible that individuals who view being an athlete as central to their identity will report greater transfer of skills learned in sports to school. This dissertation will also examine whether placing value in music for high-school musicians can facilitate transfer, a phenomenon that has not yet been explored.

**Implicit Motives.** While differences in experience and skill level may be crucial factors in determining transfer, it is also important to consider whether individual differences in motives are associated with skill transfer from sports to academics. Implicit motives are defined as unconscious fundamental needs, which play an important role in determining how individuals will behave (McClelland, 1987). Researchers have found that the three most prominent implicit motives that individuals have include the need for achievement, the need for affiliation, and the need for power. The “Big Three” implicit motives have been widely studied over the past seventy years, with the main focus on the achievement motive. The need for achievement is when one desires to master tasks and compete with a standard of excellence (McClelland et al., 1953), the need for affiliation is the desire to establish and maintain positive relationships with others (Heyns et al., 1958), and the need for power is the desire to influence others (McClelland, 1975). These three implicit motives have been shown to predict various outcomes such as life satisfaction, well-being, and flow (e.g., Hofer et al., 2006; Schüler et al., 2013). Specifically in the sports domain, studies have shown an association between implicit motives and sports, which highlights the importance of implicit motives in determining athletes’ experiences and performances in sports (e.g., Schüler et al., 2014). For example, Schüler and Brandstätter (2013)

found that athletes who were high in implicit achievement and affiliation motive were more likely to be successful with sports that provided opportunities to experience competence and social relatedness. Similarly, Gröpel et al. (2016) found that individuals high in implicit achievement motive, but not in explicit achievement motive were more likely to be engaged in sports participation. Wegner and Teubel (2014) also found that having a high implicit achievement motive, and not a high explicit achievement motives predicted performance in competition.

While the separate effect of the type of sport and the role that implicit motives play in athletes' performance have been studied, few studies have examined these factors in conjunction. In addition, no studies have examined their effects on skill transfer between different achievement domains. The present study will address the potential interaction between implicit motives and the type of sport on transfer of the skills learned from sports into academics. Prior studies have shown that team-sports athletes tend to show an increased alcohol consumption over time (e.g., Eccles & Barber, 1999; Kulesza et al., 2014). This outcome may be due to the social norm for team-sport athletes, which includes engaging in behaviors such as partying (e.g., Eccles et al., 2003). Athletes who have a strong affiliation motive and feel the need to belong, establish, and maintain relationships with others may desire to conform to these social norms. Hence, we expect that individuals who have a particularly strong affiliation motive will be less likely to utilize transfer of motivational self-regulatory skills if they are participating in a team sport. They may effectively learn the skills needed to succeed in sports, but they may not prioritize applying skills to other domains if their need to belong is already fulfilled through sports. The current study will expand on these findings related to sports and the achievement and affiliation motive by examining the role that implicit motives play in transfer.

**Type of Sport.** Studies have also examined differences in skills learned by individual-sport and team-sport athletes. Many studies have focused on self-regulation skills that athletes learn without closely examining and differentiating between the type of sport (e.g., Jonker et al., 2011; Toering et al., 2009). In the few studies that have differentiated between individual and team sports, one study found that while all athletes gained self-regulatory skills through participation in sports, individual-sport athletes scored higher on skills such as planning and effort than team-sport athletes (Jonker et al., 2010). Howard et al. (2018) partially confirmed this finding in their longitudinal study, which demonstrated that only participation in individual sports led to an increase in self-regulation skills, though the findings were for child-athletes. This finding may be explained by the difference in the amount of training that is needed to succeed in individual sports. Studies have shown that individual-sport athletes need to engage in deliberate training significantly longer than team-sport athletes to achieve the same expertise status (Baker et al., 2003; Ericsson, 2014), and that individual-sport athletes tend to have stronger relationships with their coaches (Rhind et al., 2012). In addition, team-sport athletes' overall performances are dependent on their teammates' performances, while individual-sport athletes' own performances entirely determine their level of achievement (Jonker et al., 2010). This implies that individual-sport athletes may have more opportunities to develop and strengthen their self-regulatory skills, possibly leading to more transfer of these skills to academics. The current study will assess differences in selective secondary control strategies between individual- and team-sport athletes, and it will expand on the literature by determining whether individual-sport athletes are more likely to transfer these learned skills to school.

**Social Support.** Adolescents may also receive guidance from others in their lives for experiencing transfer from extracurriculars to academics. Support for transfer may be provided

by authority figures and peers involved in youth's lives (e.g., Weiss et al., 2013). Coaches can facilitate the transfer process by directly emphasizing the application of life skills that athletes learn to other domains, while parents can validate the possibility of transferring skills from sports to other domains (Weiss et al., 2013). Additionally, peers can also play a crucial role in skill transfer by providing support in applying learned skills to different areas in life (e.g., Burke & Hutchins, 2007; Turnnidge et al., 2014). For example, Allen et al. (2015) found that student-athletes became aware of transfer possibilities from sports to school when listening to their peers' experiences of how they achieved transfer. While these findings demonstrate the importance of authority figures and peers in facilitating or impeding the transfer of skills from one domain to another, studies have yet to examine whether support for transfer can lead to transfer of specific motivational self-regulation skills that can be useful in the classroom. Thus, the present study will also examine whether social support can increase the likelihood of transferring skills used in extracurricular activities to academics.

### **Broad Model of Transfer**

According to the broad Model of Life Skill Transfer (Pierce et al., 2017), the process of transferring skills from one domain to another is preceded by and depends on many factors (Figure 2). This model posits that the individual learner, learning context, socio-cultural environment, and transfer context all contribute to determining whether the individual will transfer the skills that are learned. Before examining skill transfer, one must consider individual differences in athletes. In assessing specific skills that can be transferred to other domains, the skills can be categorized into different groups such as procedural, strategic, or conceptual. Whether the individual transfers these skills depend on the transfer context, including support for transfer or one's awareness of transfer possibilities. Ultimately, the procedural, strategic, or

conceptual skill can be transferred into a domain other than the one in which it was originally learned.

As mentioned by Pierce et al. (2017), this model is a broad framework and is not meant to be tested entirely in one study. Thus, this multi-study dissertation will focus on specific factors (i.e., experience in extracurriculars and implicit motives) pertaining to individual learners that can affect whether skills are transferred from extracurricular activities to academics, the procedural skills that can be transferred (i.e., motivational self-regulation skills and goal urgency), factors that can facilitate or hinder transfer (i.e., implicit motives), and the potential positive transfer outcome (i.e., academic achievement). Due to the focus on the transfer context, the broader learning context (e.g., school environment) in the domains included in the model will not be assessed in detail. Negative transfer outcomes (e.g., negative relationships with teammates negatively transferring to relationships with peers) will also not be addressed in this study, though factors that can hinder transfer will be examined. Finally, the Pierce et al. (2017) Model of Life Skills Transfer applies specifically to experiencing transfer from skills learned in sports only. The proposed model for this dissertation will expand the transfer model by including components that can be applied to other extracurricular activities including music.

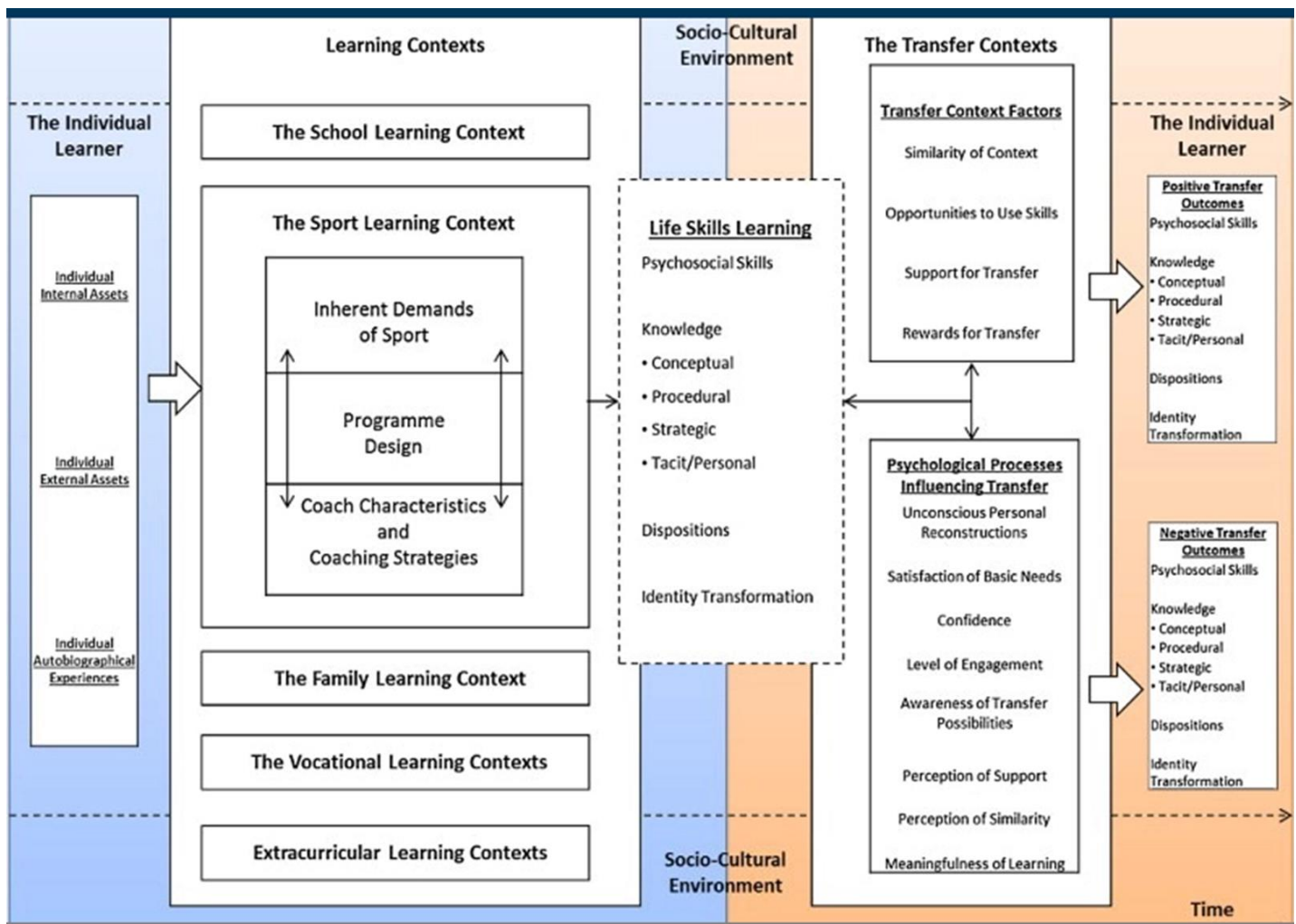


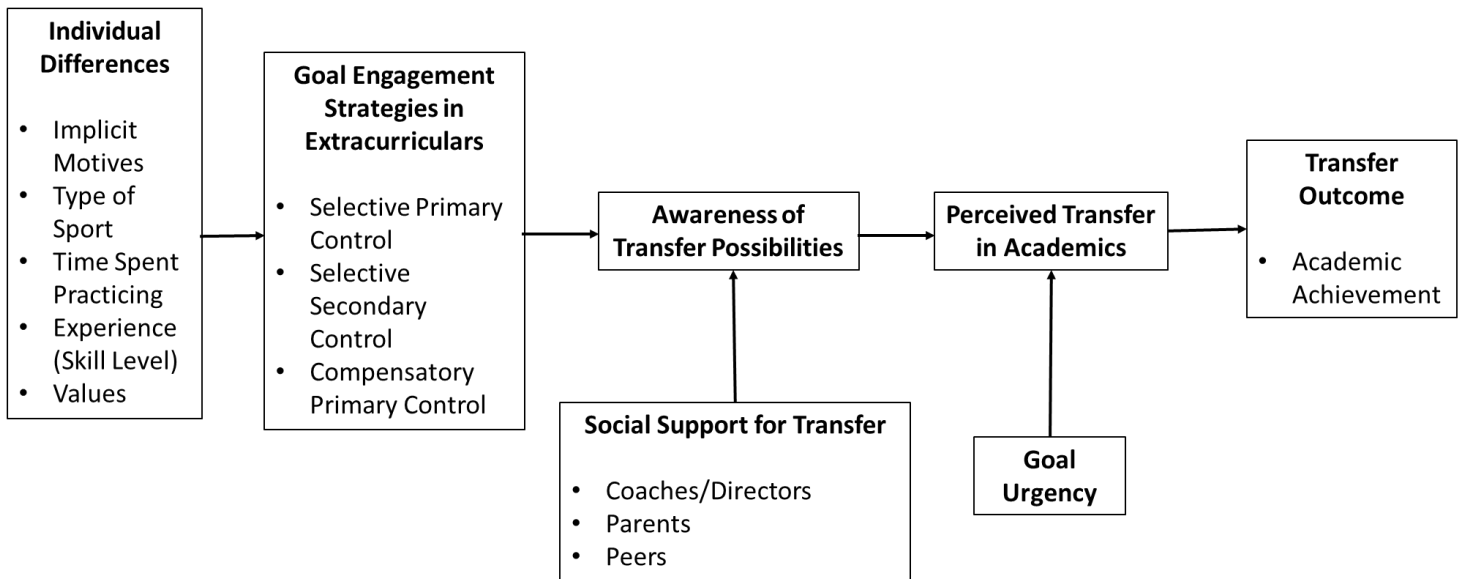
Figure 2: Model of Life Skills Transfer (Pierce et al., 2017).

### Current Study

Prior studies have addressed the effect of participation in sports and music on academic achievement, but not many studies have investigated the process by which high-school athletes and musicians transfer the skills they learn in their respective extracurricular activities to other domains. Past studies that have examined skill transfer in sports have also mostly focused on general life skill development rather than on motivational self-regulatory skills applicable to academic achievement, which is one of the major domains of adolescents' lives. In addition, no



studies to date have assessed the relation between implicit motives and skill transfer from sports to school performance. Moreover, the majority of previous studies that have examined transfer of skills used in sports to the academic domain are qualitative and have relied on interviews, which may limit generalizability due to small sample sizes.



*Figure 3: Proposed Model of Skill Transfer from Extracurricular Activities to Academics*

The proposed Model for Skill Transfer from Extracurricular Activities to Academics focuses on specific aspects that are addressed in the Life Skills Model of Transfer (Figure 3). Regarding the individual learner, the study will examine individual differences in implicit motives, values, type of sport, time spent practicing the extracurricular activity, and experience in the activity. These differences may affect the degree to which goal engagement strategies (i.e., selective primary control, selective secondary control, compensatory primary control) are learned and transferred. Various factors can either facilitate or hinder transfer, and individuals’

awareness of transfer possibilities, goal urgency in the academic domain, and perceived support from authority figures and peers may play a role in determining transfer. As adolescence is a time period in which both extracurricular activities and academics significantly increase in competitiveness (Gustafsson et al., 2017; Pascoe et al., 2020), it is important to further examine these achievement domains and assess ways in which adolescents can experience transfer and achieve success in both areas in their lives. Thus, the following studies aim to shed light on the transfer phenomenon and answer the following research questions: (1) Are extracurricular goal engagement strategies associated with academic goal engagement strategies and perceived transfer? (2) Which individual differences facilitate or hinder perceived transfer from skills used in extracurricular activities to academics? (3) Is participation in extracurricular activities positively associated with academic performance throughout childhood and adolescence?

### **Proposed Studies**

**Transfer of Goal Engagement Strategies in High School (Study 1).** The first study will address research question 1 and examine whether there is a positive association between athletes' and musicians' goal engagement strategies (i.e., selective primary control, selective secondary control, and compensatory primary control) used in extracurricular activities and (a) control strategies used in academics and (b) perceived transfer. A longitudinal dataset collected from a high school in a middle/upper-class suburban city in Southern California will be used. As prior research has shown the use of self-regulatory strategies (e.g., McCormick et al., 2019, McPherson et al., 2019,) in sports and music and the use of goal engagement strategies in the academic domain (e.g., Hamm et al., 2015; Hamm et al., 2019) the hypotheses are as follows:  
*Hypothesis 1a: Selective primary control strategies in extracurriculars are positively associated with selective primary control strategies in high-school academics.*

*Hypothesis 1b: Selective primary control strategies in extracurriculars are positively associated with perceived transfer.*

*Hypothesis 2a: Selective secondary control strategies in extracurriculars are positively associated with selective secondary control strategies in high-school academics.*

*Hypothesis 2b: Selective secondary strategies in extracurriculars are positively associated with perceived transfer.*

*Hypothesis 3a: Compensatory primary control strategies in extracurriculars are positively associated with compensatory primary control strategies in high-school academics.*

*Hypothesis 3b: Compensatory primary control strategies in extracurriculars are positively associated with perceived transfer.*

**Transfer of Goal Engagement Strategies from High School to College (Study 2).** The second study will investigate the possibility of long-term effects of perceived transfer and also address research question 1, such that the extracurricular goal engagement strategies used in high school are positively related to perceived transfer in academics during college. A cross-sectional dataset collected from college students who participated in high-school sports or music will be used for this study. As prior studies have shown that skills that are transferred have lasting effects that persist past high school (e.g., Holt et al., 2008) the following hypotheses are as follows:

*Hypothesis 1: Selective primary control strategies used in high-school extracurriculars are positively associated with perceived transfer to academics in college.*

*Hypothesis 2: Selective secondary control strategies used in high-school extracurriculars are positively associated with perceived transfer to academics in college.*

*Hypothesis 3: Compensatory primary control strategies used in high-school extracurriculars are positively associated with perceived transfer to academics in college.*

**Factors that Facilitate or Hinder Transfer (Study 3).** The third study will address research question 2 by examining whether high-school athletes and musicians' experience of skill transfer from their sport or music activities to academics will be affected by individual differences in motive strength (achievement and affiliation motive), time investment and skill level in the extracurricular activity, value placed in the extracurricular activities, youth's awareness of transfer possibilities, goal urgency in the academic domain, and youth's perception of support for transfer of skills by important socialization agents. This study will be conducted using the cross-sectional dataset from college students in Southern California.

Though no prior studies have examined implicit motives and athletes' experience of transfer, prior research regarding sports and implicit motives has indicated that athletes who have high implicit achievement motive perform better in competition (e.g., Gröpel et al., 2016; Wegner & Teubel, 2014). Studies have also indicated that team-sport athletes have been shown to engage in partying behaviors and increase in alcohol consumption (e.g., Eccles et al., 2003; Eccles & Barber, 1999; Kulesza et al., 2014), and it is possible that in doing so their need to belong may be satisfied through sports. Based on these studies, the hypotheses are as follows:

*Hypothesis 1a: High-school athletes and musicians who have a high implicit achievement motive will be more likely to report transfer from participation in extracurricular activities to academics.*

*Hypothesis 1b: Team-sport athletes who have a high affiliation motive will be less likely to transfer goal engagement strategies from sports to academics compared to individual-sport athletes.*

In comparing differences in outcomes between individual- and team-sport athletes, studies have shown that individual-sport athletes can learn and develop more self-regulatory skills than team-sport athletes (e.g., Howard et al., 2018; Jonker et al., 2010). As studies have shown that individual-sport athletes have more opportunities to learn and develop self-regulatory skills, the hypotheses are as follows:

*Hypothesis 2a: Individual-sport athletes will be more likely to transfer skills used in sports to school compared to team-sport athletes.*

*Hypothesis 2b: Individual-sport athletes who have a high achievement motive will report the highest amount of transfer from goal engagement strategies used in sports to academics.*

Past studies have shown that athletes and musicians who perform at an elite level exhibit greater use of self-regulatory skills (e.g., Ericsson et al., 1993; Harwood et al., 2004). Studies have also demonstrated that athletes and musicians who participate in sports and music develop self-regulatory skills (e.g., Varela et al., 2016; Weiss et al., 2013). In addition, research has shown that valuing an activity leads to greater investment and persistence in domain-specific goals (Wigfield & Eccles, 2000). Hence, athletes and musicians who value sports and music may acquire more motivational goal engagement skills to transfer to academics. Based on prior research, the hypotheses are as follows:

*Hypothesis 3a: Athletes and musicians who spend more hours practicing are more likely to report transferring their goal engagement strategies used in sports and music to academics.*

*Hypothesis 3b: Athletes and musicians who report greater experience in their extracurricular activities will be more likely to transfer goal engagement strategies used in sports and music to academics.*

*Hypothesis 3c: Athletes and musicians who value their extracurricular activity (i.e., as an athlete or musician) will be more likely to report transfer.*

Prior research has indicated that whether athletes experience transfer depends on their awareness of the possibility of transferring skills from sports to other domains (Pierce et al., 2017). Studies have shown that support in transfer from coaches, parents, and peers may play a role in determining whether transfer occurs (e.g., Allen et al., 2015; Weiss et al., 2013). In addition, it is possible that goal urgency in academics may positively predict the use of transfer. Based on these prior studies, the hypotheses are as follows:

*Hypothesis 4: Athletes and musicians will be more likely to transfer skills from extracurriculars to academics if they are aware of the possibility of transfer occurring.*

*Hypothesis 5: Athletes and musicians will be more likely to transfer extracurricular goal engagement strategies once there is goal urgency in the academic domain.*

*Hypothesis 6a: High-school athletes will be more likely to report transfer if their coaches encourage them to apply what they use in sports to school.*

*Hypothesis 6b: Athletes will be more likely to transfer their skills from sports to academics if their parents encourage them to transfer skills from sports to academics.*

*Hypothesis 6c: Athletes will be more likely to report transfer if their peers encourage them to transfer skills used in sports to school.*

#### **Beginning of Participation in Extracurricular Activities and Academic Achievement**

**(Study 4).** The fourth study will address research question 3 and examine the effect of participation in extracurricular activities using the NICHD SECCYD dataset, which follows participants from different states in the U.S from birth until the first year of high school. Due to the longitudinal nature of the dataset, this study will determine whether participating in sports or

music positively predicts academic achievement over time. Based on prior research regarding the positive relation between participation in extracurricular activities and academics (e.g., Beal & Crockett, 2010; Dawes et al., 2015; Vandell et al., 2020), the hypothesis is as follows:

*Hypothesis 1: Participation in sports or music is positively associated with academic achievement throughout childhood and adolescence.*

## **Study 1**

### **Study 1: Design**

Initially, the plan for longitudinal data collection was to track musicians and athletes over the course of two years and two (Fall) competition seasons, comprising a total of four waves of data. The plan was to collect data before and after the season for 2020 (wave 1 and wave 2) and 2021 (wave 3 and wave 4), and examine whether motivational goal engagement strategies used in extracurriculars could predict academic goal engagement strategies over time using longitudinal analyses and controlling for initial domain-general goal engagement strategies and the implicit achievement motive. That way, significant results for longitudinally assessed associations could likely be attributed to extracurricular-to-academics transfer rather than underlying and stable individual differences. Due to the COVID-19 pandemic, competition in extracurricular activities was halted for part of data collection, and schooling was remote for five months during data collection. Consequently, we could only collect data for one instead of two seasons. Students were asked to complete three online surveys through Qualtrics at three different time points: February 2021, May 2021, and October 2021. Remote schooling took place during the first two time points of data collection, and school was back in-person in the Fall of 2021. As data was collected for only one competition season and the sample size was small, the

three time points of data were collapsed for analyses and only participants' initial responses were analyzed. Thus, the data is now cross-sectional, and interpretation of the relation between goal engagement strategies in extracurriculars and academics is limited to associations; no directionality of effects can be inferred.

