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The Development of Future Orientation: Underpinnings and Related Constructs

by

Sarah J. Beal

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The Development of Future Orientation: Underpinnings and Related Constructs

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University of Nebraska, 2011

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Future orientation has been conceptualized in a variety of ways across literatures in psychology, sociology, education, and vocation. The lack of a shared definition and measurement across theoretical perspectives has resulted in a challenge in comparing findings across literatures and organizing results in a way that provides a coherent sense of how future orientation impacts later outcomes. Trommsdorff (1979) provided a comprehensive definition of future orientation that included eight dimensions: extension, detail, domain, affect, motivation, control, sequence of events, and number of cognitions. Study 1 was designed to test this definition using measures from five prominent theories of future orientation in the current literature, using confirmatory factor analyses in a structural equation modeling framework. The findings from Study 1 suggest that items taken from different measures of future orientation can be used as indicators of each of the dimensions proposed by Trommsdorff. However, not all of these dimensions are correlated with one another, and not all of them load onto a higher-order factor, suggesting that future orientation may be several, rather than a single, construct. A second issue within this literature is that studies have previously been designed to use future orientation as a predictor of outcomes of interest, and little attention has been paid to what factors predict future orientation itself. Based on correlated constructs found in

previous research, Study 2 was designed to explore what childhood predictors, measured in grades 3 and 6, predicted future orientation in grade 10. Predictors were conceptually organized into constructs related to a capacity for future orientation and those related to individual differences in future orientation. Results suggest that, consistent with Study 1, future orientation should be conceptualized as multidimensional rather than unidimensional, and that different constructs predict each of the dimensions modeled. These findings have important implications for theory and research in future orientation, and practical implications for interventions designed to either improve future orientation or use future orientation as a mechanism for impacting other outcomes.

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I know what I'm doing. I have it all planned out – plans to take care of you, not to abandon you, plans to give you the future you hope for. - Jeremiah 29:11

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Chapter 1

The Development of Future Orientation: Underpinnings and Related Constructs

For many developmental psychologists, adolescence is seen as a period of preparation for adulthood (Call, Reidel, Hein, McLoyd, Peterson, & Kipke, 2002). Underlying this perspective is the assumption that adolescents are being groomed and shaped, intentionally and unintentionally, for the roles they will take on in the future. Multiple systems are involved in this preparation and orientation, resulting in a complex process which operates to propel adolescents toward thinking about and making plans for later adult attainments. Through this process, adolescents should gain experiences that help them shape their own expectations of the future, which include perceptions of possibilities and opportunities (Nurmi, 2004). These expectations will impact their decisions and the opportunities they pursue, placing them on trajectories that shape the rest of their lives. However, there is little theoretical clarity and cohesion with regard to the construct of future orientation or the processes involved in developing and shaping an adolescent's orientation toward the future.

Future orientation, defined in various ways (see below), has been explored in multiple literatures and has consistently been found to relate to adult competence and attainment (Manzi, Vignoles, & Regalia, 2010), positive educational outcomes (Beal & Crockett, 2010), and delinquency (Oyserman & Markus, 1990), despite inconsistent measurement and varying definitions. In the sociological literature, adolescent future orientation is seen as an important predictor of adult attainment (e.g., education; Messersmith & Schulenberg, 2008). In the risk and resilience literature (e.g., Masten, Obradovic, & Burt, 2006), future orientation is identified as a primary predictor of

overcoming adversity. In the psychological literature, adolescent future orientation is often used to predict behavior and planning (e.g., Beal & Crockett, 2010) and transitions to adulthood (e.g., occupation; Nurmi, 1994), and has been used in intervention research to identify children at risk for school failure (e.g., Oyserman, Bybee, & Terry, 2006). In all of these literatures there is a shared understanding that some adolescents have higher levels of future orientation than others.

However, while definitions and measurement of future orientation may overlap to some extent, there is little consistency in how future orientation is conceptualized across these literatures (Trommsdorff, 1983). Each of the previously-mentioned perspectives have utilized different working definitions and measures of future orientation, in part because the emphasis of these lines of research has been on identifying where future orientation is a useful predictor for outcomes of interest, rather than understanding the construct itself. While the term *future orientation* may evoke a general concept in readers and researchers alike that references how, what, and when individuals think about the future, the lack of a shared definition and comparable measurement across disciplines limits our abilities as researchers to ensure that findings across research domains reflect the same underlying construct, limiting replicability and generalizability of studies of future orientation. If it is the case that each of these literatures use the same underlying construct (i.e., future orientation) by different names (e.g., possible selves, aspirations) then findings across literatures can be combined and compared to create a more complete literature, However, if this is not the case, then assuming that possible selves and aspirations are identical constructs could result in confusion and lead to conclusions about the role future orientation plays that are not accurate. For this reason, studies

comparing multiple perspectives of future orientation and empirically testing for their similarities and differences are needed.

