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### To improve or to compete

*Implicit theories of ability and parental behavior as determinants of achievement goals in sport*

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#### Publication date

2021

#### Document Version

Other version

#### License

Other

[Link to publication](#)

#### Citation for published version (APA):

Weltevreden, G. M. (2021). *To improve or to compete: Implicit theories of ability and parental behavior as determinants of achievement goals in sport*. [Thesis, fully internal, Universiteit van Amsterdam].

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# **Chapter 5**

## **General Discussion**

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The central aim of this dissertation was to investigate factors that predict performance and mastery goal choices in the sports domain, with a specific focus on the predicting role of implicit theories of ability, parental behavior, and parent-initiated motivational climate. The first step I took was to develop a measure to assess implicit theories of ability in the context of sports (i.e., the CNAAQ-2-NL), and investigate its psychometric properties. The second step was to experimentally manipulate implicit theories of ability in athletes to investigate their effects on achievement goals, motivation, and performance. The third step was to examine the role of parents in the emergence of achievement goals in their children, such as their parental behaviors of autonomy support, responsiveness, behavioral control, and psychological control. I expected these behaviors to link to children's achievement goals through the mastery or performance climate they create. Below I will discuss the theoretical and practical implications of the findings as reported in this dissertation.

### **The Structure of Beliefs about Talent and Improvement in Sport**

Theory describes entity and incremental beliefs as two distinct views on reality that create separate meaning systems or frameworks for understanding achievement (Dweck, 1999). According to theory, these frameworks are mutually exclusive, which means that both beliefs cannot coexist. Molden and Dweck (2006) state that 'most individuals generally endorse either an entity theory or an incremental theory' and that 'each theory occurs with equal frequency' (p. 194). Accordingly, people can be divided into entity theorists and incremental theorists. This conceptualization is called the 'person-based approach'. An alternative conceptualization is the 'variable-based approach', which assumes that individuals can endorse each view to a certain extent. In line with such a variable-based approach, Dweck, Chiu, and Hong (1995) noted that 'people do not always behave according to the laws of logic, and that it is therefore perfectly possible for an individual to hold both theories' (p. 323). Furthermore, entity and incremental beliefs are posed to be domain specific (Dweck et al., 1995). People can be entity theorists in one domain (e.g., intelligence) and incremental theorists in another domain (e.g., sport). Below, I will discuss this latter proposition when elaborating on my findings and those of previous studies. In what follows, I will address two main theoretical issues: (1) the two or one (bipolar) factor structure of entity and incremental beliefs, and (2) the applicability of Dweck's theory to the sport domain.

## **The Two or One (Bipolar) Factor Structure of Entity and Incremental Beliefs**

Can entity and incremental beliefs coexist in individuals? Or do they reflect the opposing ends of one dimension, implying that people can be grouped into entity and incremental theorists, as Molden and Dweck (2006) suggested?

In the first study of Chapter 2 and in Chapter 4 I found no significant correlation between entity and incremental beliefs, and in the third study of Chapter 2 I found small to moderate negative correlations at two time points ( $r_{\text{time1}} = -.17$ ;  $r_{\text{time2}} = -.35$ ). Also, the factor analyses reported in Chapter 2 did not support a one-factor solution, suggesting that entity and incremental beliefs are separate constructs. As an exception, only after participants' beliefs were manipulated in the first study of Chapter 3, I found a strong negative correlation between entity and incremental beliefs ( $r_{\text{Study1}} = -.78$ ). Altogether, these findings mostly indicate that entity and incremental beliefs are separate constructs.

In addition, I could not find support for the idea that people can be divided into entity theorists and incremental theorists, because neither entity beliefs nor incremental beliefs were bimodally distributed in any of the samples in this dissertation. Entity beliefs were endorsed less than incremental beliefs in all studies, suggesting that most people tend to have an incremental view of sport ability. This aligns with the findings of other studies in which people could not be clearly categorized into entity theorists and incremental theorists (Chen & Tutwiler, 2017; Tempelaar et al., 2015).

Previous research provides a mixed pattern with some studies reporting high negative correlations between entity and incremental beliefs about intelligence (between  $r = -.69$  and  $r = -.86$ ; Levy, Stroessner, & Dweck, 1998), suggesting the existence of one bipolar construct, while other studies reported much lower correlations (e.g.,  $r = -.19$ ; Malmberg & Little, 2007), suggesting the existence of two separate constructs. A meta-analysis of studies on implicit theories in sport (Vella et al., 2016) found weak to moderate negative correlations between entity and incremental beliefs, which also suggests they are separate constructs.