## **Study 1: Method**

### **Participants & Procedure**

**Participants.** High-school students from a middle-upper class suburban area were recruited to participate in the study ( $N=197$ ). The sample was predominantly female ( $n = 96$ ; 64%) and Asian ( $n = 117$ ; 82%). In the initial assessment, 38 athletes participated in sports, 29 musicians participated in music, and 15 participants were involved in both sports and music. As athletes were not compared with musicians, those in the “both” category were combined with the “sports” and “music” category for analysis. There were also 5 participants in the “sports” category, 1 in the “music category,” and 3 participants in the “both” category who completed the survey in time 2 but not in time 1. The responses from these 5 participants were combined with the responses from the rest of the participants who completed the survey in time 1. All participant demographics are presented in Table 1.



Table 1.

*Participant demographics for the high-school sample (N=197).*


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Gender	
Male	54 (36%)
Female	96 (64%)
Ethnicity	
White	9 (7%)
Asian	108 (82%)
Latinx	7 (5%)
African American	1 (.01%)
Multiracial	14 (11%)
Parents' Education	
Junior High School	7 (5%)
High School Graduate	14 (9%)
Vocational, Associates, Some college	23(15%)
Four-Year College	56 (38%)
Master's or Professional Degree	25 (17%)
Not Sure	24 (16%)

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**Procedure.** Contacts were made with the research team from the school district. After proposing the study plan to the research team, they gained approval from the high-school principal to recruit students for the study. For the first time point of the survey, all teachers were sent an email with information regarding the study, and they were asked if they would be willing to distribute the study information to the students. A flyer with details about the study (e.g., compensation, contact information) was attached to the email for teachers to distribute to the students. Students were given one month to complete the survey, which lasted approximately 45 minutes. Parental consent and assent forms were completed online before participants could

begin the survey. To compensate participants, those who participated in the study were entered into a raffle in which 30 participants received \$50 Amazon gift cards. For time 2 of the study, the survey was distributed online in May to those who participated in time 1. The survey was shorter compared to time 1 and took approximately 15-20 minutes to complete. To incentivize participants to remain in the study, all of them received \$10 Amazon gift cards for completing the survey. Thirty participants won \$50 Amazon gift cards in addition to the guaranteed \$10 gift card. The third and final time point of the study took place online in October during the next academic school year. Compensation for time 3 included \$20 Amazon gift cards for all participants, with 10 participants winning \$50 through a raffle.

### **Study 1: Measures**

**Selective Primary Control.** To measure selective primary control for extracurricular activities and academics, the School Engagement Scale (SES) was used (Doğan, 2014) and adapted for sports and music. The 10-item cognitive engagement subscale measured the amount of time and effort invested into studies. Three items were removed after conducting a confirmatory factor analysis, and examples of items that remained include, “I give all my attention to the lesson in the class” and “I believe I do my best to learn in class.” This subscale was also adapted for extracurricular-specific items, such as “I give all my attention to the lesson in practice” and “I believe I do my best to learn during practice.” Responses were reported on a 5-point Likert Scale, ranging from “*Strongly Disagree*” to “*Strongly Agree*.” The items for sports SPC and music SPC were averaged to create a composite score due to the small sample, with excellent reliability ( $\alpha = .90$ ). However, this limits the possibility of analyzing sports and music separately and is inconsistent with the following three studies. The reliability score for academics SPC was good ( $\alpha = .88$ ).

**Selective Secondary Control.** Selective secondary control for extracurricular activities and academics was measured using the Brief Regulation of Motivation Scale (Kim et al., 2018) and the Optimization in Primary and Secondary Control (OPS) Scale adapted for education (Heckhausen & Tomasik, 2002). The 8-item Regulation of Motivation subscale was used, with three items retained after running the confirmatory factor analysis. Examples of the items include, “If I lose interest in an assignment, I have ways to increase my effort to get it done” and “Even when studying is hard, I can figure out a way to keep myself going.” The wording of the items was adapted for the extracurricular activities (“If I lose interest in practicing, I have ways to increase my effort to get it done”; “Even when practice is hard, I can figure out a way to keep myself going”). Responses were recorded using a 5-point Likert scale, ranging from “*Strongly Disagree*” to “*Strongly Agree*.”

The Selective Secondary Control Subscale from the education-specific OPS Scale was also used to measure selective secondary control. This subscale includes 3 items, with one item removed after conducting the confirmatory factor analysis. Examples include, “I often imagine that I will be happy when I get a good grade on an exam” and “I often remind myself how important it is to study.” Items were also adapted for extracurricular activities, with examples including, “I often imagine that I will be happy when I perform well in competition” and “I often remind myself how important it is to practice.” Responses also included a 5-point Likert scale, ranging from “*Strongly Disagree*” to “*Strongly Agree*.” Items for sports SSC and music SSC were combined with a good reliability score ( $\alpha = .86$ ), and the reliability score for academics SSC was also good ( $\alpha = .81$ ).

**Compensatory Primary Control.** Compensatory primary control was measured using the education-specific OPS scale, adapting the one-item measure that asks, “If I have difficulties

with my schoolwork, I will get help from others (*for example, friends, a tutor*),” into three different items asking about getting help from different people. The three different items for education-specific compensatory primary control include, “If I am having difficulty with schoolwork, I will ask the teacher for help,” “If I am having difficulty with schoolwork, I will ask my friends for help,” and “If I am having difficulty with schoolwork I will ask a tutor for help.” Three separate items were also used to measure extracurricular-specific compensatory primary control but with different external resources, including “If I am having difficulty with practice, I will ask a (*coach, teammates, private coach*) for help.” Due to the low number of items, correlations were analyzed instead of conducting a confirmatory factor analysis. For both sports CPC and academics CPC, the two items related to asking the “*coach*” and “*private coach*” and the paralleled items in academics asking for help from the “*teacher*” and “*private tutor*” were much more highly correlated compared to items about asking help from “*teammates*” and “*classmates*.” Thus, for consistency, the same items were used for music CPC. CPC items for sports and music were then combined to create a composite score, with an adequate reliability score ( $\alpha = .74$ ). The reliability score for academics CPC was acceptable ( $\alpha = .63$ ).

**Perceived Transfer.** Transfer of skills learned from sports and music to academics was measured using two items from the Transfer Scale. Using a 5-point Likert scale ranging from “*Never*” to “*Always*,” participants were asked to respond to statements including, “I use skills learned in sports to school” and “lessons and skills I learn in sports are useful in helping me succeed in the classroom.” The items for musicians were the same, except the focus was on music (e.g., “lessons and skills I learn in music are useful in helping me succeed in the classroom”). Perceived transfer from sports and music was averaged to create one measure for perceived transfer for extracurricular activities, which had good reliability ( $\alpha = .86$ ).

**Implicit Motives.** The achievement motive, affiliation motive, and power motive were measured using the Picture Story Exercise (McClelland et al., 1989), though only the achievement motive was examined in this study. Participants were asked to view six different pictures and create stories from them for 5 minutes, and were told not to worry about grammatical mistakes as they typed out the stories. The six pictures included: (1) *women in laboratory*, (2) *couple by the river*, (3) *bicycle race*, (4) *teacher and student*, (5) *couple sitting opposite a woman*, and (6) *nightclub scene*. The motives in the stories were identified and scored by coders who were trained using the Winter manual (1994). All coders were paired with one other coder for each story so that stories included scores from two coders. The expert coder who trained the rest of the coders also partook in coding the stories. To ensure reliability, the coders had to achieve at least 85% agreement with the practice stories in the training manual (Schultheiss & Pang, 2007). This was achieved for three of the four coders, and the coder that did not reach 85% agreement was removed. Scores between two coders were averaged for each story. For stories that were coded by the coder who did not reach 85% agreement, the scores from the other coder in the pair were taken. The total achievement motive scores were summed up across the six pictures. Finally, the motive scores had to be residualized because word count positively predicted the total achievement motive score (Schönbrodt et al., 2021).

**Demographics.** Gender and parental education were included in this study. For gender, males were coded “0” and females were coded “1.” For parental education, the highest education from either parent was taken. Education levels included, “*Junior High School*,” “*High School Graduate*,” “*Vocational, Associates, Some College*,” “*Four-Year College*,” and “*Master’s or Professional Degree*.” Participants who did not know their parents’ education levels responded with the option “*I’m not sure*.”

## Study 1: Data Analysis Plan

Descriptive analyses were first conducted by examining the means and correlations among the variables of interest. A confirmatory factor analysis was then conducted for the goal engagement measures that were adapted for extracurricular activities, as these scales have not yet been used in other studies. All hypotheses were tested by conducting regression analyses, with the predictors (SPC, SSC, and CPC in extracurriculars) included in separate models due to the small sample size. However, this means that the unique contribution of each motivational goal engagement strategy was not assessed. Hence, interpretation of the association between SPC, SSC, and CPC in extracurriculars and perceived transfer in study 1 is limited. All analyses were conducted on STATA 15.0.

## Study 1: Results

### Descriptive Analyses

Correlations, means, standard deviations, and the range for all the main variables of interest were assessed. Descriptive statistics for goal engagement strategies (selective primary control, selective secondary control, and compensatory primary control) in extracurriculars and academics are included in Table 2, and bivariate correlations are presented in Table 3.

Table 2.  
*Descriptives for Variables of Interest.*

	N	Minimum	Maximum	Mean	Std. Deviation
Extracurriculars SPC	92	1.00	5.00	3.82	.59
Extracurriculars SSC	92	1.00	5.00	3.70	.67
Extracurriculars CPC	94	1.00	5.00	3.14	.99
Academics SPC	190	1.00	5.00	3.69	.77
Academics SSC	190	1.00	5.00	3.42	.75
Academics CPC	190	1.00	5.00	2.86	1.01
Perceived Transfer	91	1.33	4.00	3.38	.61

Table 3.  
*Correlation Matrix for Variables of Interest.*

	1	2	3	4	5	6
1. Extracurriculars SPC	1					
2. Extracurriculars SSC	.60***	1				
3. Extracurriculars CPC	.39***	.42***	1			
4. Academics SPC	.57***	.42***	.32**	1		
5. Academics SSC	.51***	.63***	.50***	.60***	1	
6. Academics CPC	.34**	.44***	.52**	.40***	.52***	1
7. Perceived Transfer	.26*	.31**	.42***	.27*	.35***	.19

*Note.* \*  $p < .05$ ; \*\*  $p < .01$ , \*\*\*  $p < .001$

### Confirmatory Factor Analysis

To determine if all items should be retained to measure selective primary control, selective secondary control, and compensatory primary control strategies used in sports and music, a confirmatory factor analysis was conducted to examine the model fit of each strategy. As the model fit for all the goal engagement strategies was poor, items with a low cutoff score were removed. Factor loading cutoff scores less than 0.60 were excluded from the measure. Although some studies suggest that cutoff values above 0.40 are acceptable (e.g., Hair et al., 1998), increasing the cutoff value was necessary to improve the model fit for each measure. Due to the small sub-sample size of musicians, model fit and item exclusion for all music-related goal engagement strategies were first assessed. The items kept were then applied to sports and academics goal engagement items for consistency. After the model fit for sports and academics goal engagement items were ensured to be good, items for each domain and engagement strategy were averaged to create composite scores.

The indices recommended by Hu and Bentler (1999) that were used to determine model fit included the Comparative Fit Index (CFI) and the standardized root mean squared residual (SRMR). The chi-squared p-value was also included as an indicator of model fit. A good model

fit includes a CFI of over 0.90 or 0.95, an SRMR of less than 0.08, and a chi-squared p-value of less than 0.05. Though the Tucker-Lewis Index (TLI) and the root mean squared error of approximation (RMSEA) are usually included as fit indices, they are not recommended for studies with smaller sample sizes and thus were not assessed (Hu & Bentler, 1999). For selective primary control, four items with low cutoff scores were removed. The model fit for SPC in music (CFI= 0.96, SRMR = 0.05,  $\chi^2 = 13.01$ ,  $p = .162$ ), sports (CFI= 0.98, SRMR = 0.04,  $\chi^2 = 12.32$ ,  $p = .196$ ), and academics (CFI= 0.95, SRMR = 0.05,  $\chi^2 = 36.67$ ,  $p < .001$ ) were good. For selective secondary control, the model fit was also good for music (CFI= 0.95, SRMR = 0.06,  $\chi^2 = 12.75$ ,  $p = .175$ ), sports (CFI= 1.00, SRMR = 0.03,  $\chi^2 = 5.07$ ,  $p = .828$ ), and academics (CFI= 0.93, SRMR = 0.06,  $\chi^2 = 35.19$ ,  $p < .001$ ). It is worth noting that the chi-squared p-value was significant for academics SPC and SSC, indicating that though the overall model is adequate but may not be as strong as the model fit for sports and music. A summary of fit indices is included in Table 4.

Table 4.

Summary of Fit Indices for Goal Engagement Strategies in Each Domain.

Measures	$\chi^2$	$p$	CFI	SRMR
Sports SPC	12.32	.196	0.98	0.04
Sports SSC	5.07	.828	1.00	0.03
Music SPC	13.01	.162	0.96	0.05
Music SSC	12.75	.175	0.95	0.06
Academics SPC	36.67	< .001	0.95	0.05
Academics SSC	35.19	< .001	0.93	0.06



Note. CFI= Comparative fit index; SRMR= Standardized root mean squared residual.

## **Hypothesis Testing**

*Hypothesis 1a: Selective primary control strategies in extracurriculars are positively associated with the use of SPC strategies in high-school academics.*

This hypothesis was tested by conducting multiple regression analyses to determine whether the use of selective primary control strategies in extracurriculars is positively associated with SPC use in high-school academics. Selective primary control in the extracurricular domain was the predictor, and SPC use in high-school academics was the criterion variable. The achievement motive score, gender, and parental education were the control variables. The achievement motive score was controlled for to account for participants who have a desire to master tasks and achieve goals in all domains. Controlling for this variable would allow for assessment of whether the use of goal engagement strategies in academics results from the use of goal engagement strategies in extracurricular activities, and not only from having a strong achievement motive. Results showed that SPC use in extracurriculars was positively associated with SPC use in academics ( $\beta = .47, p < .001$ ), controlling for the achievement motive, gender, and parental education, indicating that those who use selective primary control strategies in extracurriculars are more likely to invest effort into academics. Hence, hypothesis 1a was supported. All results are presented in Table 5.

*Hypothesis 1b: Selective primary control strategies in extracurriculars are positively associated with perceived transfer in high school.*

To test this hypothesis, regression analyses were conducted to determine whether the use of SPC in extracurriculars is positively related to perceived transfer. Selective primary control in

extracurriculars was the predictor, and perceived transfer was the outcome variable. The achievement motive, gender, and parental education were considered as the control variables. Results showed that SPC use in extracurriculars was positively associated with perceived transfer, controlling for the achievement motive, gender, and parental education ( $\beta = .28, p = .028$ ). Thus, hypothesis 1b was supported.

Table 5.

*Regression Model of SPC in Extracurriculars Predicting SPC in Academics (N=66).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	1.29	.64		1.96	.055
SPC Extracurriculars	.63	.15	.47	4.09	< .001
Implicit Achievement Motive	.03	.04	.15	1.33	.188
Gender	.23	.16	.16	1.44	.156
Parental Education	-.02	.08	-.03	-0.27	.788

$F(4, 61) = 5.33, p = .001, R^2 = .259$

Table 6.

*Regression Model of SPC in Extracurriculars Predicting Perceived Transfer (N=67).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	2.16	.64		3.38	.001
SPC Extracurriculars	.35	.15	.29	2.25	.028

Implicit Achievement Motive	.01	.03	.15	0.41	.680
Gender	.16	.16	.13	1.02	.312
Parental Education	-.06	.08	-.10	-0.78	.436

$$F(4, 62) = 1.56, p = .197, R^2 = .091$$


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*Hypothesis 2a: Selective secondary control strategies in extracurriculars are positively associated with the use of SSC academics in high school.*

Multiple regression analyses were conducted to test this hypothesis and determine whether the use of selective secondary control strategies in sports and music was positively related to the use of perceived transfer in high-school academics. Selective secondary control in extracurriculars was the predictor, and the use of SSC in academics was the criterion variable. Control variables included the achievement motive, gender, and parental education. Results showed a positive association between the use of SSC in extracurriculars and the use of SSC in academics, controlling for the achievement motive and demographics ( $\beta = .50, p < .001$ ). Thus, hypothesis 2a was supported.

*Hypothesis 2b: Selective secondary control strategies in extracurriculars are positively associated with perceived transfer in high school.*

Regression analyses were conducted to determine whether there was a positive relation between the use of selective secondary control strategies in extracurriculars and perceived transfer. SSC strategies in extracurriculars were treated as the predictors, and perceived transfer as the outcome variable. Covariates included the achievement motive, gender, and parental

education. Results showed a positive association between the use of SSC in extracurriculars and perceived transfer, controlling for the achievement motive and demographics ( $\beta = .35, p = .006$ ). Hence, hypothesis 2b was supported.

Table 7.

*Regression Model of SSC in Extracurriculars Predicting SSC in Academics (N=66).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	1.32	.55		2.40	.019
SSC Extracurriculars	.58	.13	.50	4.46	< .001
Implicit Achievement Motive	.04	.03	.16	1.42	.161
Gender	.15	.15	.11	0.99	.326
Parental Education	-.02	.08	-.02	-0.22	.826
<i>F</i> (4, 61) = 5.86, <i>p</i> < .001, <i>R</i> <sup>2</sup> = .278					

Table 8.

*Regression Model of SSC in Extracurriculars Predicting Perceived Transfer (N=67).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	1.99	.58		3.45	.001
SSC Extracurriculars	.39	.14	.35	2.87	.006
Implicit Achievement Motive	.02	.03	.07	0.56	.574
Gender	.17	.15	.13	1.09	.279
Parental Education	-.04	.08	-.07	-0.56	.574

$$F(4, 62) = 2.37, p = .061, R^2 = .133$$


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*Hypothesis 3a: Compensatory primary control strategies in extracurriculars are positively associated with the use of CPC strategies in high-school academics.*

This hypothesis was tested by conducting regression analyses to determine whether the use of compensatory primary control strategies in extracurriculars was positively associated with the use of compensatory primary control strategies in academics. Compensatory primary control strategies in extracurriculars were considered as the predictor, and perceived transfer in high-school academics was the outcome variable. Covariates included the achievement motive, gender, and parental education. Results for sports showed that the use of CPC strategies in sports was positively related to CPC use in academics ( $\beta = .34, p = .006$ ), controlling for the achievement motive and demographics. Thus, hypothesis 3a was supported.