Further, future orientation literatures have placed more emphasis on describing future orientation in adolescence and changes from early to late adolescence, even into adulthood, than in identifying the origins of future orientation. While little is known about underlying constructs that contribute to the emergence of future orientation, drawing on other domains of research not specifically tied to future orientation allows for some inferences about its development. Specifically, research addressing the development of formal operations, identity, and neuro-cognitive development seem relevant. Formal operations mark an important transition in cognitive capacity, and may play a role in influencing change in future orientation from childhood to adolescence. Further, research has demonstrated that future-oriented cognitions tends to, at least during adolescence, coincide with areas of identity development (Dunkel, 2000; Nurmi, 2004). Other constructs, including self-regulation (Robbins & Bryan, 2004), optimism (Seginer, 2000), executive function (Blakemore & Choudhury, 2006), self-efficacy (Pulkkinen & Ronka, 1994), and poverty (Nurmi, 1987) have been correlated with future orientation in adolescent samples and are also measureable in children. It is possible that the factors described above contribute to the development of future orientation, either across perspectives of future orientation or within the context of a specific theory (e.g., possible selves).

The purpose of this dissertation is to address the following questions derived from the future orientation literature: can the multiple conceptualizations of future orientation be organized into a unified definition that is empirically supported?; and, what underlying

factors predict future orientation in adolescence? This dissertation begins with a description of major theoretical models of future orientation currently used in the literature, and commonly used measures within each framework. This is followed by a discussion of research exploring potential predictors of future orientation, including self-regulation, optimism, executive function, self-efficacy, identity, and poverty. This is followed by a more focused introduction, methods, and results for each of the two studies conducted. The first study attempts to address whether the multiple conceptualizations of future orientation can be organized into a more cohesive and unified literature by attempting to empirically support a comprehensive definition of future orientation. The second study explores potential predictors of future orientation in adolescence, which could provide insight into how future orientation develops. Finally, general conclusions from the findings of both studies are discussed.

Future Orientation: A Definition (Of Sorts)

As mentioned previously, several separate literatures have explored future orientation from differing perspectives, resulting in diverse theoretical models. While multiple theories of future orientation is not problematic in and of itself, this has resulted in various conceptual definitions of future orientation for each theoretical perspective, as well as unique measures for assessing future orientation, resulting in findings that are difficult to compare, aggregate, and replicate across disciplines/perspectives.

The primary models or theories of future orientation across domains include Possible Selves Theory (Markus & Nurius, 1986), Hopes and Fears (Nurmi, 1987), Future Time Perspective (Trommsdorff, 1983; Lens and Moreas, 1994), and Aspirations and Expectations (Gottfredson, 1981; Messersmith & Schulenberg, 2008). Possible

selves are defined as “positive and negative images of the self already in a future state” (Oyserman et al., 2006, pg 188). Nurmi (1989) offered a more comprehensive definition of future orientation, which he conceptualized as a multidimensional process of motivation, planning, and evaluation, where motivation is what interests an individual has, planning is how an individual intends to realize a particular future goal, and evaluation is the extent to which realizing a goal is expected by that individual. The contrast between these two definitions is clear: for possible selves, future orientation is the affect (i.e., positive/negative) and content of a future state, whereas for hopes and fears the plan to achieve and belief about success in achieving a future state are also part of future orientation. With regard to aspirations and expectations, Gottfredson (1981), who focused on occupational aspirations and expectations, conceptualized aspirations as the range of possible goals being considered at any given time, and the expectation as the single goal identified as the best alternative at any given time. Once again, this conceptualization, when posed in contrast with the previous two definitions described, provides another aspect of future orientation to consider: not only the content and the perceived likelihood of success, which were elements of the other two definitions, but also the consideration of multiple cognitions and comparison of cognitions based on the individual’s current experiences/knowledge. Finally, Trommsdorff (1983) offered a definition of future orientation that encompasses all of the components described above, with some additions. She suggested that future orientation encompasses the length of extension into the future, domain or content of the cognition, number of cognitions, amount of detail, affect tied to the cognition, motivation to achieve the cognition, and the amount of control an individual believes he or she holds over goal attainment.

Using Trommsdorff's (1983) collective definition, perspectives and literatures can be organized by the components each includes in defining and measuring future orientation. Table 1 summarizes each of the theoretical models and which components of future orientation are addressed with each. A brief description of each model taken from the literature developed in support of each perspective follows that includes commonly used measures and variations in measurement. The measures used by each perspective of future orientation is especially important for Study 1, given that these measures are used in combination as indicators of a higher-order future orientation factor. The review of each perspective is organized based on their definitions, with possible selves emphasizing domain, content, and affect, hopes and fears adding to that motivation to achieve and evaluations of achievement of future states, aspirations and expectations also including the number of cognitions and comparison of cognitions, and finally, future time perspective as the most comprehensive definition. It is important to note, as reflected in table 1, that the absence of an emphasis on a particular dimension of future orientation in the definition of each perspective has not necessarily resulted in the absence of that dimension in the measurement used for that perspective.