All in all, based on these findings, I conclude that entity and incremental beliefs in sport are two separate constructs that should be measured separately, and cannot be captured into one bipolar construct (i.e., being either an entity or incremental theorist).

### **Dweck's Theory Applied to the Sport Domain**

Several studies have investigated whether entity and incremental beliefs can also be distinguished in people's thinking about sport abilities (e.g., Biddle et

al., 2003; Sarrazin et al., 1996). Sarrazin and colleagues reasoned that a conceptualization of sport ability as either fixed or malleable is oversimplified, and posited that people have more differentiated ideas about sport abilities. They proposed six conceptualizations that people may have of abilities in sport: (1) sport ability is a natural gift (gift); (2) sport ability is the result of learning and practice (learning); (3) sport ability cannot be changed (stable), (4) sport ability can be changed (incremental, later renamed to improvement); (5) sport ability is generic: when people have an ability for sport, they will be good at all sports (general); (6) sport ability is specific: being good at one sport does not mean that someone will be good at other sports (specific). The stable and incremental conceptualizations (3 and 4, respectively) represent the entity and incremental beliefs proposed by Dweck and Leggett (1988). The other conceptualizations are based on Fleishman's theory about motor abilities and on how lay people think about sport ability (see Sarrazin et al., 1996). However, this distinction into six conceptualizations was not supported by empirical findings (Biddle, Soos, & Chatzisarantis, 1999; Lintunen, Valkonen, Leskinen, & Biddle, 1999; Ommundsen, 2001a, 2001b).

Therefore, Biddle and colleagues (2003) introduced a new model that combines the stable and gift conceptualizations into a higher-order entity factor, and the learning and improvement conceptualizations into a higher-order incremental factor. The general and specific conceptualizations were dropped because of a lack of empirical support. This model elegantly integrates Sarrazin and colleagues' conceptualizations of sport ability with Dweck's theory about entity and incremental beliefs. The retention of the four lower-order conceptualizations allows for developing hypotheses at the lower-order level, while the higher-order factors allow for developing hypotheses about the higher-order level. This structure was subsequently replicated among respondents from the United Kingdom (Biddle et al., 2003), Sweden (Stenling et al., 2014), North-America (Stevenson & Lochbaum, 2008), Spain (Moreno-Murcia et al., 2013), and Singapore (Wang, Liu, Biddle, & Spray, 2005),

The findings of Chapter 2 show further support for this theoretical structure of two higher-order factors (entity and incremental) with four lower-order factors (stable, gift, learning, and improvement) among Dutch competitive athletes. My findings thus support the assumption that people also have entity and incremental beliefs about sport abilities, and that these views can be categorized into four subtypes of beliefs. In addition, my findings further support the assumption that these beliefs can be found across different languages and cultures.

Because in most studies the measurement of implicit theories of ability concerned intelligence (e.g., Dweck, 1999), an interesting question is how individuals' beliefs vary between the intelligence and sport domains. I found in Chapter 2 that people have stronger entity beliefs about intelligence than about sport ability, and stronger incremental beliefs about sport ability than about intelligence, and my results show that these are moderate to large effects. However, the phrasing of items may have played a role in this comparison. As there is no equivalent of the term 'sport ability' in Dutch, the items about sport read 'how good you are at sports' while the items about intelligence read 'how intelligent you are'. 'How intelligent you are', may have a more fixed connotation than the phrase 'how good you are at sport'. Therefore, future studies should pay attention to the equivalence of item phrasings. Examples of equivalent phrasings are 'how good you are at school' and 'how good you are at sport', or 'how intelligent you are' and 'how much talent you have for sport'.

### **Relations Between Implicit Theories and Achievement Goals**

According to theory, implicit theories lead people to adopt a helpless or mastery framework, which is a combination of achievement goals, attributions, behavior, and affect (Burnette et al., 2013; Dweck & Leggett, 1988). As for achievement goals, entity beliefs are predicted to relate to performance-approach goals and performance-avoidance goals, because people who believe that ability is fixed will want to know how their ability level compares to that of others. Incremental beliefs are predicted to relate to mastery-approach and mastery-avoidance goals, because people who believe that ability is malleable will want to know what they can do to improve and develop themselves. These effects are predicted to be stronger under conditions of ego-threat (Burnette et al., 2013).