*Hypothesis 3b: Selective primary control strategies in extracurriculars are positively associated with perceived transfer in high school.*

Multiple regression analyses were used to determine whether CPC strategies used in sports and in music were linked with perceived transfer. The predictors were CPC use in extracurriculars, and perceived transfer was the outcome variable. The achievement motive, gender, and parental education were considered as covariates. Results showed a positive association between CPC use in extracurriculars and perceived transfer ( $\beta = .40, p = .001$ ), controlling for the achievement motive and demographics. Hence, hypothesis 3b was supported.

Table 9.

*Regression Model of CPC in Extracurriculars Predicting CPC in Academics (N=66).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
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(constant)	1.58	.56		2.81	.007
CPC Extracurriculars	.33	.11	.34	2.87	.006
Implicit Achievement Motive	.03	.04	.09	0.77	.446
Gender	.33	.21	.18	1.52	.134
Parental Education	.01	.11	.01	0.11	.914
$F(4, 61) = 2.90, p = .029, R^2 = .160$					

Table 10.

*Regression Model of CPC in Extracurriculars Predicting Perceived Transfer (N=67).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	2.56	.39		6.65	<.001
CPC Extracurriculars	.27	.08	.40	3.39	.001
Implicit Achievement Motive	.01	.03	.03	0.29	.776
Gender	.11	.15	.08	0.71	.479
Parental Education	-.03	.07	-.04	-0.36	.724
$F(4, 62) = 3.19, p = .019, R^2 = .171$					

### Study 1: Discussion

Prior findings from qualitative studies have shown that skills learned from participation in extracurricular activities can be transferred into academics (Bradley & Conway, 2016; Jones & Lavallee, 2009; Wetter et al., 2009). Although transfer of various general skills such as interpersonal skills (e.g., Kendellen & Cameré, 2007) have been identified in previous research, we set out to examine transfer of skills that would be specifically helpful for academic

performance because of the prominent role that academics play during high school and its predictive potential for success in post-secondary education (e.g., Chang et al., 2006; Galla et al., 2019). Motivational skills for academic achievement are especially important because they are needed to overcome obstacles and challenges that arise in high-school courses (e.g., Luthar et al., 2020). According to the Motivational Theory of Lifespan Development, these motivational skills include selective primary control, selective secondary control, and compensatory primary control strategies (Heckhausen et al., 2010). Results from this study support the possible link between participation in high-school extracurricular activities and transfer of motivational goal engagement skills to academics.

### **Transfer of Motivational Goal Engagement Skills from High-School Sports and Music**

Our findings showed an association between the use of selective primary control strategies in sports and music and SPC strategies in academics, a positive relation between the use of selective secondary control strategies in extracurriculars and SSC strategies in academics, and a positive association between the use of compensatory primary control strategies in sports and music and CPC strategies in academics. In addition, results showed a positive association between the use of selective primary control, selective secondary control, and compensatory primary control strategies in extracurriculars and perceived transfer. These findings suggest that all the goal engagement strategies used in high-school sports and music are also utilized in academics. The findings support prior qualitative studies that have shown the transfer process of skills learned from extracurriculars into the academic domain (e.g., Jones & Lavalley, 2009; Pierce et al., 2017). The subsequent parts of the discussion will address specific motivational goal engagement skills and different ways in which the use of each goal engagement strategy in sports and music is associated with the use of the same strategies in academics. Interpretations of

findings cannot be extended to discuss the directional transfer from extracurriculars to academics because of the cross-sectional nature of the data.

**Selective Primary Control.** In extracurricular activities such as sports and music, athletes and musicians are required to invest effort into practicing and competition (e.g., Gould & Carson, 2008; Hatfield et al., 2017). With the high level of competition in high-school sports and music, those who participate often need to dedicate their energy and efforts to learning skills that are necessary for success (e.g., Barnett, 2007). The findings from this study indicate that the goal-oriented focus of effort investment in extracurriculars is related to the academic domain as well. The selective primary control strategies that are also used in academics include optimizing practice time by dedicating effort and focusing attention on developing skills necessary for competition (e.g., Ericsson et al., 1993; McCormick et al., 2019). As practicing in sports and music to master skills used in competition is akin to learning material to achieve academic success in a course, these skills that can be applied to academics are associated with one another and could potentially help student-athletes and musicians invest more effort into schoolwork. Future studies can examine even more specific strategies used during practice that can be transferred into time spent studying for courses. For example, research has shown that some individuals excel in performance within a domain (e.g., sports and music) through deliberate practice (Ericsson, 2008). Deliberate practice involves strategically and effectively placing effort into developing more challenging and complex skills, receiving immediate feedback while learning these skills, and using repetition to refine them (Ericsson et al., 1993; Ericsson, 2020). Findings from studies examining deliberate practice in the academic domain suggest benefits from using this strategy as well (e.g., Lehtinen et al., 2017; Plant et al., 2005). Thus, this could



be an important next step in further assessing specific SPC strategies that can potentially benefit high-school athletes and musicians in both their respective activities and academics.

**Selective Secondary Control.** While investing effort into an achievement-oriented task is the primary path to achievement, additional goal engagement strategies are necessary once individuals encounter obstacles (Heckhausen et al., 2010). As there is a high degree of competitiveness in both high-school extracurriculars and academics, selective secondary control strategies are needed and often used during goal engagement in the respective domains (e.g., Beckmann et al., 2006; Hamm et al., 2019). The findings from this study suggest a relation between selective secondary control strategies used in sports and music and the motivational strategies used in academics. In sports and music, these strategies include persevering through practice when it is difficult or not interesting, reminding oneself of the importance of success in practice, and imagining how happy one will be when performing and playing well in competition. These skills that are used in academics can be paralleled to those used in sports and music, such as continuing to study when the material is difficult or uninteresting, reminding oneself how important it is to prepare and study well for exams, and imagining future positive affect from success in a course. The results from this study support prior research that has shown the development of volitional skills through participation in sports (e.g., Beckmann et al., 2006). Regarding the potential transfer of SSC from music to academics, the current study is the first to provide initial associative, albeit not predictive evidence of potential transfer processes for these important motivational strategies.

**Compensatory Primary Control.** Another goal engagement strategy is compensatory primary control. It is utilized when goal pursuit becomes challenging because usual action means are not working, and individuals seek alternative ways to achieve their goals such as asking

others for help (Heckhausen et al., 2010). The findings from this study indicate that the use of compensatory primary control strategies in extracurriculars is associated with the use of these strategies in an academic setting. Research has suggested the important role that non-parental adults play in adolescents' lives (e.g., Chen et al., 2003), including teachers and coaches. Forming strong relationships between athletes and coaches is crucial because coaches offer instruction, guidance, and support for their athletes' performances during practice and competition, and even in other domains (e.g., Christensen et al., 2021; Jowett, 2017). Similarly, many adolescents notice and value the guidance that teachers give through engaging with their students and the support that they provide adolescents both academically and personally (e.g., Chen et al., 2003; McHugh et al., 2013). From these prior studies, it is evident that non-parental socialization agents, such as coaches and teachers, substantially contribute to adolescents' development in both extracurriculars and in school through cultivating positive relationships. It is likely that athletes and musicians who have positive experiences with their coaches and directors also seek the same guidance from teachers for coursework, though the direction of the effect is unclear due to the cross-sectional data.

### **Limitations and Conclusion**

While the findings from this study revealed novel insight into the potential transfer of motivational goal engagement skills used in extracurriculars to academics, there are a few major issues that limit the interpretability of the findings. First, the dataset is cross-sectional, and high-school athletes and musicians were not followed for multiple competition seasons. This renders it impossible to determine the directionality of transfer, whether it is from extracurriculars to academics or vice versa. In addition, there is a potential selectivity bias such that individuals who are highly motivated in general may be more likely to choose to participate in achievement-

oriented extracurriculars. While we did control for the implicit achievement motive, including a measure for general motivational engagement for all goals in future research would strengthen our argument for inter-domain transfer. Third, the sample size was small which limited the variance and statistical analyses that could have been conducted with a bigger sample (e.g., interactions and mediations). Fourth, the homogenous sample of academically high-achieving Asian students limits the generalizability of the findings. Nevertheless, the findings add to the literature on transfer by demonstrating the association between the use of motivational goal engagement strategies in extracurriculars and academics through quantitative empirical research and not just retrospective interviews. In addition, the findings expand the study of potential transfer from just one type of extracurricular activity (i.e., sports) to music. Results from this study highlight the crucial role that socialization agents such as teachers, parents, and coaches have to encourage student-athletes and musicians to expand the use of motivational goal engagement skills in the context of extracurricular activities to their academic work.

## **Study 2**

### **Study 2: Design**

The design of this study is cross-sectional and data was collected at one time point. The survey opened from January 2020 until March 2020 to give college students time to complete it. This survey is retrospective and asks participants to recall their use of motivational goal engagement strategies in high school when they were involved in extracurricular activities, as well as their current use of these strategies in a college academic setting. Collecting data with this method was not initially planned because retrospective data would not as accurately capture individuals' responses on their use of motivational goal engagement strategies. However, the COVID-pandemic led to setbacks with data collection. Some of the high schools we were in

contact with no longer gave us permission to recruit participants at their schools. With a small dataset from one high school, it was not possible to further examine and statistically analyze the different factors that are involved in the transfer phenomenon. Thus, using a college-sample dataset is beneficial because of the sample size and the ability to examine possible long-term effects of transfer. Nonetheless, collecting data at only one time point instead of tracking participants from high school to college limits the interpretability of long-term transfer. In addition, variables for high-school academic motivational goal engagement strategies were not included in the survey and thus cannot be controlled for in this study. As a result, one cannot rule out the possibility that the use of SPC, SSC, and CPC strategies in college academics is influenced by the use of these strategies in high-school academics. Thus, the study will focus on perceived transfer only as the outcome variable instead of including academic motivational goal engagement strategies as an additional dependent variable.

## **Study 2: Method**

### **Participants and Procedure**

**Participants.** A total of 440 college students majoring in Psychological Science attending the University of California, Irvine participated in the study. All students were allowed to participate in the study, if they met the following criteria: (1) Participated in sports, music, or both in high school; (2) Participated in an extracurricular activity other than sports or music in high school; (3) Did not participate in an activity during high school. A total of 281 participants were involved in sports, music, or both activities, 102 participants were involved in extracurricular activities that were not sports or music, and 57 participants were not involved in any extracurricular activities during high school. Among those who participated in the most popular extracurriculars (criteria #1), there were 172 athletes, 45 musicians, and 64 participants

who were involved in both activities. As athletes and musicians were separated for analyses, participants who responded “both” were not differentiated from those who participated in either sports or music. The sample consisted mainly of females ( $n = 347, 83\%$ ), with the ethnic breakdown ordered by the largest group: Asians ( $n = 175, 41\%$ ); Latinx ( $n = 126, 30\%$ ); Whites ( $n = 73, 18\%$ ); African Americans ( $n = 5, 1\%$ ); Multiracial ( $n = 37, 9\%$ ). Participant demographics are presented in Table 11.

**Procedure.** College students were recruited through the UCI Human Subject Pool, a place in which they can sign up to participate in research studies to receive extra credit in their psychology courses. The study was advertised by asking professors for permission to make an announcement about the study opportunity. Research assistants in the lab were also asked to advertise the study through their own psychology courses. Though the time to complete the survey varied depending on involvement in high-school extracurricular activities, the survey took up to approximately 45 minutes to finish. Once the survey was completed, participants were compensated by earning 1 credit that they could allocate towards any of their psychology courses that offered extra credit through the UCI Human Subjects Lab Pool.

Table 11.  
*Participant Demographics for the College Sample (N=440).*

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Gender	
Male	70 (16.79%)
Female	347 (83.21%)
Ethnicity	
White	73 (18%)
Asian	108 (41%)
Latinx	126 (30%)
African American	5 (.1%)

Multiracial	37 (9%)
Parents' Education	
Junior High School	63 (16%)
High School Graduate	98 (25%)
Vocational, Associates, Some college	99 (26%)
Four-Year College	94 (24%)
Master's or Professional Degree	33 (9%)
Not Sure	14 (3%)

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## Study 2: Measures

**Selective Primary Control.** Selective primary control was measured using the 10-item School Engagement Scale (Doğan, 2014), which was adapted for extracurriculars (sports and music). SPC items related to extracurriculars were phrased in the past tense, as participants were asked to recall their work ethic in sports or music from high school. For music, examples of items include “I spent a lot of time practicing” and “I worked as hard as I could during practice.” For sports, examples of items are, “I gave all my attention to the lesson during practice” and “I practiced all the skills needed for competition.” Three items were removed from the scale for sports, and one item was removed from the scale for music after conducting a confirmatory factor analysis. A 5-point Likert Scale ranging from “*Strongly Disagree*” to “*Strongly Agree*” was used for the items. Items for sports SPC were combined to create a composite measure, and the reliability score was excellent ( $\alpha = .89$ ). Items for music SPC were also averaged with excellent reliability ( $\alpha = .94$ ).

**Selective Secondary Control.** Selective secondary control was measured using both the Brief Regulation of Motivation Scale (Kim et al., 2018) and the OPS scale adapted to education (Heckhausen & Tomasik, 2002). For the Brief Regulation of Motivation Scale, an 8-item subscale pertaining to questions about persevering in academics was used and adapted to sports

and music. All items were asked in the past tense to refer to high-school extracurricular activities. For music, examples of items in this scale include, “I used different methods to keep training, even if I didn’t feel like practicing” and “If I felt like stopping before I’m really done, I had strategies to keep myself practicing.” For sports, some examples of the items are, “Even when practice was hard, I was able to figure out a way to keep myself going” and “If I needed to, I had ways of convincing myself to keep working on a tough training session.” The SSC items from the education-specific OPS scale were also adapted to music, as sports items using this scale were removed after showing low factor loading scores in the confirmatory factor analysis. For music, an example of an item is, “I tried hard to keep away from activities that could distract me from practicing.” After conducting a confirmatory factor analysis, one item was removed for music SSC, and seven items were removed for sports SSC. Responses from both scales used a 5-point Likert scale ranging from “*Strongly Disagree*” to “*Strongly Agree*.” SSC items for sports were averaged with good reliability ( $\alpha = .80$ ), and items for music were also combined with an excellent reliability score ( $\alpha = .93$ ).

**Compensatory Primary Control.** Compensatory primary control was measured using the OPS scale adapted to education (Heckhausen & Tomasik, 2002). A one-item question that asked about getting help from others if schoolwork is difficult was expanded and specified to different types of people. For academics CPC, three items included, “If I am having difficulty with schoolwork, I will ask the *teacher* for help,” “If I am having difficulty with schoolwork, I will ask my *friends* for help,” and “If I am having difficulty with schoolwork, I will ask a *private tutor* for help.” As only three items comprised this measure, correlations between the items were analyzed instead of conducting a confirmatory factor analysis. All items were significantly correlated with one another and were combined into one composite measure, with an acceptable

reliability score ( $\alpha = .69$ ). For CPC use in extracurriculars, three items were also included but were adapted to questions that were related to the activity. For example, the CPC measure for sports asked, “If I am having difficulty with schoolwork, I will ask a (*coach, teammate, private coach*) for help.” For music CPC, the three items that were used included, “If I am having difficulty with schoolwork, I will ask a (*section leader/director, teammate, private coach*) for help.” Correlations between the items for sports and for music were significant and were combined, with an acceptable reliability score ( $\alpha = .70$ ).

**Perceived Transfer.** Perceived transfer of motivational goal engagement skills from high-school extracurriculars to college academics was measured using two items from the Transfer Scale. For sports, the two items included “I use the skills learned in high-school sports to help with school” and “lessons and skills I learned in high-school sports are useful in helping me succeed in my college courses.” Items were the same for music except the focus was on music (e.g., “lessons and skills I learned in high-school music activities are useful in helping me succeed in my college courses”). Responses were recorded on a 5-point Likert Scale ranging from “*Never*” to “*Always*.” Items for sports were combined for a composite measure with excellent reliability ( $\alpha = .90$ ), and transfer items for music were averaged with a good reliability score ( $\alpha = .86$ ).

**Implicit Motives.** Implicit motives were measured using the Picture Story Exercise (McClelland et al., 1989). While the achievement, affiliation, and power motive were all measured, only the achievement motive was analyzed in this study. Participants were asked to view and write a story with six different pictures: (1) *women in laboratory*, (2) *couple by the river*, (3) *bicycle race*, (4) *teacher and student*, (5) *couple sitting opposite a woman*, and (6) *nightclub scene*. To determine the number of motives written in each picture, coders were trained



using the Winter manual (1994) by an expert coder. Each coder had to reach an 85% agreement with the coding from the practice stories in the training manual. One out of the four coders did not reach this score and thus was removed and replaced by the expert coder. Each story was coded by two coders, and motive scores from the pair were averaged. For the stories that the coder who did not reach achieve 85% agreement coded, the score from the other coder was taken. The total achievement motive score across the six pictures was summed up, and a residualized implicit achievement motive score was created and used because word count from the stories predicted the total achievement motive score (Schönbrodt et al., 2021).

**Demographics.** Responses for participants' gender, ethnicity, and parental education were included in the study. Males were coded "1" and females were coded "2." For ethnicity, participants were categorized into five groups including, "*White*," "*Asian American*," "*Latinx*," "*African American*," and "*Multiracial*." For parental education, mothers' and fathers' education were combined by taking the highest education of either parent. Education levels included, "*Junior High School*," "*High School Graduate*," "*Vocational, Associates, Some College*," "*Four-Year College*," and "*Master's or Professional Degree*." Participants who did not know their parents' education level indicated "*I'm not sure*."

## **Study 2: Data Analysis Plan**

First, descriptive analyses for all variables of interest in this study were conducted. Correlations and means were assessed, and further analyses were conducted for variables that were highly correlated with one another. Next, confirmatory factor analyses were conducted for motivational strategies measures in sports and music to determine which combination of items best fit each strategy in each extracurricular activity. Multiple regression analyses were then conducted first separately with each motivational strategy (i.e., SPC, SSC, and CPC) before

combining them into one model. The same analyses were conducted for sports and music, and all regression models were also conducted without covariates to assess whether the inclusion of the control variables would significantly change the results. All analyses were conducted on STATA 15.0.

## Study 2: Results

### Descriptive Analyses

First, correlations, means, and standard deviations for all variables of interest were examined. Descriptive statistics were assessed for both high-school extracurricular- and college academic-specific goal engagement strategies (selective primary control, selective secondary control, and compensatory primary control strategies), and are presented in Table 12. Bivariate correlations are included in Table 13. As the correlation between high-school music SPC and high-school music SSC was very high ( $r = .81$ ,  $p < .001$ ), a collinearity analysis was conducted by assessing the variance inflation factor (VIF) between the two variables in a regression model (with perceived transfer to college academics as the outcome). The VIF was 2.83, which indicated that multicollinearity was not detected. Thus, music SPC and music SSC were kept as separate variables for analyses.

Table 12.  
*Descriptives for Variables of Interest.*

	N	Minimum	Maximum	Mean	Std. Deviation
HS Sports SPC	276	1.00	5.00	3.78	.68
HS Sports SSC	276	1.00	5.00	3.51	.65
HS Sports CPC	276	1.00	5.00	3.60	.85
HS Music SPC	105	1.00	5.00	3.39	.87
HS Music SSC	105	1.00	5.00	3.28	.86
HS Music CPC	105	1.00	5.00	3.40	1.05
Sports Perceived Transfer	232	1.00	5.00	2.99	1.14
Music Perceived Transfer	104	1.00	5.00	2.89	1.11

*Note.* HS= High School.

Table 13.

*Correlation Matrix for Variables of Interest.*

	1	2	3	4	5	6	7
1. HS Sports SPC	1						
2. HS Sports SSC	.66***	1					
3. HS Sports CPC	.30***	.30***	1				
4. HS Music SPC	.23	.16	.32*	1			
5. HS Music SSC	.22	.35**	.35**	.81***	1		
6. HS Music CPC	.21	.10	.28*	.35***	.57***	1	
7. Sports Perceived Transfer	.42***	.42***	.30***	.09	.20	-.02	1
8. Music Perceived Transfer	.37**	.23	.22	.41***	.52***	.27***	.47***

Note. \*  $p < .05$ ; \*\*  $p < .01$ , \*\*\*  $p < .001$ . HS= High School.

### Confirmatory Factor Analysis

A confirmatory factor analysis was conducted for both selective primary control and selective secondary control in extracurriculars and academics to determine which items should be retained for these goal engagement measures. The factor cutoff score was also set to 0.60 for this study. While a cutoff value of 0.40 is considered acceptable and is used for some studies (e.g., Hair et al., 1998), it was necessary to increase the cutoff value to improve the model fit and remove items that contributed to a poor fit. Unlike study 1, items for sports and music were not combined because of a larger sample size, and the extracurricular activities were analyzed separately. Indices that were used to assess model fit included the Comparative Fit Index (CFI), the standardized root mean squared residual (SRMR), and the chi-squared p-value, which are recommended by Hu and Bentler (1999). A good model fit includes a CFI greater than .90 or .95, an SRMR of less than 0.08, and a chi-squared p-value of less than 0.05. After removing one item from the music SSC scale and seven items from the sports SSC scale, the model fit was good for music SSC (CFI= 0.93, SRMR = 0.04,  $\chi^2 = 94.98$ ,  $p < .001$ ) and for sports SSC (CFI= 0.92,

SRMR = 0.05,  $\chi^2 = 32.40$ ,  $p < .001$ ). After one item was removed for SPC in music and three items for SPC in sports, the model fit was good for music SPC (CFI= 0.90, SRMR = 0.05,  $\chi^2 = 104.26$ ,  $p = < .001$ ), and sports SPC (CFI= 0.95, SRMR = 0.04,  $\chi^2 = 60.59$ ,  $p < .001$ ). Results for the indices for selective primary control and selective secondary control strategies in each domain are presented in Table 14.

Table 14.

Summary of Fit Indices for Goal engagement Strategies in Each Domain.

Measures	$\chi^2$	$p$	CFI	SRMR
HS Sports SPC	60.59	< .001	0.95	0.04
HS Sports SSC	32.40	< .001	0.92	0.05
HS Music SPC	104.26	< .001	0.90	0.05
HS Music SSC	94.98	< .001	0.93	0.04

*Note.* HS= High School.

## Hypothesis Testing

*Hypothesis 1: Selective primary control strategies used in high-school sports and music are positively associated with perceived transfer to academics in college.*

Multiple regression analysis was used to determine whether there is a positive association between the use of selective primary control in high-school sports and music and perceived transfer to college academics, controlling for gender, ethnicity, parental education, and the implicit achievement motive. Separate regression models were run for each extracurricular activity, and regressions for each motivational strategy were also conducted separately first before combining the predictors into one model. Starting with sports, SPC use in sports was

treated as the predictor variable with perceived transfer to college academics as the outcome variable. Results showed a positive association between SPC strategies used in high-school sports and perceived transfer to college academics, which remained significant when gender, parental education, the implicit achievement motive, and ethnicity, were included as covariates in the next regression model ( $\beta = .36, p < .001$ ). However, selective primary control strategies no longer significantly predicted perceived transfer after SSC and CPC strategies were included ( $\beta = .11, p = .183$ ), controlling for demographics and the implicit achievement variable. Results from covariates showed that compared to Whites, Asians ( $\beta = .36, p < .001$ ), African Americans ( $\beta = .36, p < .001$ ), and Multiracial participants ( $\beta = .36, p < .001$ ) were less likely to report transfer from high-school sports to college academics. Results are presented in Table 15 and Table 16.

For music, regression models were first conducted with SPC use in music as the predictor and perceived transfer to academics as the outcome. SPC use in high-school music was positively related to perceived transfer to college academics, and significance did not change after including demographics and the implicit achievement motive as control variables ( $\beta = .41, p < .001$ ). When selective primary control was combined with the rest of the motivational strategies, results were the same as for sports SPC, such that SPC use in high-school music no longer significantly predicted perceived transfer to college academics ( $\beta = .04, p = .829$ ), controlling for demographics and the implicit achievement motive. Thus, hypothesis 1 was not supported. Results are shown in Table 17 and Table 18.

*Hypothesis 2: Selective secondary control strategies used in high-school sports and music are positively associated with perceived transfer to academics in college.*

To determine whether there was a positive association between the use of selective secondary control strategies in high-school sports and music and perceived transfer to college academics, multiple regression models were conducted for each extracurricular activity. For sports, a regression model was run without any covariates with SSC in high-school sports as the predictor and perceived transfer was the outcome. Results showed a positive association between SSC use in high-school sports and perceived transfer, and significance did not change when covariates including gender, parental education, ethnicity, and the implicit achievement motive were added into the model ( $\beta = .42, p < .001$ ). In the next regression model, selective primary control and compensatory primary control strategies were also included and the positive relation between selective secondary control in high-school sports and perceived transfer to college academics remained significant ( $\beta = .28, p = .001$ ). Results are presented in Table 16 and Table 19.

For music, a regression was first conducted with SSC use in high-school music as the predictor and perceived transfer to college academics as the outcome. Results showed that the use of SSC in high-school music was positively related to perceived transfer, and SSC use in high-school music remained significant after demographic variables and the implicit achievement motive were included in the regression model ( $\beta = .50, p < .001$ ). When combining all the motivational strategies into one model and selective primary control and compensatory primary control were added, music SSC remained significant in predicting perceived transfer ( $\beta = .49, p = .005$ ). Thus, hypothesis 2 was confirmed. Results are presented in Table 18 and Table 20.

*Hypothesis 3: Compensatory primary control strategies used in high-school sports and music are positively associated with perceived transfer to academics in college.*

Multiple regression analyses were conducted to assess the relation between CPC strategies used in high-school extracurriculars and perceived transfer to college academics. Regression models were conducted for high-school sports and high-school music separately. For sports, a regression model was first conducted with the use of compensatory primary control strategies in high-school sports as the predictor and perceived transfer to academics in college as the outcome. Results showed a positive relation between CPC use in high-school sports and perceived transfer, which did not change after including the implicit achievement motive, gender, parental education, and ethnicity as control variables in the regression model ( $\beta = .33, p < .001$ ). In the next regression model, all motivational strategies were combined along with covariates, and results for sports CPC remained significant ( $\beta = .21, p = .002$ ). Results are presented in Table 16 and 21.

For music, a regression was conducted with the use of CPC in high-school music as the only predictor and perceived transfer to college academics as the outcome, which remained significant after adding demographic variables and the implicit achievement motive were added into the model ( $\beta = .29, p = .009$ ). However, music CPC no longer positively predicted perceived transfer to college academics after adding selective primary control and selective secondary control strategies into the regression model ( $\beta = -.03, p = .796$ ). Thus, hypothesis 3 was partially supported. Results are presented in Table 18 and 22.

Table 15.

*Regression Model of the Use of SPC Strategies in High-School Sports Predicting Perceived Transfer to College Academics (N=205).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
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(constant)	1.05	.63		1.67	.097
High-School Sports SPC	.62	.11	.36	5.52	<.001
Implicit Achievement Motive	.01	.02	.02	0.25	.800
Gender	-.04	.19	-.01	-0.19	.847
Parental Education	-.01	.07	-.01	-0.16	.875
Ethnicity					
Asian	-.44	.21	-.19	-2.18	.031
Latinx	-.32	.23	-.13	-1.41	.160
African American	-2.18	.77	-.19	-2.84	.005
Multiracial	-.67	.30	-.16	-2.22	.027
$F(8, 196) = 6.26, p < .001, R^2 = .203$					

Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as “0” and females as “1.”

Table 16.

*Regression Model of the Use of SPC, SSC, and CPC strategies in High-School Sports Predicting Perceived Transfer to College Academics (N=205).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	-.14	.65		-0.21	.831
High-School Sports SPC	.19	.14	.11	1.34	.183
High-School Sports SSC	.52	.15	.28	3.45	.001
High-School Sports CPC	.28	.09	.21	3.17	.002
Implicit Achievement Motive	.00	.02	.00	0.08	.938



Gender	-.08	.18	-.01	-0.46	.648
Parental Education	-.02	.07	-.03	-0.37	.711
Ethnicity					
Asian	-.49	.20	-.21	-2.50	.013
Latinx	-.45	.22	-.18	-2.02	.044
African American	-2.84	.74	-.24	-3.84	<.001
Multiracial	-.63	.28	-.15	-2.21	.028
$F(10, 194) = 8.06, p < .001, R^2 = .293$					

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Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as “0” and females as “1.”

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Table 17.

*Regression Model of the Use of SPC Strategies in High-School Music Predicting Perceived Transfer to College Academics (N=91).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	1.05	.83		1.26	.212
High-School Music SPC	.54	.13	.41	4.03	<.001
Implicit Achievement Motive	.01	.04	.03	0.29	.775
Gender	.05	.29	.02	0.16	.871
Parental Education	.01	.10	.01	0.08	.936
Ethnicity					
Asian	-.11	.30	-.05	-0.38	.704

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Latinx	-0.28	.13	-.19	-2.11	.036
Multiracial	.03	.51	.01	0.06	.952

$$F(7, 83) = 2.41, p = .027, R^2 = .169$$

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Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as “0” and females as “1.” No African American participants reported involvement in music.

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Table 18.

*Regression Model of the Use of SPC, SSC, and CPC strategies in High-School Music Predicting Perceived Transfer to College Academics (N=91).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	.60	.82		0.74	.462
High-School Music SPC	.05	.22	.04	0.22	.829
High-School Music SSC	.67	.23	.49	2.91	.005
High-School Music CPC	-.04	.15	-.03	-0.26	.796
Implicit Achievement Motive	-.00	.04	-.01	-0.07	.984
Gender	.07	.28	.02	0.24	.807
Parental Education	-.01	.10	-.01	-0.09	.925
Ethnicity					
Asian	-.07	.30	-.03	-0.22	.827
Latinx	-.28	.36	-.10	-0.79	.434
African American	-----	-----	-----	-----	-----
Multiracial	.27	.49	.06	0.54	.590

$$F(9, 81) = 2.99, p = .004, R^2 = .249$$


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\*Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as “0” and females as “1.” No statistics were included African Americans because none participated in high-school music activities.

Table 19.

*Regression Model of the Use of SSC Strategies in High-School Sports Predicting Perceived Transfer to College Academics (N=204).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	0.51	.63		0.81	.421
High-School Sports SSC	.77	.12	.42	6.50	<.001
Implicit Achievement Motive	.02	.01	.09	1.41	.159
Gender	-.08	.19	-.03	-0.45	.653
Parental Education	.01	.07	.01	0.13	.896
Ethnicity					
Asian	-.47	.20	-.20	-2.36	.019
Latinx	-.35	.22	-.14	-1.56	.121
African American	-2.60	.75	-.22	-3.49	.001
Multiracial	-.63	.29	-.16	-2.15	.033
$F(8, 195) = 7.10, p < .001, R^2 = .226$					

Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as “0” and females as “1.”

Table 20.

*Regression Model of the Use of SSC Strategies in High-School Music Predicting Perceived Transfer to College Academics (N=91).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	0.62	.80		0.77	.441
High-School Music SSC	.68	.13	.50	5.17	<.001
Implicit Achievement Motive	-.00	.03	-.01	-0.10	.921
Gender	.06	.28	.02	0.23	.819
Parental Education	-.01	.10	-.01	-0.10	.923
Ethnicity					
Asian	-.08	.29	-.04	-0.29	.772
Latinx	-.28	.35	-.10	-0.81	.420
Multiracial	.27	.48	.06	0.56	.578
	$F(7, 83) = 3.92, p = .001, R^2 = .248$				
Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as "0" and females as "1." No African American participants reported involvement in music.					

Table 21.

*Regression Model of the Use of CPC Strategies in High-School Sports Predicting Perceived Transfer to College Academics (N=205).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	2.18	.52		4.16	<.001
High-School Sports CPC	.44	.09	.33	4.96	<.001
Implicit Achievement Motive	.01	.02	.03	0.44	.662
Gender	.03	.19	.01	0.15	.882
Parental Education	-.09	.07	-.09	-1.32	.190
Ethnicity					
Asian	-.68	.20	-.29	-3.30	.001
Latinx	-.64	.23	-.26	-2.76	.006
African American	-3.12	.78	-.27	-3.98	<.001
Multiracial	-.67	.30	-.17	-2.21	.028
	$F(8, 196) = 5.46, p < .001, R^2 = .182$				

Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as "0" and females as "1."

Table 22.

*Regression Model of the Use of CPC Strategies in High-School Music Predicting Perceived Transfer to College Academics (N=91).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	1.94	.81		2.39	.019
High-School Music CPC	.32	.12	.29	2.67	.009
Implicit Achievement Motive	.00	.04	.01	0.09	.928
Gender	-.00	.31	-.00	-0.01	.995
Parental Education	.01	.11	.01	0.05	.958
Ethnicity					
Asian	-.24	.32	-.11	-0.73	.468
Latinx	-.31	.39	-.11	-0.80	.424
Multiracial	.05	.53	.01	0.10	.923
	$F(7, 83) = 1.10, p = .373, R^2 = .085$				
Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as "0" and females as "1." No African American participants reported involvement in music.					

### Study 2: Discussion

The focus of this study was to examine the potential for long-term transfer from the motivational skills used in high-school sports and music to academics. Results showed positive associations between the use of selective secondary control and compensatory primary control strategies in high-school sports and perceived transfer to college academics. The use of selective

secondary control strategies in high-school music was also positively related to perceived transfer, though the other two goal engagement strategies were not. The findings will now be discussed in terms of the potential of long-term transfer, the importance of selective secondary control strategies, and the positive impact of coaches on former athletes' college academic studies. However, findings should be interpreted with caution due to the retrospective and cross-sectional nature of the data.

### **Long-Term Transfer**

Prior studies on skill transfer from sports to other domains have demonstrated short-term transfer within the high-school years (e.g., Beckmann, 2006; Jones & Lavallee, 2009), and others have shown that the transfer of skills used in sports can be retained and applied to various domains even years after individuals are removed from the high-school context (Holt et al., 2008; Kendellen and Camiré, 2007; 2017). For example, Kendellen and Camiré (2017) found that former high-school athletes whose current life-stage ranged from young adulthood to middle-aged adulthood were able to apply self-regulation and interpersonal communication skills to their workplace. The evidence of long-term transfer has also been found in the present study through an academic context, suggesting the possibility that motivational skills used in high-school extracurriculars and transferred to academics can persist from adolescence to young adulthood. As individuals' learning experience and academic outcomes in college have been shown to predict psychological well-being and success in their careers (e.g., Antaramian, 2017; Vermeulen & Schmidt, 2008), findings indicate the potential continued benefits of motivational goal engagement strategy transfer for former athletes and musicians. However, not all academic motivational strategies may be the most impactful for long-term transfer.

## **The Importance of Selective Secondary Control Strategies**

Selective secondary control comprises of strategies aimed at sustaining one's commitment to a goal by avoiding distractions and enhancing positive perception of goal attainment, which are motivational strategies addressing one's own motivation-related cognitions. These selective secondary control strategies are expected to be used particularly when obstacles are encountered during goal pursuit (Heckhausen et al., 2010; Shane & Heckhausen, 2016; Wrosch et al., 2000). Hamm and colleagues (2019) found that selective secondary control strategies helped improve academic performance in college. The present study not only supports this beneficial effect on academic performance, but also suggests that SSC strategies can be learned in one domain and transferred to another domain, in this case from high-school sports and music to college academics. The current findings also show the widespread use of SSC strategies and the importance of maintaining goal commitment cognitively. Although an association between the use of selective primary control strategies for high-school extracurriculars and perceived transfer to college academics was initially found, the association was no longer significant after including SSC in the analyses. This suggests that while selective primary control strategies may be a part of inter-domain transfer, this strategy may be too ubiquitous to be consciously represented as a distinct strategy to use in one domain and transfer to another. Specific cognitive strategies used for strengthening goal commitment are needed to overcome difficulty during practice and competition during high school (e.g., Beckmann et al., 2006; Englert et al., 2012; Hatfield et al., 2017), which are purposed for challenging situations and may become more easily remembered by former athletes and musicians. Thus, when academic challenges arise in their new college environment, these students may attempt to overcome the obstacles by recalling prior experiences of selective



secondary strategy use. However, further research would be needed to confirm this given that the interpretability of long-term transfer in this study is limited.

### **Influence of High-School Coaches**

Findings in the current study also revealed an association between compensatory primary control strategies used in high-school sports and perceived transfer to college academics only and not for music, which is measured by recruiting external help from coaches and teammates. Specifically for coaches, their guidance and support when instructing student-athletes are crucial for athletes' sports performance and for developing life skills (Camerié et al., 2014; Gould et al., 2007; Zourbanos et al., 2006); this highlights the benefits and importance of relationships between coaches and athletes (Jowett, 2017). Moreover, studies have shown the long-term impact of coaches that go beyond high school (Christensen et al., 2021). Christensen and colleagues (2021) conducted a longitudinal study with adolescents who participated in sports and found that having a coach that student-athletes considered as a mentor in high school positively predicted academic success in college. The finding from the current study may help explain the possibility of the process by which the relation occurred, such that the positive relationships between coaches and student-athletes encouraged the students to seek help from coaches when struggling in their sport. This may have taught them to turn to external help during difficulties in other domains, which could include seeking help from educational instructors such as professors in college when encountering obstacles in their courses. Though Christensen et al. (2021) speculated that coaches may have taught perseverance to the athletes which was applied to academics, our finding that both SSC and CPC strategies predicted perceived transfer suggests that compensatory primary control strategies are valuable on their own and the principle of

seeking others for assistance during difficulty in goal pursuit may be remembered and potentially transferred over to college academics.

### **Limitations and Conclusion**

While the current study contributes to the transfer literature and expands on the type of skills that can potentially transfer long-term into a different life-stage, several limitations should be noted. One of the greatest limitations is that the data was collected retrospectively, and former high-school athletes and musicians who are now in college were asked to recall their use of motivational skills while participating in their extracurricular activities. Thus, it is possible that their responses are not accurate and may be biased based on their current level of motivation. The second limitation is that the use of motivational goal engagement strategies in high-school academics was not assessed and thus could not be controlled for. This means that the possibility that SSC and CPC strategies from high-school academics mainly contributed to the use of these strategies in college academics cannot be ruled out. Thirdly, the cross-sectional dataset limits the predictability and thus validity of observing the transfer phenomenon. Future studies should address these issues by tracking high-school athletes and musicians into their college years to determine whether transfer of the use of SSC and CPC strategies can be truly observed. Despite these limitations, the findings of the study are still valuable in that it reveals the potential for transfer in motivational strategies that have assisted adolescents in one domain to another as they transition to young adulthood. Additionally, this study suggests that those motivational strategies that are specifically suited to overcome obstacles during goal pursuit, namely cognitive strategies to enhance goal commitment, and compensatory strategies to get help and advice, are the most memorable and useful for long-term and inter-domain transfer.

## **Study 3**

### **Study 3 Design**

Study 3 of the dissertation utilizes the same dataset as the one analyzed in Study 2, with the same procedure and participants (See Study 3 Method Section). Data was collected using a survey at one time point from college students at the University of California, Irvine majoring in Psychological Science. In this study, only students who participated in sports, music, or both activities ( $N=281$ ) are included in the analyses, although students who participated in an extracurricular activity other than sports or music and students who were not involved in high-school extracurriculars also participated in the original data collection. This is the same dataset as study 2, and therefore most of the method section of study 2 applies here too including several variables and the limitations.

The aim of study 3 is to further examine factors that can facilitate or hinder transfer from high-school sports and music to college academics, and additional variables apart from those in study 2 will be introduced. However, some of the same measures from study 2 will be included. Reported transfer, the three motivational goal engagement strategies (i.e., SPC, SSC, and CPC), the implicit achievement motive, and demographic variables will also be analyzed but will not be described again in this study's Method section (see Study 2 Measure Section). The method section of study 3 will only introduce the new variables.

### **Study 3 Method**

The design and sample are identical to Study 2.

## Measures

**Type of Sport.** Individual and team-sports were categorized by sorting through open-ended responses that asked participants to indicate which sport they were involved in. A third category was created for those who participated in multiple sports that were both individual and team-sports (e.g., cross country and basketball).

**Time and Experience Invested in Extracurriculars.** The number of days per week that former athletes and musicians practiced was assessed by asking the participants to recall how often they practiced in high school (“How many days did you practice per week?”). Participants responded using a slide bar that ranged from 1-7 days. To measure the amount of experience that athletes had in their sport participation, they were asked, “How many years did you play this sport?” Former musicians were asked the same question about the number of years that they played their instrument, and a slide bar was also used ranging from 1-19 years.

**Implicit Affiliation Motive.** The implicit affiliation motive was also measured using the Picture Story Exercise (McClelland et al., 1989). Participants were asked to write a story for five minutes from six different pictures that were shown. The following pictures were included: (1) *women in laboratory*, (2) *couple by the river*, (3) *bicycle race*, (4) *teacher and student*, (5) *couple sitting opposite a woman*, and (6) *nightclub scene*. These stories were then coded with the Winter Manual (1994) by trained coders who had to achieve 85% agreement with the practice stories in the training manual (Schultheiss & Pang, 2007). Two combinations of coders were paired for each story, and the scores for the motives were averaged and summed across all the pictures for the total motive score. As the word count was positively associated with the implicit affiliation motive, the motive score was residualized and used for analysis.

**Value and Identity in Extracurriculars.** The amount of value placed in extracurriculars was measured using the Academic and Athletic Identity Scale (AAIS), which is a 13-item measure that assesses the value that individuals place in being an athlete and being a student (Yukhymenko-Lescroart, 2014). Six items were used to assess placing value in being an athlete including, “Being a capable athlete” and “Being proud to be an athlete.” Items were averaged together with excellent reliability ( $\alpha = .92$ ). A 5-point Likert scale ranging from “*Not central at all*” to “*Very Central*” was used for the scale. For musicians, the items regarding athletes were replaced with the term “musicians” (e.g., being proud to be a musician) with excellent reliability scores ( $\alpha = .92$ ).