Most of these theoretical relations were supported in this dissertation. Chapter 2 shows that entity beliefs were positively related to performance-approach goals ( $r_{t1} = .12$ ;  $r_{t2} = .12$ ), but not to performance-avoidance goals ( $r_{t1} = .01$ ;  $r_{t2} = .04$ ), and that incremental beliefs were positively related to both mastery-approach goals ( $r_{t1} = .27$ ;  $r_{t2} = .29$ ) and mastery-avoidance goals ( $r_{t1} = .18$ ;  $r_{t2} = .23$ ). In Chapter 4 entity beliefs were positively related to performance-approach goals ( $r = .42$ ) and performance-avoidance goals ( $r = .21$ ), and incremental beliefs were positively related to mastery-approach goals ( $r = .37$ ) and mastery-avoidance goals ( $r = .16$ ). The Chapter 4 correlations were mostly stronger than those in Chapter 2, possibly because in Chapter 4 we tested participants at their sports clubs.

The effect sizes of the relations that I found between implicit theories and achievement goals are weak to moderate, which is similar to findings from other

sport studies (e.g., Mascret, Elliot, & Cury, 2015; Stenling et al., 2014; Wang et al., 2009). A meta-analysis in sport also found weak to moderate relations between entity beliefs and performance-approach ( $r = .18$ ), and performance-avoidance goals ( $r = .19$ ), a moderate to strong relation between incremental beliefs and mastery-approach goals ( $r = .41$ ), and again a weak to moderate relation between incremental beliefs and mastery-avoidance goals ( $r = .17$ ; Vella et al., 2016). Generally, the relation between entity beliefs and performance goals seems to be weaker than the relation between incremental beliefs and mastery goals, which argues for measuring entity and incremental beliefs separately in future research.

Interestingly, I repeatedly found positive correlations between incremental beliefs and performance-approach goals, which are not predicted by theory. This is comparable to what other sports studies have found (e.g., Stenling, 2014; Stevenson & Lochbaum, 2008; Wang et al., 2009). Moreover, a sport specific meta-analysis showed a small positive relation between incremental beliefs and performance-approach goals ( $r = .09$ ; Vella et al., 2016), while in a general meta-analysis a negative correlation was found for this relation ( $r = -.15$ ; Burnette et al., 2013). The positive relation between incremental beliefs and performance-approach goals in sport implies that the more people believe that sport ability can be improved, the more they adopt the goal of outperforming others. A possible explanation for this finding could be that in many sports (e.g., in tennis or football) an individual's level of performance cannot be objectively measured, so it is often estimated by the comparison with others.

### **Implicit Theories Affecting Achievement Goals, Motivation, and Performance**

In Chapter 3, I experimentally investigated the causal relations between implicit theories and three dependent variables: achievement goals, motivation, and performance. I also tested whether the effects would particularly exist under ego-threat (Burnette et al., 2013) by telling participants that they had failed.

I first investigated the theoretical prediction that entity beliefs will make people set performance goals and incremental beliefs will make people set mastery goals. The manipulation of participants' implicit theories was largely successful, but there were hardly any effects small effects of implicit theories on achievement goals. Study 1 did not find any differences in achievement goals between the entity and incremental conditions. In Study 2 there was a difference in performance-avoidance goals between the entity and incremental condition before failure. However, I did not find differences in performance-approach goals, mastery-approach goals or mastery-avoidance goals before or after failure in this study. Study 3 also found no differences between conditions in any of the achievement goals, either before or after failure.

The findings of the three studies in Chapter 3 led me to conclude that experimental condition hardly affected achievement goal choice. To my knowledge, there is only one publication that demonstrated a causal effect of implicit theories on achievement goals in the context of sport (Spray et al., 2006). The fact that such an important effect has only been found once, either may suggest that the predicted relation is absent in the sports context or that it is hard to capture in an experiment.

I also investigated the theoretical prediction that entity theorists will be less motivated to practice than incremental theorists, because entity theorists believe that abilities are fixed and therefore practice will not really change how good they are. I found support for this prediction in the first experiment of Chapter 3, where athletes in the entity condition were significantly less motivated to practice than those in the incremental condition, and the effect size was large. However, in the second and third experiment there were no differences between conditions in motivation to practice. Although these findings are inconsistent, the large effect size in Study 1 suggests that implicit theories in some situations may affect motivation to practice in the sports domain.

Theory further predicts that entity theorists will perform worse than incremental theorists, because entity theorists are distracted by negative thinking, negative affect, and worries about failure (Dweck & Leggett, 1988). Instead, incremental theorists will have mostly task-relevant thoughts and neutral affect, which will benefit performance. In this dissertation, I included performance as an outcome variable in the third experiment of Chapter 3, and I found a medium-sized effect of experimental condition. Participants in the entity condition performed worse than those in the incremental condition in the first round of the task. In the second round, participants in the entity condition also scored lower than those in the incremental condition (medium-sized effect), but the difference was only significant at an adjusted alpha of .10. Nevertheless, these findings show some support for the theoretical prediction that implicit theories affect performance.