**Encouragement of Transfer.** Encouragement of transfer was assessed by using a one-item question for coaches, parents, and peers. An example of the item for sports includes, “My parents encouraged me to apply skills learned in sports to academics in high school.” The same question was asked of coaches and peers. For music, the one-item question was identical except the term “sports” was replaced with “music” (“My parents encouraged me to apply skills learned in music to academics in high school.”). The term “director” was also used for music instead of “coaches.” A 5-point Likert was used ranging from “*Never*” to “*Always*.”

### **Study 3: Data Analysis Plan**

Descriptives (means, standard deviations, correlations) for all variables of interest will first be examined. Multiple regression analyses will be conducted to examine whether the implicit achievement motive is positively associated with perceived transfer (hypothesis 1a), whether athletes and musicians who spend more hours practicing and have more experience are more likely to perceive transfer from motivational goal engagement strategies used in sports and music to college academics (hypothesis 3a and 3b), whether valuing extracurricular activities is

positively related to perceived transfer (hypothesis 3c), whether awareness of possibility can predict perceived transfer (hypothesis 4), whether academic goal urgency can predict perceived transfer (hypothesis 5) and whether encouragement of transfer from coaches, parents, and peers is positively associated with perceived transfer (hypothesis 6a, 6b, and 6c). Interaction analyses will be conducted to assess whether team-sport athletes with a high affiliation motive are less likely to perceive transfer (hypothesis 1b), and whether individual-sport athletes with a high implicit achievement motive are more likely to report transfer (hypothesis 2b). Next, a one-way ANOVA will be conducted to determine if individual-sport athletes have higher levels of perceived transfer compared to team-sport athletes (hypothesis 2a). Finally, a double mediation model will be conducted to assess whether coaches,' parents,' and peers' encouragement and awareness of transfer mediate the relation between the use of SSC and CPC strategies and perceived transfer to college academics. PROCESS macro for SPSS version 23.0 will be used for mediation analyses, and STATA 13.0 will be used for the rest of the analyses.

### **Study 3: Results**

#### **Descriptive Analyses**

Correlations, means, and standard deviations were first assessed before testing the hypotheses. Descriptives for variables of interest including the implicit achievement and affiliation motive, time spent practicing in extracurriculars, years of experience in sports and music, value placed into the activities, awareness of transfer for athletes, and encouragement of transfer to athletes and musicians from socialization agents (coaches/directors, parents, and peers) are presented in Table 23. Bivariate correlation tables are presented in Table 24 for sport-related variables, and in Table 25 for all music-related variables. As the correlation between awareness of transfer possibility and perceived transfer was very high ( $r = .79$ ,  $p < .001$ ),

mediation analyses will not be conducted to test hypothesis 4. The motivational goal engagement strategies for sports and music were included in the correlation tables, but not for the descriptives, which were already presented in Study 2 (page 56).

Table 23.  
*Descriptives for Variables of Interest.*

	N	Minimum	Maximum	Mean	Std. Deviation
Implicit Achievement Motive	276	1.00	5.00	3.78	.68
Implicit Affiliation Motive	276	1.00	5.00	3.51	.65
HS Sports Time Practice	232	1	7	2.67	1.01
HS Music Time Practice	103	0	7	3.68	1.73
HS Sports Experience	230	0	19	5.38	3.63
HS Music Experience	104	0	16	5.93	3.83
HS Sports Value	227	1	4	2.37	.87
HS Music Value	99	1	4	2.29	.88
HS Sports Awareness of Transfer	231	1	5	3.43	1.14
HS Sports Encouragement from Coaches	232	1	5	3.09	1.23
HS Music Encouragement from Director	104	1	5	3.09	1.24
HS Sports Encouragement from Parents	232	1	5	2.79	1.36
HS Music Encouragement from Parents	103	1	5	2.61	1.21
HS Sports Encouragement from Peers	232	1	5	2.46	1.17
HS Music Encouragement from Peers	104	1	5	2.39	1.16

*Note.* HS= High School.

Table 24.

*Correlation Matrix for Variables of Interest for Sports.*

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Implicit Achievement Motive	1												
2. Implicit Affiliation Motive	.37***	1											
3. Time Practice	.15*	.19**	1										
4. Experience	.01	-.02	.15*	1									
5. Value	-.02	-.01*	.07	.29***	1								
6. Awareness of Transfer	.05	.04	.12	.27***	.43***	1							
7. Encouragement. From Coaches	-.09	-.07	.02	.13*	.22***	.43***	1						
8. Encouragement From Parents	-.11**	-.08	.03	.28***	.34***	.44***	.50***	1					
9. Encouragement From Peers	-.23***	-.17*	-.10	.15*	.23***	.43***	.52***	.59***	1				
10. SPC	-.01	.05	.07	.27***	.45***	.42***	.18**	.34***	.22***	1			
11. SSC	.12	.11	.19*	.27***	.41***	.40***	.18*	.34***	.21*	.66***	1		
12. CPC	-.01	-.01	-.08	.01	.28***	.22***	.27***	.30***	.36***	.30***	.30***	1	
13. Perceived Transfer	-.01	.00	.09	.29***	.44***	.79***	.56***	.60***	.56***	.42***	.42***	.30***	1

Note. \*  $p < .05$ ; \*\*  $p < .01$ , \*\*\*  $p < .001$ .

Table 25.

*Correlation Matrix for Variables of Interest for Music.*

	1	2	3	4	5	6	7	8	9	10	11	12
1. Implicit Achievement Motive	1											
2. Implicit Affiliation Motive	.37***	1										
3. Time Practice	.17*	.10	1									
4. Experience	.12	.05	.19	1								
5. Value	-.01	-.03	.18	.14	1							
6. Encouragement. From Directors	-.07	.02	.15	.07	.10	.1						
7. Encouragement From Parents	-.16	-.17	-.07	.06	.30**	.47***	1					
8. Encouragement From Peers	-.09	-.18	-.03	-.02	.16	.48***	.62***	1				
9. SPC	.01	.09	.28**	.12	.39***	.26**	.24*	.22*	1			
10. SSC	.07	.16	.23*	.12	.31**	.41***	.33***	.32***	.81***	1		
11. CPC	.06	.09	.20***	.23*	.43***	.21*	.16	.17	.64***	.57***	1	
12. Perceived Transfer	-.01	.07	.11	.16	.34***	.58***	.49***	.65***	.41***	.52***	.27**	1

Note. \*  $p < .05$ ; \*\*  $p < .01$ , \*\*\*  $p < .001$ .



## Hypothesis Testing

*Hypothesis 1a: High-school athletes and musicians who have a high implicit achievement motive will be more likely to report transfer from participation in extracurricular activities to academics.*

Regression analyses were conducted to determine whether the implicit achievement motive was positively associated with perceived transfer for athletes and musicians. The implicit achievement motive was treated as the predictor, with perceived transfer as the outcome variable. For sports, results showed that the association between the implicit achievement motive and perceived transfer was not significant, which remained non-significant when controlling for gender, ethnicity, and parental education ( $\beta = .03, p = .706$ ). Results also showed that compared to White participants, Asian participants ( $\beta = -.27, p = .004$ ), African American participants ( $\beta = -.22, p = .002$ ), and Multiracial participants ( $\beta = -.17, p = .032$ ) were less likely to report transfer. For music, the result was the same such that the implicit achievement motive did not positively predict perceived transfer, controlling for demographics ( $\beta = .03, p = .767$ ). Thus, hypothesis 1a was not supported. Results are presented in Table 26 and Table 27.

Table 26.

*Regression Model of the Implicit Achievement Motive Predicting Athletes' Perceived Transfer to College Academics (N=205).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	3.53	.47		7.46	<.001
Implicit Achievement Motive	.01	.03	.03	0.38	.706
Gender	.05	.21	.02	0.26	.798
Parental Education	-.05	.07	-.05	-0.68	.496
Ethnicity					
Asian	-.64	.22	-.27	-2.95	.004
Latinx	-.47	.24	-.19	-1.95	.053
African American	-2.53	.82	-.22	-3.09	.002
Multiracial	-.70	.32	-.17	-2.16	.032
	$F(7, 197) = 2.43, p = .021, R^2 = .008$				

Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as "0" and females as "1."

Table 27.

*Regression Model of the Implicit Achievement Motive Predicting Musicians' Perceived Transfer to College Academics (N=91).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	2.85	.76		3.74	<.001
Implicit Achievement Motive	.01	.04	.47	0.30	.767
Gender	.05	.32	.02	0.14	.885
Parental Education	-.00	.11	-.00	-0.04	.968
Ethnicity					
Asian	-.03	.33	-.01	-0.10	.922
Latinx	-.16	.40	-.06	-0.40	.687
Multiracial	.17	.55	.04	0.31	.758
<i>F</i> (6, 84) = 0.09, <i>p</i> = .997, <i>R</i> <sup>2</sup> = .006					

Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as "0" and females as "1." No African American participants reported involvement in music.

*Hypothesis 1b: Team-sport athletes who have a high affiliation motive will be less likely to transfer goal engagement strategies from sports to academics compared to individual-sport athletes.*

To determine whether athletes who participated in a team sport with a strong implicit affiliation motive would show less perceived transfer, a categorical x continuous interaction was included in a regression model. The categorical predictors in the model included the type of sport

with two categories, individual sports and team sports. The implicit affiliation motive was considered as the continuous predictor, and perceived transfer as the outcome variable. Results showed that the interaction term (type of sport x the implicit affiliation motive) was not significant, which remained the same after controlling for ethnicity, gender, parental education, and the implicit achievement motive ( $\beta = .17, p = .334$ ). Results also showed that compared to White participants, Asian participants ( $\beta = -.25, p = .021$ ), African American participants ( $\beta = -.23, p = .004$ ), and multiracial participants ( $\beta = -.20, p = .026$ ) were less likely to report transfer. As the interaction term did not predict perceived transfer, this indicates that the relation between the type of sport and perceived transfer does not vary by the strength of their implicit affiliation motive. Simple slopes did not need to be tested, and results are presented in Table 28.

Table 28.

*Regression Model with an Interaction Term between Type of Sport and the Implicit Affiliation Motive in Predicting Athletes' Perceived Transfer to College Academics (N=171).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	3.72	.62		5.96	<.001
Implicit Affiliation Motive	-.01	.04	-.03	-0.22	.822
Type of Sport	-.29	.37	-.12	-0.78	.439
Type of Sport x Affiliation Motive	.04	.04	.17	0.97	.334
Gender	-.03	.24	-.01	-0.11	.914
Parental Education	-.03	.08	-.03	-0.38	.707
Ethnicity					
Asian	-.61	.26	-.25	-2.32	.021

Latinx	-.53	.29	-.20	-1.82	.071
African American	-2.56	.87	-.23	-2.95	.004
Multiracial	-.84	.37	-.20	-2.25	.026
	$F(10, 160) = 1.39, p = .188, R^2 = .080$				

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Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as “0” and females as “1.” For type of sport, individual sports is coded as “1” and team sports as “2.”

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*Hypothesis 2a: Individual-sport athletes will be more likely to transfer skills used in sports to academics compared to team-sport athletes.*

A one-way ANOVA was conducted to determine whether there were differences in mean scores of perceived transfer depending on the type of sport in which participants were involved. Comparisons between individual- and team-music activities were not assessed because all musicians are involved in individual training for practicing their instruments. The mean scores were compared only between individual-sport athletes ( $N=78$ ), team-sport athletes ( $N=117$ ), and athletes who play both individual- and team-sports ( $N=26$ ). Mean scores of perceived transfer were highest for athletes who played both individual- and team-sports ( $M=3.31$ ), followed by team-sport ( $M=2.98$ ) and individual-sport ( $M=2.88$ ). However, results from the one-way ANOVA showed that the mean differences between the three groups were not statistically different [ $F(2, 218) = 1.35, p = .262$ ] and that the effect of the type of sport played on the amount of perceived transfer was not significant. Thus, post-hoc tests did not need to be performed and hypothesis 2a was not supported. Results are presented in Table 29.

Table 29.

*ANOVA Results of Athletes' Responses on Perceived Transfer According to Type of Sport.*

Variable		N	Mean	SD	Source of variance	SS	F	P
Type of Sport	Individual	78	2.88	1.10	Between groups	3.60		
	Team	117	2.98	1.21	Within groups	290.83	1.35	.262
	Individual & Team	26	3.31	1.03	Total	294.43		

*Note.* SD = Standard deviation. SS = Sums of squares.

*Hypothesis 2b: Individual-sport athletes who have a high achievement motive will report the highest amount of transfer from goal engagement strategies used in sports to academics.*

To examine whether athletes who participate in an individual sport and have a high implicit achievement motive would have the highest amount of transfer, a categorical x continuous interaction was conducted in the regression model. An interaction term was first created with the type of sport as the categorical predictor (individual and team sport) and the implicit achievement motive as the continuous predictor. Perceived transfer was considered as the outcome variable. Results in the regression model showed that the interaction term between the type of sport and the implicit achievement motive was not significant, which remained non-significant after including demographics as control variables ( $\beta = .18, p = .207$ ). As the interaction term (type of sport x implicit achievement motive) did not predict perceived transfer, the relation between the type of sport in which athletes participated and perceived transfer to college academics did not vary depending on the implicit achievement motive. Thus, hypothesis 2b was not supported. Results are presented in Table 30.

Table 30.

*Regression Model with an Interaction Term between Type of Sport and the Implicit Achievement Motive in Predicting Athletes' Perceived Transfer to College Academics (N=171).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	3.44	.57		6.08	<.001
Implicit Achievement Motive	.02	.03	.05	-0.22	.607
Type of Sport	.31	.32	.13	0.97	.332
Type of Sport x Achievement Motive	-.06	.05	-.18	-1.27	.334
Gender	.02	.24	.01	0.08	.937
Parental Education	-.03	.08	-.03	-0.38	.707
Ethnicity					
Asian	-.63	.26	-.27	-2.41	.017
Latinx	-.54	.29	-.21	-1.86	.064
African American	-2.43	.86	-.22	-2.82	.005
Multiracial	-.82	.37	-.20	-2.20	.029
$F(9, 161) = 1.57, p = .127, R^2 = .081$					

Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as “0” and females as “1.” For type of sport, individual sports is coded as “1” and team sports as “2.”

*Hypothesis 3a: Athletes and musicians who spend more time practicing are more likely to report transferring their goal engagement strategies used in sports and music to academics.*

Multiple regression analyses were conducted to determine whether the number of days spent practicing sports and music per week was positively related to perceived transfer. For

sports, the number of days spent practicing was considered as the predictor, and perceived transfer as the outcome variable. Results showed that the number of days spent practicing did not predict perceived transfer, which was also non-significant after controlling for gender, ethnicity, parental education, and the implicit achievement motive ( $\beta = .07, p = .323$ ). As the number of years athletes participate in sports as well as the value placed in the sport may be important in addition to the actual time spent practicing, these predictors were added into the model altogether. Results for time spent practicing weekly remained non-significant in the regression model ( $\beta = .05, p = .457$ ). Results also showed that compared to White participants, African American participants were less likely to report transfer ( $\beta = -.18, p = .006$ ). Results are presented in Table 31 and Table 32.

For music, multiple regression analyses were also conducted with the number of days spent practicing per week on the musical instrument as the predictor and perceived transfer as the outcome variable. The results were the same as they were for sports, such that a positive association between the number of days spent practicing per week and perceived transfer was not found and did not change after controlling for demographics and the implicit achievement motive ( $\beta = .06, p = .617$ ). Results were still non-significant after adding the number of years participants were involved in music and value placed in it to the regression model, controlling for gender, ethnicity, parental education, and the implicit achievement motive ( $\beta = -.03, p = .828$ ). Thus, hypothesis 3a was not supported. Results are shown in Table 33 and Table 34.



Table 31.

*Regression Model of the Amount of Time Spent Practicing Per Week Predicting Athletes' Perceived Transfer to College Academics (N=205).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	3.16	.60		5.23	<.001
Time Spent Practicing	.08	.08	.07	0.99	.323
Implicit Achievement Motive	.01	.03	.03	0.39	.698
Gender	.04	.21	.01	0.20	.842
Parental Education	-.04	.07	-.04	-0.59	.556
Ethnicity					
Asian	-.62	.22	-.26	-2.87	.005
Latinx	-.46	.24	-.18	-1.90	.059
African American	-2.54	.82	-.22	-3.10	.002
Multiracial	-.70	.32	-.17	-2.19	.030
	$F(8, 196) = 2.25, p = .025, R^2 = .084$				
Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as "0" and females as "1."					

Table 32.

*Regression Model of the Amount of Time Spent Practicing, Experience, and Value in Sports Predicting Athletes' Perceived Transfer to College Academics (N=198).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	1.67	.62		2.73	.007
Time Spent Practicing	.05	.07	.05	0.74	.457
Experience	.04	.02	.10	1.43	.155
Value Placed in Sports	.51	.09	.38	5.62	<.001
Implicit Achievement Motive	.00	.02	.01	0.08	.936
Gender	.06	.19	.02	0.30	.768
Parental Education	-.07	.07	-.07	-0.98	.330
Ethnicity					
Asian	-.20	.22	-.08	-0.92	.357
Latinx	-.18	.24	-.07	-0.74	.458
African American	-2.08	.75	-.18	-2.78	.006
Multiracial	-.48	.30	-.12	-1.64	.103
				$F(10, 187) = 6.07, p < .001, R^2 = .245$	

Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as "0" and females as "1."

Table 33.

*Regression Model of the Time Spent Practicing Predicting Musicians' Perceived Transfer to College Academics (N=89).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	2.85	.76		3.74	<.001
Time Spent Practicing	.04	.07	.06	0.50	.617
Implicit Achievement Motive	.01	.04	.04	0.37	.714
Gender	.05	.32	.01	0.10	.921
Parental Education	.02	.11	.02	0.19	.848
Ethnicity					
Asian	-.04	.33	-.02	-0.12	.902
Latinx	-.17	.40	-.06	-0.42	.672
Multiracial	.15	.56	.04	0.28	.783
$F(7, 81) = 0.12, p = .997, R^2 = .010$					

Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as "0" and females as "1." No African American participants reported involvement in music.

Table 34.

*Regression Model of the Time Spent Practicing, Experience, and Value in Music Predicting Musicians' Perceived Transfer to College Academics (N=84).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	2.69	.89		3.03	.003
Time Spent Practicing	-.00	.07	-.01	-0.06	.950
Experience	.01	.03	.03	0.22	.828
Value in Music	.37	.13	.31	2.73	.008
Implicit Achievement Motive	.01	.04	.03	0.29	.773
Gender	.05	.32	.01	0.10	.921
Parental Education	-.23	.32	-.08	-0.71	.481
Ethnicity					
Asian	-.16	.35	-.07	-0.46	.645
Latinx	-.24	.41	-.09	-0.59	.558
Multiracial	-.06	.55	-.01	-0.10	.917
$F(9, 74) = 0.98, p = .462, R^2 = .107$					

Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as "0" and females as "1." No African American participants reported involvement in music.

*Hypothesis 3b: Athletes and musicians who report greater experience in their extracurricular activities will be more likely to transfer goal engagement strategies used in sports and music to academics.*

Multiple regression analyses were conducted to determine whether the number of years involved in sports and music was positively associated with perceived transfer. For sports, the number of years involved in sports was considered as the predictor, and perceived transfer as the outcome variable. Control variables included the implicit achievement motive, gender, ethnicity, and parental education. Results showed a positive association between the number of years involved in sports and perceived transfer, which remained significant after including the control variables ( $\beta = .22, p = .004$ ). However, the number of years involved in sports no longer predicted perceived transfer after adding the number of days spent practicing per week and value placed in sports into the regression model, controlling for demographics and the implicit achievement motive ( $\beta = .10, p = .155$ ). Results are presented in Table 32 and Table 35.

For music, the number of years involved in playing an instrument was considered as the predictor and perceived transfer as the outcome. Controlling for gender, ethnicity, parental education, and the implicit achievement motive, results showed that the number of years involved in playing an instrument did not predict perceived transfer ( $\beta = .09, p = .437$ ). After adding the number of times of practicing each week and value placed in music as predictors, results remained non-significant ( $\beta = .03, p = .828$ ). Thus, hypothesis 3b was not supported. Results are shown in Table 34 and Table 36.

Table 35.

*Regression Model of Experience in Sports Predicting Athletes' Perceived Transfer to College Academics (N=203).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	2.82	.53		5.36	<.001
Experience	.07	.02	.22	2.89	.004
Implicit Achievement Motive	.01	.02	.02	0.25	.801
Gender	.13	.20	.04	0.63	.533
Parental Education	-.04	.07	-.05	-0.61	.543
Ethnicity					
Asian	-.35	.23	-.16	-1.56	.119
Latinx	-.19	.25	-.08	-0.76	.446
African American	-2.43	.80	-.21	-3.04	.003
Multiracial	-.56	.32	-.14	-2.19	.030
	$F(8, 194) = 3.31, p = .002, R^2 = .120$				
Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as "0" and females as "1."					

Table 36.

*Regression Model of Experience in Music Predicting Musicians' Perceived Transfer to College Academics (N=89).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	2.85	.76		3.74	<.001
Experience	.04	.07	.06	0.50	.617
Implicit Achievement Motive	.01	.04	.04	0.37	.714
Gender	.05	.32	.01	0.10	.921
Parental Education	.02	.11	.02	0.19	.848
Ethnicity					
Asian	-.04	.33	-.02	-0.12	.902
Latinx	-.17	.40	-.06	-0.42	.672
Multiracial	.15	.56	.04	0.28	.783
$F(7, 81) = 0.12, p = .997, R^2 = .010$					

Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as "0" and females as "1." No African American participants reported involvement in music.

*Hypothesis 3c: Athletes and musicians who value their extracurricular activity (i.e. as an athlete or musician) will be more likely to report transfer.*

Multiple regression analyses were conducted to determine whether there would be a positive relation between valuing extracurricular activities and perceived transfer. For sports, value placed in being an athlete was the predictor, and perceived transfer as the outcome variable. Gender, ethnicity, parental education, and the implicit achievement motive were

included as covariates in the regression model, and results showed a positive association between value placed in being an athlete and perceived transfer ( $\beta = .29, p < .001$ ). When the amount of time spent practicing per week and the number of years spent participating were added as predictors into the model, results remained significant ( $\beta = .27, p < .001$ ). Results are presented in Table 32 and Table 37.

For music, the value placed in being a musician was treated as the predictor and perceived transfer as the outcome. Results showed that value placed in being a musician was positively associated with perceived transfer, controlling for demographics and the implicit achievement motive ( $\beta = .38, p < .001$ ). Results remained significant after adding the amount of time spent practicing music per week and the number of years participating in music activities into the regression model ( $\beta = .31, p = .008$ ). Thus, hypothesis 3c was supported. Results are shown in Table 34 and Table 38.

Table 37.

*Regression Model of Value in Sports Predicting Athletes' Perceived Transfer to College Academics (N=200).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	2.26	.49		4.57	<.001
Value in Sports	.51	.09	.38	5.81	<.001
Implicit Achievement Motive	.01	.02	.01	0.27	.788
Gender	.13	.19	.00	0.07	.947
Parental Education	-.06	.07	-.07	-0.94	.349
Ethnicity					
Asian	-.36	.21	-.15	-1.73	.085



Latinx	-.31	.23	-.12	-1.38	.170
African American	-2.10	.76	-.18	-2.75	.006
Multiracial	-.54	.30	-.13	-1.81	.071
	$F(8, 191) = 6.63, p < .001, R^2 = .218$				

Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as “0” and females as “1.”

Table 38.

*Regression Model of Value in Music Predicting Musicians’ Perceived Transfer to College Academics (N=87).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	2.71	.81		3.36	.001
Value in Music	.36	.13	.30	2.81	.006
Implicit Achievement Motive	.01	.04	.02	0.17	.865
Gender	-.20	.32	-.07	-0.65	.519
Parental Education	-.03	.10	-.04	-0.33	.741
Ethnicity					
Asian	-.10	.32	-.04	-0.30	.763
Latinx	-.23	.39	-.08	-0.59	.559
Multiracial	-.03	.52	-.01	-0.05	.958
	$F(7, 79) = 1.26, p = .282, R^2 = .100$				

Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as “0” and females as “1.” No African American participants reported involvement in music.

*Hypothesis 4: Athletes and musicians will be more likely to transfer skills from extracurriculars to academics if they are aware of the possibility of transfer occurring.*

After running descriptive statistics and observing a very high correlation between awareness of the possibility of transfer and perceived transfer ( $r=.79, p < .001$ ), this hypothesis was not tested for mediation.

*Hypothesis 5: Athletes and musicians will be more likely to transfer extracurricular goal engagement strategies once there is goal urgency in the academic domain.*

After further considering the assessment of goal urgency in the academic domain, this hypothesis was not tested in the study. This is due to a measurement issue with goal urgency, such that the item asked (e.g., “I use lessons and skills learned from sports to help me in school more when the quarter is over”) was not a valid measurement of goal urgency. Suggestions to operationalize goal urgency in the academic domain will be expanded upon in the Discussion section.

*Hypothesis 6a: High-school athletes and musicians will be more likely to report transfer if their coaches and directors encourage them to apply what they use in sports to school.*

Multiple regression analyses were conducted to determine whether high-school encouragement of transfer from coaches could positively predict reported transfer for athletes, and whether encouragement of transfer from high-school directors (equivalent to coaches for sports) is positively associated with reported transfer. For sports, encouragement of transfer from coaches was considered as the predictor, and perceived transfer as the outcome. Control variables including gender, ethnicity, and parental education were added to the model. Results showed a positive association between coaches’ encouragement of transfer and perceived transfer controlling for demographics and the implicit achievement motive, which remained

significant after including encouragement of transfer from parents and peers into the model as well ( $\beta = .25, p < .001$ ). Results also showed that African American participants were less likely to report transfer compared to White participants. For music, directors' (responsible for conducting and instructing musicians) encouragement of transfer was treated as the predictor and reported transfer as the outcome variable. Demographic variables and the implicit achievement motive were also controlled for in the model. Results showed a positive relation between encouragement of transfer from directors and musicians' reported transfer, and results remained significant after encouragement of transfer from musicians' parents and peers were included in the model ( $\beta = .32, p < .001$ ). Thus, hypothesis 6a was supported. Results are presented in Table 39 and Table 41.

*Hypothesis 6b: Athletes and musicians will be more likely to transfer their skills from sports to academics if their parents encourage them to transfer skills from sports to academics.*

Multiple regression analyses were conducted to assess whether encouragement of transfer from athletes' and musicians' parents would be positively associated with perceived transfer. For sports, encouragement of transfer from parents was treated as the predictor and perceived transfer as the outcome variable. Gender, ethnicity, parental education, and the implicit achievement motive were controlled for in the regression model. Results showed a positive association between parents' encouragement of transfer and perceived transfer controlling for demographics and the implicit achievement motive, which remained significant when encouragement of transfer from coaches and peers was added into the model ( $\beta = .30, p < .001$ ). For music, encouragement of transfer from parents was treated as the predictor, perceived transfer as the outcome variable, and demographic variables and the implicit achievement motive as control variables. Results showed a positive relation between parents' encouragement of

transfer and perceived transfer while controlling for demographics and the implicit achievement motive variable ( $\beta = .47, p < .001$ ). However, parents' encouragement of transfer no longer predicted perceived transfer after adding directors' and peers' encouragement of transfer into the regression model ( $\beta = .02, p = .834$ ). Thus, hypothesis 6b was partially supported. Results are presented in Tables 39-41.

*Hypothesis 6c: Athletes and musicians will be more likely to report transfer if their peers encourage them to transfer skills used in sports to school.*

Multiple regression analyses were conducted to assess whether peers' encouragement of transfer for athletes and musicians would be positively related to perceived transfer. For sports, peers' encouragement of transfer was the predictor and athletes' perceived transfer as the outcome. Controlling for gender, ethnicity, and parental education, peers' encouragement of transfer was positively associated with perceived transfer, which remained significant after including coaches' and parents' encouragement of transfer into the model ( $\beta = .26, p < .001$ ). For musicians, peers' encouragement of transfer was also considered as the predictor and reported transfer as the outcome variable. Control variables included demographics and the implicit achievement motive. Results showed a positive association between peers' encouragement of transfer and perceived transfer controlling for demographics and the implicit achievement motive, and results remained significant after adding directors' and parents' encouragement of transfer into the regression model ( $\beta = .47, p < .001$ ). Thus, hypothesis 6c is supported. Results are presented in Table 39 and Table 41.

Table 39.

*Regression Model of Socialization Agents' Encouragement to Transfer for High-School Sports Predicting Perceived Transfer to College Academics (N=205).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	.72	.42		1.70	.091
Encouragement from Coaches	.23	.06	.25	3.74	<.001
Encouragement from Parents	.26	.06	.30	4.35	<.001
Encouragement from Peers	.25	.07	.26	3.74	<.001
Implicit Achievement Motive	.02	.02	.05	1.04	.298
Gender	.22	.15	.07	1.42	.158
Parental Education	.01	.05	.01	0.10	.919
Ethnicity					
Asian	-.21	.17	-.09	-1.26	.209
Latinx	-.30	.19	-.12	-1.61	.110
African American	-1.54	.63	-.13	-2.46	.015
Multiracial	-.07	.25	-.02	-0.30	.763
				$F(10, 194) = 18.77, p < .001, R^2 = .492$	

Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as "0" and females as "1."

Table 40.

*Regression Model of Parents' Encouragement for Transfer to High-School Music Predicting Perceived Transfer to College Academics (N=90).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	1.80	.71		2.53	.013
Encouragement from Parents	.43	.09	.47	4.82	<.001
Implicit Achievement Motive	.02	.03	.05	0.50	.618
Gender	.04	.28	.02	0.15	.878
Parental Education	-.02	.10	-.03	-0.25	.801
Ethnicity					
Asian	-.07	.30	-.03	-0.22	.826
Latinx	-.26	.36	-.09	-0.70	.484
Multiracial	.34	.49	.08	0.70	.488
$F(7, 82) = 3.41, p = .003, R^2 = .226$					

Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as "0" and females as "1." No African American participants reported involvement in music.

Table 41.

*Regression Model of Socialization Agents' Encouragement to Transfer for High-School Music Predicting Perceived Transfer to College Academics (N=90).*

Variables	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
(constant)	.57	.59		0.97	.336
Encouragement from Directors	.29	.08	.32	3.58	.001
Encouragement from Parents	.02	.09	.02	0.22	.830
Encouragement from Peers	.48	.10	.51	4.94	<.001
Implicit Achievement Motive	.00	.03	.01	0.08	.938
Gender	.16	.22	.06	0.72	.475
Parental Education	.02	.08	.02	0.25	.800
Ethnicity					
Asian	-.18	.24	-.08	-0.77	.441
Latinx	-.34	.29	-.12	-1.17	.246
Multiracial	-.24	.40	-.05	-0.59	.554
$F(9, 80) = 9.81, p < .001, R^2 = .525$					

\*Note: For ethnicity, Whites were treated as the reference group. For gender, males were coded as "0" and females as "1." No statistics were included African Americans because none participated in high-school music activities.

### Study 3: Discussion

The purpose of the current study is to investigate different factors that can either facilitate or hinder high-school athletes' and musicians' ability to transfer motivational goal engagement strategies that are used in their extracurricular activities to their academic studies in college.

Findings revealed that the type of sport in which athletes participate, their implicit motives, and the amount of time spent practicing are not significant in facilitating transfer. The factors for sports that are important in facilitating transfer to academics include the centrality of being an athlete for one's identity, as well as coaches,' parents,' and peers' encouragement of transfer. The findings were similar for music, except that encouragement of transfer from musicians' parents was not positively related to perceived transfer. In the following section, I will discuss possible reasons why some factors appear more influential in the transfer of motivational self-regulatory skills from an extracurricular domain to academics. Findings should be interpreted with caution due to the cross-sectional and retrospective nature of the data.

### **Type of Sport and Implicit Motives**

Findings from this study showed that whether athletes participated in individual sports or team sports did not predict different levels of perceived transfer. Prior studies have found that individual-sport athletes tend to acquire greater self-regulation skills compared to team-sport athletes (e.g., Howard et al., 2018; Jonker et al., 2010). While some of the self-regulation skills may overlap with the motivational goal engagement strategies (e.g., effort), the self-regulation skills addressed in past studies do not include strategies resembling selective secondary control and compensatory primary control that are needed to endure challenging situations. As both individual- and team-sport athletes encounter obstacles during practice and competition (Crust & Clough, 2011, Tedesqui & Young, 2017) these specific strategies are needed in both types of sports. Coaches may then encourage transfer of these strategies either individually directed to a single athlete or through team-focused communications.

Results also indicated that neither the implicit achievement motive nor the implicit affiliation motive predicted perceived transfer. Initially, it was surprising that the implicit



achievement motive did not play a role in the level of perceived transfer because prior studies have shown the importance of having a high implicit achievement motive in goal-oriented tasks such as sports (e.g., Gröpel et al., 2016; Wegner & Teubel, 2014). It would seem plausible that student-athletes and musicians with a high implicit achievement motive would be more likely to use motivational goal engagement skills to achieve success in the sports and music domain and utilize transfer to succeed in another achievement domain. However, the actual findings of study 3 indicate that the transfer phenomenon is not driven by affective responses but rather is a conscious process. Thus, explicit motives, which are cognitively elaborated and accessible (McClelland et al., 1989), and not implicit motives, may be the dominating factor involved in transfer. Explicit motives are self-attributed and are based on individuals' self-concept (Brunstein, 2018), leading to a stronger pursuit of achievement-oriented tasks that aligns with one's values and beliefs about oneself. Apparently, it takes conscious reflection on transfer to actually utilize strategies used in an achievement domain for another unrelated domain. Moreover, transfer needs to be explicitly explained and promoted by socialization agents to facilitate transfer. Results showing a lack of interaction between participating in team-sports and the implicit affiliation motive suggest that having a high affiliation motive that can be satisfied through involvement in a competitive team sport may not be harmful for transfer, and does not necessarily hinder or block any potential thoughts of transferring motivational strategies used in sports to help with academics.

### **Experience in Extracurriculars and Identity as Athletes and Musicians**

Results from the current study show that the centrality of being an athlete or musician to one's identity was positively associated with perceived transfer, the number of years spent participating in sports was positively related to perceived transfer when value of sports and

music was not included in the model, and the amount of time spent practicing sports and music did not predict perceived transfer. Findings indicate that the amount of experience in participating in the sport is helpful for athletes' eventual transfer of motivational strategies learned throughout the years into college academics. Prior studies show that motivational self-regulation skills in sports are acquired and developed over time (McCormick et al., 2019; Weiss et al., 2013), and the results from this study suggest that spending more time in sports and developing selective secondary control and compensatory primary control strategies may lead to more benefits regarding transfer. It is possible that experience leads to a greater accumulation of knowledge and deeper understanding of the sport, along with more exposure to challenging situations. However, results also show that identity as an athlete or musician is a stronger predictor of perceived transfer. Individuals who participate in sports and music and strongly identify as athletes and musicians are more motivated to strive for success in their extracurricular activities because of the value they place in tasks that are central to their self-image, and their beliefs that their efforts in goal-oriented tasks related to their extracurricular domain are effective (Eccles, 2009). Hence, tying one's identity to being an athlete or musician often leads to greater cognitive and behavioral investment into extracurricular activities (e.g., Benson et al., 2015; Gustafsson et al., 2018), subsequently leading to more impact and reflection about situations relating to sports or music. In turn, former high-school athletes and musicians may have more experiences and lessons to draw on and apply to the academic domain.

### **The Role of Socialization Agents in Facilitating Transfer**

Findings from the study highlight the important role that socialization agents have in helping athletes and musicians to transfer selective secondary control and compensatory primary control strategies to academics. While the implicit achievement motive was initially predicted to

be associated with perceived transfer, findings from this study suggest otherwise and emphasize the explicit nature of inter-domain transfer. This shows that facilitating transfer can be done most effectively when it is promoted explicitly. Results from this study suggest that coaches, parents, and peers may draw attention to the possibility and potential of transfer by encouraging athletes to apply cognitive strategies (SSC) and resort to external help from others (CPC) used in extracurriculars to academics. As discussed in previous studies, coaches have the opportunity to build close relationships with athletes and highly influence their development of athletic, life, and academic skills (e.g., Camerié et al., 2014; Christensen et al., 2021; Jowett 2017). Given that coaches are the ones that are directly instructing athletes during practice and competition time, they are in a unique position to connect the detailed information taught in sports to academics.

Studies have shown the ability of peers to positively influence their friends' performance in academics and persistence with sports (Jõesaar et al., 2011; Wang et al., 2018; Yu & Patterson, 2011), which is more prevalent and prominent during the adolescent life-stage (Eccles & Roeser, 2011). Allen et al. (2015) found that student-athletes who shared about successfully transferring skills from sports to academics brought awareness of the possibility for other athletes to do the same, which supports the current finding. The study also found that though parents are not directly involved with athletes' practices and competitions, they can still help bring awareness of transfer from sports to school to their children (Weiss et al., 2013). However, encouragement of transfer from musicians' parents was significantly associated with perceived transfer only before encouragement of transfer from the director and peers were entered into the regression model. This suggests that despite parental support, directors and peers may have a more specific contextual influence on music than parents.

Furthermore, differences in the way that parents are involved in these two extracurricular activities may help explain why encouragement of transfer from parents was associated with perceived transfer for athletes, but not for musicians. For instance, sports competitions (approximately 1-2 times per week) are held more frequently than music performances or competitions (Knight et al., 2011). Thus, compared to musicians' parents, athletes' parents have relatively more opportunities to observe their children competing and to advise them to use motivational skills such as perseverance and concentration, and in that context may encourage their children to apply these skills to academics as well. In contrast, though musicians' parents can observe their children's practices at home daily, they have fewer opportunities to attend music performances or competitions as they occur less frequently. Hence, their involvement may only involve general encouragement for hard work in music instead of focusing on using specific skills to overcome challenges in both music and academics. In addition, parents are more likely to have experience participating in competitive sports compared to musicians' parents who may be less knowledgeable about specific musical instruments. With greater experience in sports, athletes' parents have a more thorough understanding of the strategies needed to overcome challenging situations and may then encourage their children to utilize these strategies for academics. Future studies should include measures of parents' own knowledge and involvement in sports or music to confirm this explanation. Nevertheless, the small sample size of musicians ( $N = 90$ ) may indicate that an effect for encouragement of transfer from musicians' parents may be found with more participants in this group. In sum, parents' explicit encouragement to transfer skills from extracurricular activities to academics may contribute to students' perception of the parental role in facilitating transfer.

## **Exclusion of Goal Urgency in the Academic Domain**

As mentioned in the Results section, Hypothesis 5, which stated that athletes and musicians will be more likely to transfer extracurricular goal engagement strategies once there is goal urgency in the academic domain, was not tested in this study. The item used to measure goal urgency in school was not a valid assessment, which operationalized academic goal urgency as the end of the school term. However, goal urgency in the academic domain may occur earlier for individuals who aim to achieve high grades towards the middle of the school term to avoid relying on final exams to boost their final grades. In this case, the psychologically constructed deadline for academic achievement in a course would not necessarily be defined as the end of the school term. Thus, future studies can operationalize goal urgency in the academic domain by asking participants about the time point during the school term when they would feel the most pressure to earn high grades. Accordingly, responses can be categorized into the beginning, middle, and end of the school term to define academic goal urgency. Longitudinal statistical analyses can then be conducted to determine whether perceived transfer increases with academic goal urgency.

## **Limitations and Conclusions**

Given that the same dataset was used for study 2, the same limitations apply in this study as well. Specifically for the current study, conclusions establishing directionality cannot be made for associations such as the relation between parents' encouragement and perceived transfer. Regarding the retrospective nature of the dataset, it is highly possible that responses for some of the measures used to test hypotheses such as the number of days and time spent practicing sports and music were not entirely accurate. It is therefore important that future studies collect longitudinal data to closely track the amount of time that athletes and musicians spend practicing

to confirm its importance for transfer. Future research should also collect more data from high-school musicians to examine whether some of the findings for high-school athletes are parallel to those in the music domain. Finally, the one-item measures that were used such as encouragement of transfer from socialization agents should be further developed to be more specific towards the goal engagement strategies (i.e., SPC, SSC, and CPC).

Despite these limitations, the current study contributes to the literature on transfer phenomenon and is the first to thoroughly investigate different factors that facilitate transfer of motivational skills learned in extracurriculars to academics. Findings especially highlight the explicit nature of inter-domain transfer, such that transfer is a conscious process that is cognitively elaborated. In this way, value placed in sports and music as well as explicit instruction and encouragement of transfer from socialization agents are crucial in guiding adolescents to learn about transfer opportunities. Interventions that encourage coaches, music directors, parents, and peers to communicate transfer from extracurriculars to academics explicitly and specifically can effectively shape high-school athletes' academic future.

## **Study 4**

### **Study 4 Design**

The design of this study is longitudinal, with five time points analyzed in this study over a span of seventeen years. Data was collected when participants were in 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 9<sup>th</sup>, and 12<sup>th</sup> grade. The focus of this study is to determine whether participation in extracurricular activities, specifically sports and music/performance arts throughout childhood and adolescence predicts academic performance. Given the longitudinal nature of the dataset and the availability of an ample number of covariates, the possibility of the third variable explanations can be tested. As such, this study aims to address some of the limitations of the first three studies, which include

their cross-sectional designs and a limited number of parental variables that are available in this dataset (e.g., income and home environment).