Other studies have also found effects of implicit theories on motor performance (Chiviacowsky & Drews, 2014; Drews, Chiviacowsky, & Wulf, 2013). In contrast to my experiments, participants in these studies went through an extensive practice phase, and differences in performance between conditions only appeared when participants came back a day later for a retention test. Studies that examined the effects of implicit theories on performance in the school domain found equivocal results. A large-scale experiment (Yaeger et al., 2019) showed effects of a growth-mindset intervention on school grade point average, but a pre-



registered experiment found only small effects, with the largest being opposite to the theoretical prediction (i.e., entity beliefs were related to better performance; Burgoyne, Hambrick, & Macnamara, 2020). Furthermore, two meta-analyses found no or only few effects of implicit theories on academic achievement. That is, Costa and Faria (2018) found no relation between entity beliefs and achievement and only a small relation between incremental beliefs and achievement ( $r = .10$ ), and Sisk and colleagues (2018) found that 37 out of 43 effect sizes were not significant. Thus, the effects of implicit theories on performance seem variable, and potentially dependent on specific conditions, which future studies need to uncover.

With regard to achievement goals, I conclude that although implicit theories were initially proposed as an important determinant of achievement goal choice (Dweck, 1999), empirical studies show that they explain only a small part of the variance, so other predictors must also be relevant. Implicit theories are internal predictors of achievement goals influencing an athlete's thinking, but an athlete's psychological environment, more specifically, the behavior of parents may operate as an external determinant. In this dissertation, I therefore also investigated the relation between parental behavior and achievement goals in athletes, which is discussed next.

### **Parental Behavior, Motivational Climate and Achievement Goals**

In Chapter 4, I examined four types of parental behavior (autonomy support, responsiveness, psychological control, and behavioral control), the parent-initiated mastery and performance climate, and the coach-initiated mastery and performance climate. The findings largely supported my hypotheses about the relations between parental behavior and achievement goals.

Parental autonomy support and responsiveness were positively related to mastery-approach and mastery-avoidance goals, as mediated by parent-initiated mastery climate. For behavioral control, we hypothesized a relation with performance-approach and performance avoidance goals, because it refers to parental behavior that is focused on complying with societal standards (Soenens & Vansteenkiste, 2010), which in sport often means winning or comparing with others. However, behavioral control unexpectedly turned out to be positively related to mastery-approach and mastery-avoidance goals, as mediated by the parent-initiated mastery climate. An explanation for the relation between behavioral control and mastery climate could be that behavioral control means that parents have reasonable expectations and set reasonable boundaries, which are communicated in the interest of their child's development. This may contribute to the perception of a mastery climate by their children, and their subsequent

pursuit of mastery goals. Although I think this relation is plausible, future studies will have to replicate the relation between behavioral control, mastery climate, and mastery goals.

As predicted, psychological control was positively related to performance-approach and performance-avoidance goals, through a mediation by the parent-initiated performance climate. The underlying mechanism may be that psychological control expresses parents' desire for their children to meet their expectations (i.e., to be a 'good' child). They use affection as a reinforcer, and reward the child when it does what they want, or withhold affection when it does not. In sport, parents often communicate the expectation that their child should try to be better than others, which the child may perceive as a parent-initiated performance climate, and to which it reacts by focusing on performance-goals.

I found these relations between parental behavior, motivational climates, and achievement goals while controlling for incremental and entity beliefs, which indicates that the motivational climate created by parents, predicts variance in achievement goals over and above implicit theories of ability. An interesting finding was that while parent-initiated motivational climate was a predictor of achievement goals, coach-initiated motivational climate was not. This aligns with previous research showing that parent-initiated motivational climate predicted athletes' self-esteem, anxiety, and motivation over and above the coach-initiated motivational climate (O'Rourke et al., 2014). However, other studies indicate that coach behavior was more important than parents' behavior for the development of perfectionism (Madigan, Curran, Stoeber, Hill, Smith, & Passfield, 2019). This leads me to conclude that parents have to be included when studying youth sports environments and how these environments affect specific psychological variables that are important for sport performance

### **Limitations and Future Research Suggestions**

This dissertation provides more insight in the predictors of achievement goals in sport, and in the effects of implicit theories on factors affecting sport performance. There are also some limitations to discuss, which may help to improve future studies.