## **Study 4: Method**

### **Study 4: Participants & Procedure**

**Participants.** This study will use data collected from the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development (SECCYD). The longitudinal birth cohort was recruited in 1991, and they were followed until 2007 when participants were 15 years old. Participants were selected from ten different cities across the United States (Little Rock, AR; Irvine, CA; Lawrence, KS; Wellesley, MA; Philadelphia, PA; Pittsburgh, PA; Morganton, NC; Charlottesville, VA; Seattle, WA; and Madison, WI). To recruit participants, 3,015 families were randomly sampled from approximately 5,400 families who were eligible and were asked to participate in the study. Families were ineligible if the mothers were younger than 18 years old, did not speak English, had medical problems, lived more than one hour away from the study site, or had problems with substance abuse. Infants who had developmental disabilities or stayed in the hospital for more than one week were also ineligible. Families were also ineligible if they planned to move within the next year. Out of the 3,015 families who were randomly sampled, 1,364 families participated in the interview one month after the infants were born. A total of 1,226 children remained in the study after first grade, 1,061 children remained in the study through sixth grade, 1,009 children remained in the study through 9th grade, and 782 participants remained in the study for the follow-up in 12<sup>th</sup> grade.

Within the extracurricular domain, participation in sports and music/performance arts increased from 4<sup>th</sup> grade to 12<sup>th</sup> grade. A total of 407 participants were involved in sports in 4<sup>th</sup>

grade, 469 in 5<sup>th</sup> grade, 685 in 6<sup>th</sup> grade, 750 in 9<sup>th</sup> grade, and 424 (54% of the total sample) in 12<sup>th</sup> grade. For music and performance arts, a total of 240 participants were involved in 4<sup>th</sup> grade, 290 in 5<sup>th</sup> grade, 433 in 6<sup>th</sup> grade, 462 in 9<sup>th</sup> grade, and 262 participants (34% of the total sample) in 12<sup>th</sup> grade.

**Procedures.** Participants were assessed in each phase of the study using multiple methods of measurement including home and lab visits, interviews over the phone, and mailed surveys. To assess participants' outcomes, parents and teachers were also involved in the study through the completion of interviews and questionnaires. Parents and participants completed interviews and questionnaires during home and lab visits, while teachers reported participants' academic outcomes at the school sites using questionnaires. To answer questions about participants' involvement in extracurricular activities, mothers were interviewed over the phone or at their homes. When participants reported their own involvement in extracurricular activities, they filled out questionnaires at home or in a lab. To answer questions about students' grades, teachers were provided with questionnaires to complete at schools. Participants' official school transcripts were also obtained after gaining permission to receive copies from the school sites.

#### **Study 4: Measures**

**Involvement in Extracurricular Activities.** Questions about participation in extracurricular activities were included in assessments during 4<sup>th</sup> and 5<sup>th</sup> grade. Participants' mothers were asked whether their child was involved in structured activities or lessons after school, in the evenings, and on the weekends. Responses were categorized into team sports, individual sports, or art/music/performance lessons. Participants' mothers were then asked to indicate the number of minutes that their child spent engaging in the structured activities in a typical week. The variables for team sports and individual sports were combined into one single



variable for sports. In 4<sup>th</sup> grade, involvement in sports and music/performance arts was measured at three different time points: Fall, Winter, and Spring (2000-2001). As time spent in extracurricular activities was measured at one time point in 5<sup>th</sup>, 6<sup>th</sup>, 9<sup>th</sup>, and 12<sup>th</sup> grade, all three 4<sup>th</sup> grade scores were averaged together. In 6<sup>th</sup>, 9<sup>th</sup>, and 12<sup>th</sup> grade, participants themselves were asked about their own involvement in organized sports or music/performance arts after school or on the weekends. They were asked about the number of days that they would take part in the activity in a typical week, ranging from less than 1 to 7. Thus, time spent in structured sports and music/performance arts for 6<sup>th</sup>-12<sup>th</sup> grade was assessed by the number of days, while time spent in these activities in 4<sup>th</sup> and 5<sup>th</sup> grade was measured by the number of minutes. Although the scores were standardized, the measurement difference limits the interpretability of the results.

**Academic Achievement.** Participants' academic achievement was measured through teachers' ratings and their GPA in core subjects. From 4<sup>th</sup> to 6<sup>th</sup> grade, participants' academic performance was measured using the Mock Report Card (Pierce et al., 1999). Teachers were asked to rate their students' performance in the following six subjects: Reading, Oral Language, Written Language, Math, Social Studies, and Science using a 5-point Likert Scale (*1=below grade level, 5=excellent*). In 9<sup>th</sup> grade, school transcripts were used to assess academic achievement. Participants' grade point average (GPA) in the four core subjects were recorded (Math, English, Science, and Social Studies), with scores ranging from 1.00-4.00. In 12<sup>th</sup> grade, participants were asked to report their letter grades from an 8-point Likert scale ranging from 1 (*Mostly A's*) to 8 (*Mostly below D's*). Scores were reverse-coded, with a higher score indicating higher grades. Grades at all time points were standardized.

**Demographics.** When participants were infants, mothers were asked to report the child's gender (1=Male, 2= Female) and ethnicity. As the majority were White participants (83%), the

ethnicity variable was dichotomously categorized as Whites versus non-Whites. Participants' mothers were also asked to indicate their educational attainment level as well as that of their partner. For mothers' education level, a 5-point Likert scale was used ranging from "*Less than 12 years*" to *post-graduate degree*." For fathers, a 6-point Likert scale was used to measure completed education (*1=High school graduate or GED, 6= More than one Master's degree or a Doctoral degree*). Scores for mothers' and fathers' education were averaged, and a composite score was created. Finally, a standardized income-to-needs ratio variable was included at all time points in the study. This variable assesses socioeconomic status by dividing the annual family income (pre-tax) by the poverty threshold, which considers the annual income, the number of members in a household, and the number of children living in the household.

**Home Environment.** Children's home environment was assessed using Caldwell's Home Observation for Measurement of the Environment (HOME) scale (Caldwell & Bradley, 1979; 2000), which is used to indicate the quality and quantity of support available that parents provide to facilitate children's development in a home setting. Both parent and observer reports were used to assess home environment. The Middle Childhood H.O.M.E scale was used in 3<sup>rd</sup> grade, with a total of 59 items and 7 subscales. For the remaining four time points in the study, the Early Adolescence H.O.M.E scale was used. This scale includes five of the seven original subscales (44 items), including Physical Environment (e.g., "house and immediate surroundings are not overly noisy"), Learning Materials (e.g., "adolescent has access to at least 20 age-appropriate books"), Modeling (e.g., "parent regularly interacts with friends outside of work"), Variety of Experiences (e.g., "family has taken adolescent to a sporting event in the past year"), and Acceptance and Responsivity (e.g., "when speaking of and to the child, parent's voice is positive"). As this scale is not scored on a Likert scale but rather through a dichotomous

checklist (i.e., yes or no for each question), past studies have averaged all of the subscales into one composite score (e.g., Simpkins et al., 2020), and the same approach will be taken for the current study. Internal reliability for home environment measured when participants were in 3<sup>rd</sup> grade and 5<sup>th</sup> grade were good ( $\alpha = 0.83$ ;  $\alpha = 0.84$ , respectively).

#### **Study 4: Data Analysis Plan**

First, correlations and means among the variables of interest will be examined. After conducting descriptive analyses, our hypothesis that participation in organized sports and music/performance arts activities predict academic achievement throughout childhood and adolescence will be examined using a cross-lagged model. The cross-lagged model allows for analysis of the bidirectional relation between the predictors and outcome variables at each time point. A random-intercept cross-lagged model was initially planned for analyses to assess both intra-individual and inter-individual differences. However, the model did not coverage during analysis. Thus, the cross-lagged model will be used but cannot capture within-person variations. Cross-lagged models will be conducted separately for sports and music/performance arts. Covariates including demographics and home environment will also be included. All analyses were conducted on STATA 17.0.

#### **Study 4: Results**

##### **Descriptive Analyses**

Correlations, means, and standard deviations between the variables of interest were first examined in the study (see Table 42). Results for the main predictors showed a significant positive correlation between participation in organized sports activities in 4<sup>th</sup> grade and academic performance in 5<sup>th</sup> grade ( $r = .17, p < .001$ ), and participation in 5<sup>th</sup> grade sports and 6<sup>th</sup> grade academic performance ( $r = .18, p < .001$ ), but was not significantly correlated with academic performance in either 9<sup>th</sup> grade ( $r = -.08, p = .097$ ) or in 12<sup>th</sup> grade ( $r = .03, p = .406$ ). Results are

shown on Table 43. The pattern was different for music/performance arts. While participation in 4<sup>th</sup> grade music/performance arts was positively correlated with academic performance in 5<sup>th</sup> grade ( $r = .19, p < .001$ ), and 5<sup>th</sup> grade participation in music/performance arts was positively correlated with 6<sup>th</sup> grade academic performance ( $r = .19, p < .001$ ), results showed a negative correlation between 6<sup>th</sup> grade involvement in music/performance arts and 9<sup>th</sup> grade academic performance ( $r = -.12, p = .034$ ), and 9<sup>th</sup> grade involvement in music/performance arts and 12<sup>th</sup> grade academic performance ( $r = -.17, p = .001$ ). Results are presented in Table 43 and Table 44.

Table 42.

*Descriptives for all variables including predictors, covariates, and outcome variables.*

	N	Mean	Std. Deviation
Sports4	1,132	25.78	58.39
Sports5	1,132	30.91	52.02
Sports6	685	3.37	1.62
Sports9	750	4.68	1.68
Sports12	424	4.49	1.89
Mupa4	1,046	13.32	34.11
Mupa5	1,012	10.64	24.57
Mupa6	433	2.32	1.75
Mupa9	462	3.73	1.98
Mupa12	262	3.64	2.07
Grades4	932	3.41	0.95
Grades5	942	3.49	0.96
Grades6	869	3.43	0.97
Grades9	721	3.03	0.71
Grades12			
Parental Education	1,132	3.14	1.10
Inc4	985	4.50	3.88
Inc9	924	5.26	5.79
Home3	1,009	0.79	0.11
Home5	1,008	0.83	0.12
Gender	1,090		
Female	542		
Ethnicity	1,090		
Whites	900		

*Note:* All predictor and outcome variables are unstandardized. All numbers after variable name represent the grade number (e.g., sports4= sports in 4<sup>th</sup> grade). Mupa= music and performance arts. Inc= Income-to-needs ratio. Gender (1= Males, 2= Females). Ethnicity (1=Whites, 2= Non-Whites).

Table 43.

*Correlation Matrix for Sports Participation, Covariates, and Academic Performance (N=1,132).*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. sports4	1																
2. sports5	.42***	1															
3. sports6	.05	.16***	1														
4. sports9	.06	.15***	.22***	1													
5. sports12	.05	.07	.13*	.26***	1												
6. grades4	.17***	.21***	-.02**	.02	.12*	1											
7. grades5	.17***	.23***	-.11	.06	.06	.77***	1										
8. grades6	.15***	.18***	-.07	.01	.14**	.71***	.73***	1									
9. grades9	.17***	.20***	-.08	-.00	.15**	.50***	.55***	.57***	1								
10. grades12	.12***	.15***	.02	.03	.19***	.42***	.41***	.48***	.65***	1							
11. gender	.10**	-.05	-.16***	-.09**	-.02	.10**	.14***	.14***	.23***	.18***	1						
12. ethnicity	-.09**	-.13***	-.00	.05	-.06	-.24***	-.27***	-.21***	-.27***	-.18***	.01	1					
13. parent ed	.21***	.23***	-.02	-.03	.08	.41***	.42***	.42***	.46***	.37***	.03	-.26***	1				
14. inc4	.21***	.22***	.03	-.03	.12*	.31***	.31***	.29***	.26***	.27***	.02	-.21***	.56***	1			
15. inc9	.21***	.22***	.04	-.01	.12*	.28***	.24***	.24***	.25***	.20***	.02	-.17***	.48***	.77***	1		
16. home3	.16***	.21***	.00	-.02	.09	.38***	.39***	.39***	.43***	.31***	.02	-.33***	.52***	.37***	.29***	1	
17. home5	.19***	.26***	-.01	-.02	.13**	.38***	.41***	.43***	.42***	.29***	.02	-.33***	.52***	.39***	.32***	.65***	1

Note: \*  $p < .05$ . \*\*  $p < .01$ , \*\*\*  $p < .001$ . Income in both 4<sup>th</sup> and 9<sup>th</sup> were included because significant mean differences were found. inc = income to needs-ratio.

Table 44.

*Correlation Matrix for Music and Performance Arts Participation, Covariates, and Academic Performance (N=1,132).*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. mupa4	1																
2. mupa 5	.50***	1															
3. mupa 6	-.03	.06	1														
4. mupa 9	.05	.04	.14*	1													
5. mupa 12	.15*	.10	-.03	.39***	1												
6. grades4	.16***	.12***	-.11*	-.06	.03	1											
7. grades5	.19***	.18***	-.13*	-.10	-.01	.77***	1										
8. grades6	.21***	.19***	-.08	-.09	-.03	.71***	.73***	1									
9. grades9	.19***	.20***	-.12*	-.06	.05	.50***	.55***	.57***	1								
10. grades12	.13***	.12***	-.08	-.17***	.02	.42***	.41***	.48***	.65***	1							
11. gender	.17***	.23***	-.01	-.07	-.02	.10**	.14***	.14***	.23***	.18***	1						
12. ethnicity	-.10***	-.01***	.16***	.12*	.06	-.24***	-.27***	-.21***	-.27***	-.18***	.01	1					
13. parent ed	.21***	.17***	-.14**	-.08	-.00	.41***	.42***	.42***	.46***	.37***	.03	-.26***	1				
14. inc4	.19***	.14***	-.13**	-.06	.02	.31***	.31***	.29***	.26***	.27***	.02	-.21***	.56***	1			
15. inc9	.14***	.13***	-.12*	-.04	.06	.28***	.24***	.24***	.25***	.20***	.02	-.17***	.48***	.77***	1		
16. home3	.15***	.13***	-.19***	-.12*	-.04	.38***	.39***	.39***	.43***	.31***	.02	-.33***	.52***	.37***	.29***	1	
17. home5	.18***	.15***	-.16**	-.08	-.05	.38***	.41***	.43***	.42***	.29***	.02	-.33***	.52***	.39***	.32***	.65***	1

Note: \*  $p < .05$ . \*\*  $p < .01$ , \*\*\*  $p < .001$ . Income in both 4<sup>th</sup> and 9<sup>th</sup> were included because significant mean differences were found. inc = income-to-needs ratio. mupa= music and performance arts.

## Cross-Lagged Models

With a structural equation modeling (SEM) framework, a cross-lagged model was used to test whether participation in sports and music/performance arts predicted academic performance in 5<sup>th</sup>, 6<sup>th</sup>, 9<sup>th</sup>, and 12<sup>th</sup> grade. In addition, using this model allows for analysis of a possible bidirectional association between extracurriculars and academics. Cross-lagged analyses were conducted separately for sports and music/performance arts. To determine the model fit for each cross-lagged model, the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), the chi-squared p-value, and the root mean squared error of approximation (RMSEA) were used. For each model, error terms for the predictor and outcome variable at the same time point were correlated with one another. Model-fit indices are presented on Table 45.

Table 45.  
Summary of Fit Indices in Each Cross-Lagged Model.

Models	X <sup>2</sup>	p	CFI	TLI	RMSEA
Model 1	185.14	<.001	.936	.883	.007
Model 2	193.832	<.001	.952	.900	.047
Model 3	184.10	<.001	.955	.907	.045

*Note:* Model 1= sports without covariates, Model 2= sports with covariates, Model 3= music/performance arts with covariates.

The bidirectional relation between participation in organized sports and academic performance in 5<sup>th</sup>, 6<sup>th</sup>, 9<sup>th</sup>, and 12<sup>th</sup> grade was examined without covariates in Model 1. Autoregressive paths for sports and academic performance were also controlled for in this model. The model fit indices showed an acceptable fit (CFI= .936, TLI = .883, RMSEA = .077.  $\chi^2 = 185.14, p < .001$ ). Results showed that sports participation in 4<sup>th</sup> grade positively predicted academic performance in 5<sup>th</sup> grade ( $\beta = .04, p = .033$ ), but not for the other time points. A bidirectional association was found as academic performance in 4<sup>th</sup> grade also predicted 5<sup>th</sup> grade

sports participation ( $\beta = .14, p < .001$ ). Surprisingly, academic performance in 5<sup>th</sup> grade negatively predicted sports participation in 6<sup>th</sup> grade ( $\beta = -.16, p < .001$ ). Finally, 9<sup>th</sup> grade academic performance positively predicted 12<sup>th</sup> grade sports participation ( $\beta = .15, p = .008$ ). Results are presented in Figure 4.



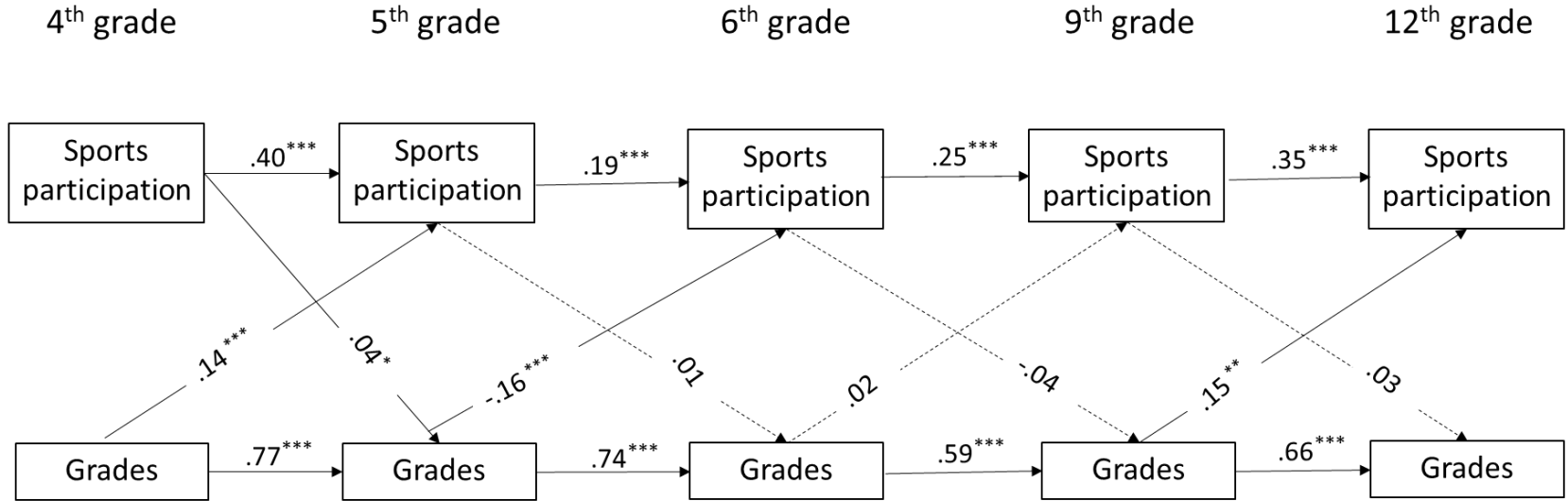


Figure 4: Cross-lagged model of participation in sports and academic performance in 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 9<sup>th</sup>, and 12<sup>th</sup> grade excluding covariates (N=1,132). Standardized coefficients estimates are presented in each pathway. Solid lines represent significant associations, while non-significant associations are depicted with dotted lines. Note:  $p < .05$ . \*\*  $p < .01$ , \*\*\*  $p < .001$ .

In Model 2, covariates including gender, ethnicity, parental education, income-to-needs ratio, and home environment were added. The model fit was good and improved after including the covariates (CFI= .952, TLI = 0.900, RMSEA = .047.  $\chi^2 = 193.83, p < .001$ ). Results showed that 4<sup>th</sup> grade participation in sports no longer uniquely contributed to predicting 5<sup>th</sup> grade academic performance ( $\beta = .01, p = .513$ ). Thus, the hypothesis in this study was not supported for sports. Academic performance in 4<sup>th</sup> grade still positively predicted sports participation in 5<sup>th</sup> grade ( $\beta = .09, p = .004$ ), 5<sup>th</sup> grade academic performance still negatively predicted sports participation in 6<sup>th</sup> grade ( $\beta = -.14, p = .002$ ), and 9<sup>th</sup> grade academic performance still positively predicted 12<sup>th</sup> grade sports participation ( $\beta = .15, p = .025$ ). All covariates significantly predicted grades or sports participation at different time points. Results showed that girls were less likely to participate in 5<sup>th</sup> grade sports ( $\beta = -.10, p < .001$ ) and 6<sup>th</sup> grade sports ( $\beta = -.12, p = .002$ ), non-White participants were more likely to receive lower grades in 5<sup>th</sup> grade ( $\beta = -.06, p = .008$ ) and 9<sup>th</sup> grade ( $\beta = -.10, p = .001$ ), parental education positively predicted academic performance in 5<sup>th</sup> grade ( $\beta = .06, p = .022$ ), 6<sup>th</sup> grade ( $\beta = .08, p = .010$ ), 9<sup>th</sup> grade ( $\beta = .22, p < .001$ ), and 12<sup>th</sup> grade ( $\beta = .11, p = .005$ ), and home environment positively predicted grades in 5<sup>th</sup> grade ( $\beta = .09, p = .001$ ), 6<sup>th</sup> grade ( $\beta = .14, p < .001$ ), and 9<sup>th</sup> grade ( $\beta = .13, p < .001$ ). Regarding the bidirectional association, results also showed that home environment positively predicted sports participation in 5<sup>th</sup> grade ( $\beta = .07, p = .031$ ). Income-to-needs ratio in 4<sup>th</sup> grade positively predicted 5<sup>th</sup> grade sports participation ( $\beta = .07, p = .043$ ). All results in this model are presented in Figure 5.