**Validation of the CNAAQ-2-NL.** With regard to the CNAAQ-2-NL, I conclude that this is a sufficiently valid measure of implicit theories to be used in sport contexts, but that the conceptualization of the scales and formulation of the items could be improved even further.

**Improve the conceptualization of the nature of sport ability.** A first improvement could be made in the conceptualization of the stable scale. This

subscale represents the belief that sport ability cannot be changed. However, athletes sometimes were confused by statements from this subscale, because it contradicts what they believe about training and practice. Therefore, items of the stable scale may need to be formulated more precisely so they convey the idea that athletes may practice, but that this cannot change their innate ability for a sport.

A second improvement would be to simplify the CNAAQ-2-NL. The developers of the CNAAQ have tried to capture a range of views on the nature of sport ability (Sarrazin et al., 1996), which led to the construction of subscales reflecting views from laypeople to experts. However, the basic question of an implicit theories questionnaire should be whether people believe that an ability can be changed or not. Research about implicit theories studies the effects of what people believe to be the answer to this question. To make the study of implicit theories in sport comparable to the study of implicit theories in other domains, it should focus on whether people believe that sport ability is changeable or not. A problem with this approach could be that people have different conceptualizations of sport ability and intelligence. Qualitative evidence (Jowett & Spray, 2013) suggests that athletes do not see sport ability as one single construct, comparable to a g-factor of intelligence, but that they believe some abilities in sport are fixed, while others are malleable, which may require a more refined assessment of implicit theories in sport.

**Assess entity beliefs as well as incremental beliefs.** With regard to measurement, my advice for future studies in sport would be to measure both entity and incremental beliefs, because in the sport context entity beliefs do not seem to be the opposite of incremental beliefs. In the third study of Chapter 2, I assessed participants' implicit theories using the CNAAQ-2-NL which resulted in a small negative correlation between entity and incremental beliefs ( $r = -.17$ ). Interestingly, in this study I also administered the items developed by Dweck (1999) to assess implicit theories about intelligence, and implicit theories about sport ability. The comparison of beliefs about intelligence to beliefs about sport ability showed that in both domains entity and incremental beliefs were negatively correlated, but much stronger so for intelligence ( $r = -.69$ ) than for sport ( $r = -.35$ ). Hence, the two beliefs about intelligence are much more each other's opposite than those about sport ability (see also Vella et al., 2016). Maybe this difference in conceptualization is based on the experience that in school some students get high grades without much effort, while in sport natural ability has to be combined with effort in order to achieve success.

The correlation between entity and incremental beliefs measured with the CNAAQ-2-NL was lower than the same correlation measured with the Dweck items about sport ability, which could be due to differences in operationalization. The subscales of the CNAAQ-2 represent different beliefs about sport ability, which are not necessarily opposing ideas. The scales for entity and incremental beliefs by Dweck, in contrast, are framed much more as each other's opposite. This means that my advice to assess entity as well as incremental beliefs pertains specifically to studies using the CNAAQ-2.

**The relation between implicit theories and achievement goals.** I investigated the relation between implicit theories and achievement goals in Chapter 2 to establish the predictive validity of the CNAAQ-2-NL, and I also measured both constructs in Chapter 4. The findings were in line with those of previous correlational studies and thus provide further support for this relation in the sports domain. Similar to Vella and colleagues' (2016) notion, I conclude that sufficient correlational support has now been found for this relation in sport. Future research should focus on investigating other variables related to implicit theories of ability. These could be moderators, psychological outcomes, or behaviors that affect performance (e.g., effort, persistence, willingness to seek out challenge, and intensity of physical activity).

**Differences between practice and competition.** An interesting question is whether implicit theories and achievement goals in sport differ between practice and competition. These situations will probably elicit different meaning systems (Dweck, 1999, p. xi), that is, a focus on improving abilities versus a focus on proving abilities. When an athlete perceives a higher level of ego-threat in competition than during practice, this will amplify the effects of implicit theories on psychological factors (Burnette et al., 2013).

Incremental beliefs and mastery goals will probably be more salient during practice, and entity beliefs and performance goals will be more salient during competition. Future research could investigate if athletes shift from an incremental view during practice to an entity view during competition, and how this affects their experience of the situation, and their performance. Based on theory, it is likely that focusing on incremental beliefs and mastery goals will help athletes perform better during competition. However, they may find it difficult, or paradoxical, to focus on learning during matches when they see these as the moment to demonstrate their ability. If this is the case, athletes could benefit from an intervention that helps them prepare incremental beliefs and mastery goals specifically for competitions.