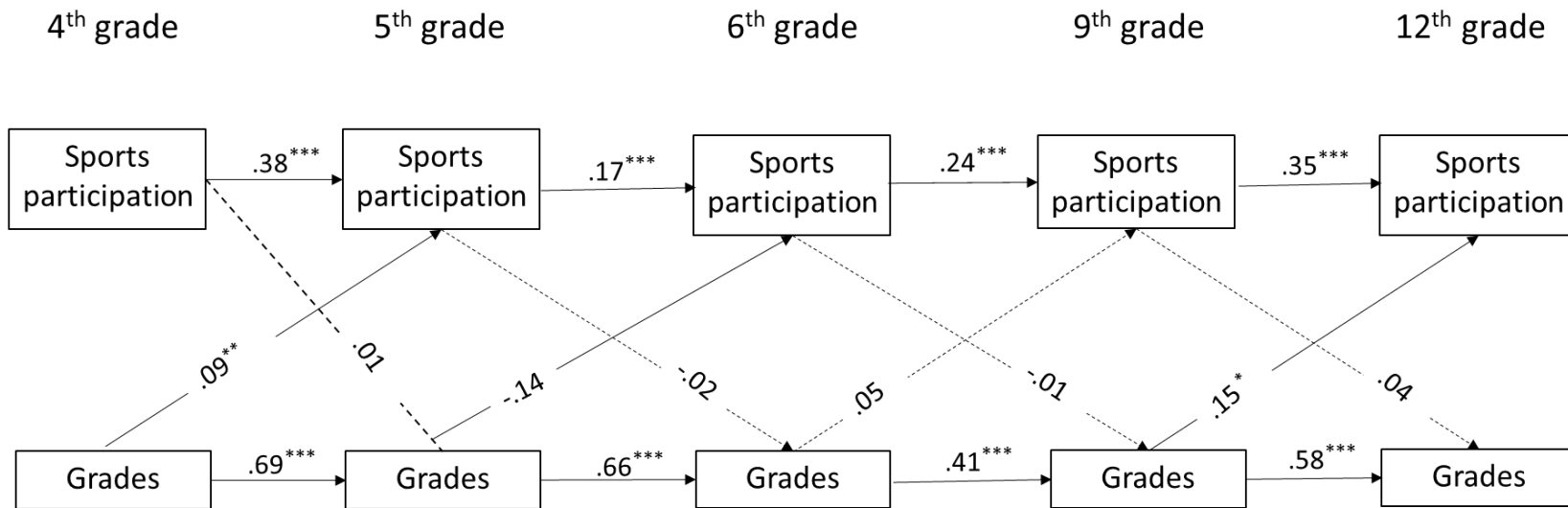


Figure 5: Cross-lagged model of participation in sports and academic performance in 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 9<sup>th</sup>, and 12<sup>th</sup> grade including covariates (N=1,132). Covariates included in this model are gender, ethnicity, income-to-needs ratio, parental education, and home environment. Standardized coefficients estimates are presented in each pathway. Solid lines represent significant associations, while non-significant associations are depicted with dotted lines. Note:  $p < .05$ . \*\*  $p < .01$ , \*\*\*  $p < .001$ .

A separate cross-lagged analysis was conducted for music/performance arts. As the model without covariates did not converge, only results for the model including covariates will be reported in Model 3. The model fit for the cross-lagged model including covariates was good (CFI= .955, TLI = .907, RMSEA = .045.  $\chi^2 = 184.10, p < .001$ ). Results showed that participation in music/performance arts did not significantly predict academic performance at any time point, controlling for gender, ethnicity, parental education, income-to-needs ratio, and home environment (see Figure 6). Thus, the hypothesis for this study was also not supported for participation in music/performance arts. Conversely, 9<sup>th</sup> grade participation in music/performance arts negatively predicted grades in 12<sup>th</sup> grade, controlling for demographics and home environment ( $\beta = .10, p = .024$ ). Results for covariates showed bidirectional associations such that girls were more likely to receive higher grades in 5<sup>th</sup> grade ( $\beta = .06, p = .004$ ) and 9<sup>th</sup> grade ( $\beta = .16, p < .001$ ) and were more likely to participate in music/performance arts activities in 5<sup>th</sup> grade ( $\beta = .15, p < .001$ ). For ethnicity, non-White participants were also more likely to participate in music/performance arts in 5<sup>th</sup> grade compared to White participants ( $\beta = .07, p = .016$ ), and were more likely to receive lower grades in 5<sup>th</sup> grade ( $\beta = -.06, p < .011$ ) and 9<sup>th</sup> grade ( $\beta = -.09, p = .002$ ). Home environment positively predicted academic performance in 5<sup>th</sup> grade ( $\beta = .09, p = .001$ ), 6<sup>th</sup> grade ( $\beta = .14, p < .001$ ), and 9<sup>th</sup> grade ( $\beta = .13, p = .001$ ), and negatively predicted music/performance arts participation in 6<sup>th</sup> grade ( $\beta = -.13, p = .037$ ). Parental education positively predicted academic performance in 5<sup>th</sup> grade ( $\beta = .06, p = .027$ ), 6<sup>th</sup> grade ( $\beta = .07, p = .018$ ), 9<sup>th</sup> grade ( $\beta = .22, p < .001$ ), and 12<sup>th</sup> grade ( $\beta = .10, p = .005$ ). Income-to-needs ratio did not significantly predict academic performance nor music/performance arts participation at any time point.

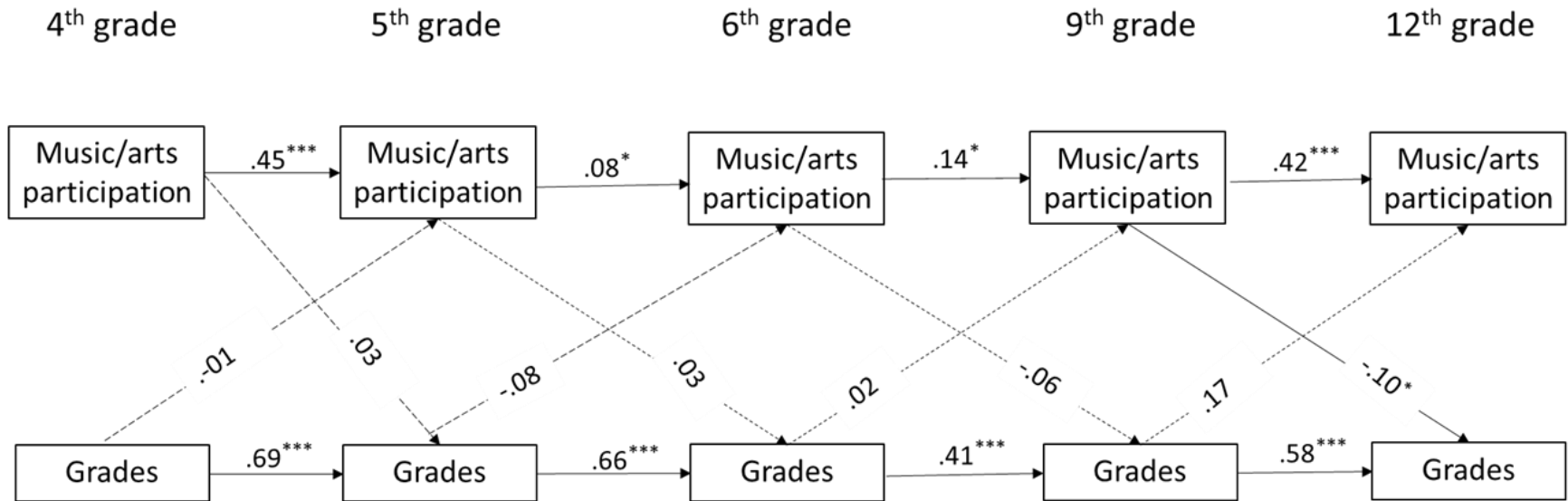


Figure 6: Cross-lagged model of participation in music/performance arts and academic performance in 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 9<sup>th</sup>, and 12<sup>th</sup> grade including covariates (N=1,132). Covariates included in this model are gender, ethnicity, income-to-needs ratio, parental education, and home environment. Standardized coefficients estimates are presented in each pathway. Solid lines represent significant associations, while non-significant associations are depicted with dotted lines. *Note:*  $p < .05$ . \*\*  $p < .01$ , \*\*\*  $p < .001$ .

## **Study 4: Discussion**

The present study examined the association between participation in extracurriculars, specifically sports and music performance/arts, and academic performance in 5<sup>th</sup> grade, 6<sup>th</sup> grade, 9<sup>th</sup> grade, and 12<sup>th</sup> grade. Results showed that 9<sup>th</sup> grade participation in music/performance arts negatively predicted academic performance in 12<sup>th</sup> grade. Participation in 4<sup>th</sup> grade sports positively predicted academic performance in 5<sup>th</sup> grade but was no longer significant after covariates were included. Thus, the findings in this study do not support evidence of transfer. Results showed associations in the opposite direction with 5<sup>th</sup> grade academic performance negatively predicting 6<sup>th</sup> grade sports participation, and 9<sup>th</sup> grade academic performance positively predicting 12<sup>th</sup> grade sports participation. Findings also showed that parental education and home environment predicted grades consistently, with parental education positively predicting grades at every time point, and home environment positively predicted grades in 5<sup>th</sup>, 6<sup>th</sup>, and 9<sup>th</sup> grade.

### **Academic Performance and Sports Participation**

Contrary to past research (e.g., Dyer et al., 2017; Fox et al., 2010), the current longitudinal study did not find a positive relation between participation in sports and academic achievement. However, it is notable that many of the studies that reported a significant positive association were cross-sectional (e.g., Bradley et al., 2013; Burns et al., 2020; Fox et al., 2010; Owen et al., 2022; Wretman, 2017). With the few longitudinal studies that have found a positive relation between sports participation and academic achievement, longitudinal statistical analyses were not utilized, nor was the possibility of a bidirectional relation tested (Dyer et al., 2017; Fejgin, 1994). Results from the current study showed a positive relation in the opposite direction,

such that individuals who received higher grades in 4<sup>th</sup> grade were more likely to participate in sports in 5<sup>th</sup> grade, and those who performed better academically in 9<sup>th</sup> grade were more likely to participate in 12<sup>th</sup> grade sports. While previous studies mainly focus on sports predicting academics, this finding suggests that it may be important to consider the effect of academic performance on sports participation as well, and to be even more cautious about the interpretability of cross-sectional results. It is possible that parents are encouraged to actively place their children into athletic programs or allow them to participate in sports once they are confident that their children have demonstrated intellectual ability and time management skills. Future research could further examine the bidirectional relationships between participation in sports and academic performance by including measures that assess parents' reasoning for placing their children into sports.

On the other hand, findings also showed that students who performed better academically in 5<sup>th</sup> grade were less likely to participate in 6<sup>th</sup> grade sports. While this result was initially surprising, the finding can be explained by Eccles's stage-environment fit theory. This theory posits that for adolescents to thrive in a middle-school and high-school educational setting, the school environment must match their developmental needs (Midgley et al., 1989). Oftentimes, students' socio-emotional and academic needs are not met which leads to a decline in academic motivation and engagement (Eccles & Roeser, 2009). For example, the increase in classroom size, a greater emphasis on performance-oriented goals, and earlier school start times are not conducive to fostering students' developmental growth (Eccles & Roeser, 2009). A decrease in teachers' investment in their students is particularly detrimental to students' academic motivation, as teachers serve as crucial socialization agents that facilitate students' growth in learning and help meet adolescents' socio-emotional needs (Roorda et al., 2011). A substantial

increase in the number of classes that teachers are required to teach decreases their capacity to cultivate relationships with the students, which leads to lower teacher support (e.g., Reddy et al., 2003). From teachers' perspectives, studies have shown that middle-school teachers have lower perceived competence in their teaching abilities compared to elementary school teachers (e.g., Ryan et al., 2015).

Hence, it is possible that during this transition stage, parents aim to ensure that their children learn how to navigate the challenges presented in the new school setting and maintain their academic motivation and engagement before investing time into extracurricular activities. Once they are adjusted, parents may encourage children to participate for enjoyment, to foster developmental growth, or to utilize extracurriculars as a tool for long-term educational attainment (e.g., bolstering college applications). Eccles and Roeser (2009) argued that though the environment-stage theory has been studied more with the elementary to middle-school transition, the transition into high school involves similar obstacles, such as an increase in school size and a lack of mentoring relationships between the teachers and students. However, more research should be conducted to confirm whether participation in sports decreases during transition years in school.

### **Negative Effect of Participation in Music/Performance Arts**

Unexpectedly, 9<sup>th</sup> grade participation in music/performance arts negatively predicted 12<sup>th</sup> grade academic performance, controlling for demographics and home environment. While music, drama, and arts activities were combined into one category and thus the interpretation may be limited, it is possible that the negative direction may be attributed to the nature of the activity. As some extracurricular activities are more achievement-oriented than others (Feigin, 1994), activities that are categorized in the achievement domain (e.g., music) may be more conducive to



an academic setting than activities that specifically emphasize creativity and expression (e.g., drama). However, many studies have mainly focused solely on the effect of participation in music on academic achievement, rather than comparing academic achievement across music and performance arts activities (e.g., Gouzouasis, 2007; Wetter et al., 2009). Results suggest that future studies can examine music and performance arts activities individually to determine whether the amount of achievement-oriented components in the activity may differentially affect academic performance.

### **Parental Influence in Academics Throughout Development**

The finding in this study suggests that factors other than participation in sports and music/performance arts, and in particular socioeconomic factors have a dominating effect on academic performance in childhood and adolescence, which may dwarf and thus mask potential transfer effects. Both parental education and home environment predicted grades in all or a majority of the time points. Prior studies have highlighted the ways in which having higher parental education can benefit children academically, such that these parents have higher academic expectations for their children (e.g., Davis-Kean, 2005; Wilder, 2014), are more equipped to support their children's learning at home, communicate with teachers more effectively, and guide their children in the steps needed to achieve academic success (e.g., Tan et al., 2020). These parental behaviors may then increase students' academic self-efficacy, which leads to greater investment in academic tasks (Eccles, 2005). It is also worth noting that parental education and not income predicted academic performance throughout later childhood and adolescence. This implies that parents' academic guidance and knowledge of the education system may be more influential than income in promoting children's and adolescents' academic success.

Findings from the current study also showed that home environment consistently predicted academic performance throughout childhood and adolescent development, suggesting the importance of parents' informal educational support in providing their children with a safe environment and learning materials to develop their academic skills (e.g., Davis-Dean, 2005; Engle & Black, 2008). In addition, parents' initiation and provision of a variety of non-academic activities as well as their emotional support for their children may be crucial to children's academic success (e.g., Li & Meier, 2017). However, further research would need to be conducted to examine the unique contribution of different aspects of the home environment.

### **Limitations and Conclusion**

The NICHD SECCYD data used in this study is an extremely rich dataset. The study follows participants from birth all the way to adolescence, with a follow-up at the end of high school and at age 26. A wide array of variables capturing different aspects of development were included at each time point. Nevertheless, there are a few limitations to note. First, the sample consisted mostly of Caucasian participants. Given that cultural differences may affect individuals' perceptions of the benefits of participating in sports versus academic success, it would be helpful to include an ethnically diverse sample to explore potential ethnic differences in transfer. Second, the measurements used for 4<sup>th</sup> and 5<sup>th</sup> grade sports participation were different from those used for 6<sup>th</sup>, 9<sup>th</sup>, and 12<sup>th</sup> grade. Measuring the amount of time spent participating in sports in both hours and the number of days of the week consistently for each time point may increase the interpretability of the results. Third, the extracurricular activity for music, arts, and performance arts was combined into one category. As some activities are more achievement-oriented than others, it is possible that differential transfer effects may be found.

Finally, the effect of participation in sports and music/performance arts on academic performance was assessed with a 1-year time lag. Future research could use a shorter-interval longitudinal design to repeatedly measure participation in extracurriculars with domain-specific transfer skills for both academics and extracurricular activities. This could determine whether transfer for athletes and musicians occurs more often when they are currently participating in sports and music, and their experiences and thoughts about sports and music are more salient. Nonetheless, the present findings with this high-quality and longitudinal dataset show multiple ways in which parents have a substantial influence on children's academic performance throughout childhood and adolescence. Parents who have higher education and provide resources and support for their children can be more effective in facilitating their children's learning experiences in both curricular and extra-curricular contexts.

### **General Discussion**

The aim of the dissertation was to examine transfer of motivational goal engagement skills (selective primary control, selective secondary control, and compensatory primary control) quantitatively between two achievement domains: extracurricular activities (specifically sports and music) and academics. In four studies, transfer was examined across different periods of development, including later childhood, adolescence, and young adulthood. Study 1 examined associations between each motivational goal engagement skill in the extracurricular and academic domain as well as with perceived transfer in a high-school sample, study 2 assessed long-term transfer by examining whether the use of extracurricular motivational goal engagement skills in high school was associated with perceived transfer in college academics, study 3 investigated different factors that can facilitate or hinder transfer, and study 4 examined

whether transfer occurred throughout later childhood and adolescence by assessing the relation between participation in extracurriculars and academic achievement longitudinally.

Studies 1 and 2 provided evidence of transfer by showing significant positive associations between motivational goal engagement skills and perceived transfer in high school and college academics. However, in the longitudinal study 4, a relation between sports and music/performance arts and academic performance was not found. Given that longitudinal data was used in study 4 while cross-sectional data was used for studies 1 and 2, selection bias likely skewed the findings in studies 1 and 2. It is possible that participants who were already achieving academic success participated in extracurriculars as well. The finding from study 4 may support this explanation, in which individuals who achieved higher academic success in 4<sup>th</sup> grade were more likely to participate in sports in 5<sup>th</sup> grade, and those who received higher grades in 9<sup>th</sup> grade were more likely to participate in 12<sup>th</sup> grade sports. As shown in study 4, parenting in the context of providing guidance in the school setting and informal educational support may be a much more influential factor for children's academic success than transferring skills learned from extracurriculars to academics. However, findings from study 3 may suggest that socialization agents still play a role in the potential transfer process. Though results were drawn from a cross-sectional study, findings showed that encouragement of transfer from peers, coaches/directors, and parents (for sports) was positively associated with athletes' and musicians' perceived transfer. These findings, along with the parenting findings in study 4, highlight the integral role that socialization agents play in students' pursuit of academic success. Prior research has shown that adolescents' desire to distance themselves from their parents during their teenage years is often a misconception (e.g., Lerner, 2008). Findings from the

dissertation support this notion, suggesting that parental involvement is just as important, if not more impactful and consequential during the adolescent years compared to childhood.

### **Future Directions**

Though evidence for transfer was not found in the longitudinal study (study 4), future studies can continue to explore the potential for transfer between sports and music and academics with motivational-specific skills and between shorter time-intervals. For example, it is possible that transfer occurs more closely to the time in which athletes and musicians are currently participating in their respective activities. When they are currently in season or have just stopped participating for the season, the potential for drawing the connections between what they have learned in sports and music to academics may be more salient. Thus, examining academic outcomes during multiple time points in closer proximity such as during the season, one month, three months, and one semester after the season ends may capture a transfer effect. Additionally, it may be especially beneficial to focus on further examining potential transfer of selective secondary control and compensatory primary control strategies longitudinally, as these specific motivational goal engagement skills were found to be associated with perceived transfer in study 2. Interventions to assist academically struggling students who prioritize extracurriculars over school may focus on explicitly drawing parallels between the use of selective secondary control and compensatory primary control strategies in the extracurricular domain and the academic domain.

### **Conclusion**

Altogether, the findings from this dissertation suggest that socialization agents, specifically parents, substantially contribute to their children's academic success throughout later

childhood and adolescence. While results from the longitudinal study lacked evidence to support the inter-domain transfer between the sports and music domain and the academic domain, significant associations between motivational goal engagement skills and perceived transfer from studies 1, 2, and 3 are encouraging for further exploring this phenomenon longitudinally with motivational-specific variables and shorter time intervals between measurements. The methods and framework used to quantitatively explore the inter-domain transfer phenomenon between extracurricular activities and academics provide direction for future studies to build upon.

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