**Implicit theories and autonomous motivation.** Achievement goal theory and self-determination theory can be linked (Pannekoek, Piek, & Hagger, 2013) because achievement goals describe how competence is evaluated and self-determination theory proposes that satisfaction of the need for competence is one of the three predictors of autonomous motivation. Indeed, the meta-analysis by Vella et al. (2016) shows that self-determined motivation is one of the psychological outcomes most strongly related to implicit theories in sport. Incremental beliefs are positively related to autonomous motivation and entity beliefs are negatively related to it. These relations are partly indirect, mediated by achievement goals (Wang & Liu, 2007; Wang, Liu, & Biddle, 2003).

Future studies could further investigate the relation between implicit theories and autonomous motivation, building on an integration of achievement goal theory and self-determination theory. It would be interesting to examine what psychological mechanisms are responsible for the relations between implicit theories and autonomous motivation. Moreover, because these relations have been mostly found in the context of physical education (Vella et al., 2016) it would be worthwhile to examine whether these relations generalize to competitive sports.

**Implicit theories and goal-directed strategies.** Burnette et al. (2013) proposed a model describing relations between implicit theories and a set of psychological factors and mechanisms relevant for performance. Their findings show that implicit theories relate to these factors and mechanisms differentially. More specifically, entity beliefs are related to helpless coping strategies (e.g., task-avoidance, ego-protection), and incremental beliefs are related to mastery coping strategies (e.g., increase effort, ask for advice). Their meta-analysis shows general support for the relations in this model, but only a few sport studies were included. Because the concrete form of coping strategies may vary between domains, research is required to verify this model in sports. It is also relevant to investigate why athletes choose helpless or mastery coping strategies, and why they shift from mastery to helpless coping strategies or vice versa.

**Coaches' implicit theories.** Another avenue for investigation is whether the implicit theories of coaches predict their coaching behavior, the coach-initiated motivational climate, and the implicit theories of their pupils. This does not appear to have been studied in the sport context, but some studies exist in work settings (Caniëls, Semeijn, & Renders, 2018; Kouzes & Posner, 2019). First, future research could examine how coaches convey their implicit theories of sport ability, and whether athletes adopt their coaches' views. Coaches can communicate their implicit theories verbally, but also through their behavior and

coaching style. Coaches may talk explicitly about their beliefs on talent and malleability, but they may also communicate their ideas implicitly, for example by how they react to shortcomings of athletes. Coaches with strong entity beliefs might think athletes with deficiencies will never become proficient in the sport, and try to convince them to accept their shortcomings. In contrast, coaches with strong incremental beliefs will see shortcomings as opportunities for improvement. They will convince athletes that almost anything can be developed through effortful practice, and help and encourage them to work on their weaker points.

Second, future research could also investigate whether coaches' implicit theories interact with their perception of an athlete being talented or not. Coaches with strong entity beliefs will probably act differently towards athletes who they see as talented than towards athletes who they see as untalented. They may, for example, devote more time and attention to talented athletes than to untalented ones. Coaches with strong incremental beliefs will attach much less value to talent, and emphasize that everyone can improve through practice. They may even invest extra time in athletes who hold entity beliefs, in order to help them develop an incremental view.

***Development of a research paradigm.*** Researchers who use experimental designs to study implicit theories in sport should develop an experimental paradigm that consistently elicits the effects of implicit theories in experienced athletes from different sporting backgrounds. Although notable exceptions exist (Cury et al., 2006; Spray et al., 2006) the robust effects found in the initial experiments of implicit theories and children's achievement behavior (Mueller & Dweck, 1998) could hardly be replicated in studies that used even more elaborated interventions (Dinger & Dickhäuser, 2013). The question is whether this is due to failing experimental designs, untenable theoretical predictions, or unknown boundary conditions. Whereas correlational studies in sport mostly support the theory, although with modest correlations, experimental studies do not provide enough empirical evidence.

Experimental studies struggle with possible design issues such as participants' pre-existing incremental beliefs and the credibility of the experimental manipulation. These issues may also apply to the experiments in this dissertation. For example, it is possible that participants said that they endorsed the beliefs as described in the manipulation, but in fact did not, and behaved according to their own views (Dweck, 2015). This phenomenon occurred in an intervention study about weight loss, where participants lost weight when they believed the implicit theory manipulation, but gained weight when they did not

believe the manipulation, resulting in an overall effect of zero (Burnette & Finkel, 2012).

Another possible bias in experimental research is social desirability. Nowadays many athletes have been instructed that hard work is more important than talent, and that mastery goals are better than performance goals. When athletes see this as the 'right' way to think, it may affect their responses to questionnaires about implicit theories and achievement goals, camouflaging their true beliefs. To overcome this socially desirable response tendency, implicit association tests (IATs) can be more often used in future studies, which seems to be a fruitful approach (Mascret, Falconetti, & Cury, 2016).

Based on the considerations discussed above, I propose three recommendations for future experiments for the study of implicit theories in sport. The first is to use a task, or combination of tasks, that can credibly be presented as an assessment of sport ability that is predictive of an athlete's future prospects. When participants truly believe their ability for sport is being assessed, effects of the experimental manipulation will likely be stronger. A combination of tasks, including non-computerized tasks (e.g., Chiviakowsky & Drews, 2014; Wulf, Lewthwaite & Hooyman, 2013) may be even more plausible as a test of sports ability. It also provides more opportunities to use performance as a dependent variable, and to provide false failure feedback.

My second recommendations is to take care to create a credible failure experience. The effects of implicit theories are predicted to be stronger after participants experience failure, and it appears to be essential in causing their effects (Dweck & Yeager, in press).

My third recommendation is to ask participants prior to the experiment whether they are familiar with the concept of implicit theories of ability, and to assess their pre-existing implicit theories. Athletes who have been instructed about the effects of believing in malleability versus fixedness may not be susceptible to the experimental manipulation. Based on a pre-assessment, the effects of prior knowledge and pre-existing implicit theories on experimental outcomes can be investigated.

The findings of my experiments showed some effects of implicit theories on performance and performance-related psychological processes. This suggests it is worthwhile to continue studying these phenomena in the sport context. The suggestions proposed above could contribute to the development of an effective experimental paradigm.

**Mediation and Moderation of the relation between implicit theories and achievement goals.** Future research could also investigate whether the relations between implicit theories and achievement goals in sport are indeed mediated as theory predicts. Dweck (1999) proposed that people with entity beliefs want to demonstrate their ability, or avoid demonstrating a lack of ability, because they believe that failure indicates they lack ability in general (i.e., also in other situations), which will be permanent (i.e., for the rest of their life). People with incremental beliefs will be less concerned with demonstrating ability or a lack thereof, because they believe that their performance is a snapshot that is specific to the current task, time and situation, and that can be changed by practice or learning. These beliefs emerged from a study about intelligence in fifth graders (Stone, 1998; in Dweck, 1999). Because the relations between implicit theories and achievement goals in sport are generally weak, further research is needed that examines why people tend to choose performance goals and what circumstances moderate this tendency.

**Parents and achievement goals.** My findings show that parental behavior is related to the achievement goals of their children in sport. When looking at the prominent role of parents in the lives of their children this may be unsurprising. However, since children's achievement goals have a major effect on their sporting experience, we need to know more about the specific parental behaviors that affect achievement goals in their children and how these behaviors shape the setting of achievement goals.

Future research could investigate other types of parental behavior than the ones studied in Chapter 4. A promising option would be to explore parental conditional positive regard (PCPR) and parental conditional negative regard (PCNR; Assor & Tal, 2012). A study in a school setting reported the remarkable finding that parental conditional positive regard was related to negative psychological attributes in children. Parents' (strong) reward for their children's performance was related to self-aggrandizement, self-devaluation, compulsive over-investment, and the avoidance of challenges in children (Assor & Tal, 2012). These effects may also exist in the context of sport, where it is quite common for parents to show more or less affection based on their children's performance.

Future studies on the role of parents in sport could improve current methodological approaches by collecting information not only from children, but also from their parents and their coaches. Parents can provide insight into their thoughts, feelings, and deliberations that their children are not aware of. The assessment of the motivational climate surrounding young athletes could be further complemented with information from coaches (about the coaches



themselves, but also about the athletes and their parents). Obtaining information from multiple informants would allow a more complete model to be tested and possible discrepancies between informants could be used as a source of information in itself (De Los Reyes, 2011).

### **Practical Implications**

The findings in this dissertation have a number of practical implications. First, the CNAAQ-2-NL is a sufficiently valid measure of implicit theories of ability in sport. The availability of this questionnaire in Dutch allows the comparison of findings with other studies using the CNAAQ-2. If the validity is further improved and norms are developed, it may also be used as an instrument for individual diagnostics with athletes.

Second, the correlational studies in this dissertation show a clear relation between incremental beliefs and mastery-approach goals. Because mastery-approach goals have a host of positive effects in sport, my advice to parents, coaches, and athletes would be to focus on incremental beliefs, and to emphasize practice as the way to improve in a sport, whether one is talented or not. The message to children and athletes should be that any skill can be learned if one practices regularly for long enough. Some people may have a talent that helps them learn faster than others or reach a higher level eventually, but skills improve from practice. Furthermore, the activity should be enjoyed in itself, and not be undertaken for some reward that is expected from reaching a future goal. The joy should be in the journey, not in reaching the destination.

With regard to effort, Dweck (2015) has pointed to a common misconception, namely that a growth mindset equals working hard. Dweck states that when children are praised just for their effort, when they did not learn, something is wrong. Children are supposed to discover the relation between strategy and progress, and understand that it matters what you put effort into. People can be conditioned to feel good about themselves just for working hard (Eisenberger, 1998), and although industriousness is a virtue, energy should be spent wisely.

Compliments should be about how someone performed compared to previous occasions instead of compared to the performance of others. Feedback should preferably be given in concrete terms (e.g., 'you kept on trying even though you were falling behind'), rather than general terms (e.g., 'well done'), because specific feedback gives stronger support to the learning process. After a loss, many young athletes tend to think everything was bad. By emphasizing what went well, parents and coaches teach young athletes to evaluate their

performance in a more balanced way. This becomes even more powerful when they talk about why certain things went wrong, and how that could be remedied.

A final advice to coaches is to make sure they give equal amounts of attention and feedback to all athletes which signals that they believe everyone can improve. Focusing on the better players, as is often done, shows that coaches do not really believe in change, and actually increases inequalities.

A practical implication of the findings of Chapter 4 is that parents should provide autonomy support, be responsive, and exert behavioral control but not psychological control to create a parent-initiated mastery climate for their children. Psychologically controlling behavior should be avoided because it fosters the creation of a performance climate, which has a detrimental effect on children's sporting experience.

Parents could try to support and protect an intrinsic motivation for sport in their children (as opposed to an extrinsic motivation) and help them act in line with their own desires and ambitions. Parents can support their children's autonomy through (1) providing their children with choices, (2) acknowledging their feelings (i.e., showing empathy), and (3) explaining them why things are necessary or important (Gaudreau et al., 2016). To be responsive, parents could show interest in their child's emotional state, listen to what their child wants to talk about, and try to understand the world from the child's perspective. Further, parents could provide the right amount of behavioral control if they have reasonable expectations of their child's performance and behavior, which should be expressed in the interest of the child's development (i.e., not because parents want it, but because it is good for the child). Also parents are advised to compare their children's current sport performance with their past performances. If their child performs better than before this is reason for praise. If their child performs worse than before, parents may ask what happened and encourage the child to increase effort.

To avoid being psychologically controlling, parents should pay attention not to show conditional affection but love their child unconditionally. Conditional affection (i.e., loving children more or less depending on their performance) is a specific form of love withdrawal with negative effects on children's psychological development (Assor & Tal, 2012; Soenens & Vansteenkiste, 2010).

Last but not least, parents could create a mastery sport climate (instead of a performance climate) and thus promote the adoption of mastery-approach goals in their children by focusing on learning and skill development rather than winning, competition, and interpersonal comparisons.

## **Concluding Remarks**

This dissertation has provided more insight into the role of implicit theories in the sports domain, and into the predictors of achievement goals. I have demonstrated that implicit theories relate to achievement goals in sport, although they explain only a small portion of the variance. Therefore, additional predictors of achievement goals (such as parental behaviors) should be identified and studied. Furthermore, although the effects of implicit theories are often demonstrated in correlational studies, the three experiments showed only few effects on achievement goals, motivation to practice, and performance. My conclusion is that the effects of implicit theories are difficult to capture in experiments. Future research is needed to develop an experimental paradigm that consistently elicits the proposed effects. Three recommendations for future experiments are (1) to find a task or set of tasks that can be presented as a credible measure of sports ability, (2) to create a credible failure experience, and (3) to ask whether participants are familiar with the effects of entity and incremental beliefs.

Finally, I conclude that parents are an important factor in the sporting experience of their children. Parental behaviors relate to the motivational climate that adolescent athletes experience, which in turn relates to the goals that they try to achieve in sport. The relation between parent-initiated motivational climate and achievement goals was substantial even after controlling for implicit theories and coaching. All in all, it seems worthwhile to involve parents when studying the psychological climate surrounding children and adolescents in sport.