Possible selves. Possible selves theory was first proposed by Markus and Nurius (1986) as a way of conceptualizing the process by which future thoughts regarding the self motivate behavior to achieve desired outcomes. *Possible selves* are comprised of three distinct cognitions: *hoped for selves*, *expected selves*, and *feared selves*. The *hoped for self* is the most desired or idealistic view of the self in the future and is not necessarily realistic. The *expected self* is what one anticipates becoming in the future. It is

Table 1. Summary of theoretical perspectives of future orientation.

Theories	Future Extension	Domain	Number of Cognitions	Detail	Affect	Motivation	Control
Possible Selves	Not part of theory, sometimes manipulated by researcher	Measured	Sometimes considered or manipulated by researcher	Sometimes analyzed	Included as part of theory (e.g., feared self)	Cognitions seen as motivating behavior, not explicitly measured	Not part of theory
Hopes and Fears	Sometimes measured	Assigned by the researcher	Not part of theory	Measured	Measured	Measured	Measured
Future Time Perspective	Sometimes measured	Sometimes measured or assigned by the researcher	Not part of theory	Not generally measured	Not generally measured	Sometimes measured	Sometimes measured
Aspirations Expectations	Sometimes measured	Usually assigned by the researcher	Sometimes analyzed	Not generally measured	Sometimes measured	Not explicitly measured or incorporated	Not explicitly measured or incorporated

typically more realistic and what the individual believes is most likely to occur. Finally, *feared selves* are what one wants to avoid in the future.

According to possible selves theory, individuals are motivated to engage in behaviors that move them toward attaining the *hoped for self* and away from the *feared self*. Further development of possible selves theory postulated the importance of balance between selves, where an individual is most motivated by a *hoped for, expected, and feared self* in the same domain (e.g., occupation; Oyserman & Markus, 1990). Unemori, Omoregie, and Markus (2004) identified six domains of possible selves: intrapersonal, interpersonal, career/education, extracurricular, material possessions, and health.

Possible selves are usually measured using open-ended prompts for each of the three types of selves. For *hoped for selves*, the prompt is similar to the following:

Many people have thoughts about what they hope for the future. These are the things they would most like to be or do, and may not be realistic. List the things you would most like to be or do in the future (Markus & Nurius, 1986).

Expected selves and feared selves follow a similar structure but refer to "thoughts of what they expect for the future" or "thoughts about what they fear for the future or want to avoid."

There are several variations on this measure that have been used in the literature. One variant is to limit the number of open-ended responses (i.e., "List three things..."). Another is to restrict the length of extension (i.e., "you would most like to be or do five years from now."). A final variation is to include options for participants to check off rather than open-ended responses. Responses to possible selves measures are then coded, typically for domain (e.g., occupational, interpersonal) and for balance (i.e., same domain

of hoped for, expected, and feared selves). In a study conducted with Latino adolescents around the age of 14, education was the most common domain for hoped for selves, and extension varied across domains, with 18 as the average age for extension in education, 24 for occupation, and 26 for family (Yowell, 2000).

Possible selves have also been demonstrated to impact adolescent behaviors. For example, Oyserman and colleagues (2006) randomly assigned at-risk middle school students to a possible selves intervention/control group and found that increasing educational aspirations resulted in subsequent reduced absences, increased GPA and proficiency scores, and a decreased likelihood of being retained within the same academic year. In the following academic year, youth who had participated in the possible selves intervention reported greater amounts of time spent on homework compared to those who did not participate, were less disruptive in class, maintained a higher GPA, and had better school attendance.

Possible selves theory is limited in a number of ways. First, the theory itself provides a notion to suggest that possible selves motivate behavior to move toward a desired future state and/or away from an undesired future state (Markus & Nurius, 1986). However, the process by which this occurs is not clearly described. Second, work done in the area of possible selves has suggested that there are changes in the frequency of particular domains, length of extension, and the balance between hoped for, expected, and feared selves across the lifespan (Cross & Markus, 1991; Hoppmann, & Smith, 2007), but few studies to date have explored the mechanisms that undergird these changes or where possible selves come from. When research has explored processes that may explain changes in possible selves, it has typically been within the context of change

in identity (e.g., identity exploration and possible selves; Sica, 2009). It is important to note that even in this instance, the literature is not clear on the direction of the relations between identity and possible selves – in some instances studies have explored how possible selves provide a mechanism for exploring identity (e.g., identity development in new teachers, Hamman, Gosselin, Romano, & Bunuan, 2010) and in other instances identity is seen as a mechanism for enhancing our understanding of possible selves (e.g., identity underlying hoped and feared possible selves; Vignoles, Manzi, Regalia, Jemmolo, & Scabini, 2008). Thus, while the identification of a future-oriented cognition that influences behavior is a key feature and contribution of possible selves theory, the processes by which this occurs, how possible selves develop, and why they change is currently unclear.

Hopes and fears. Nurmi (1987) proposed a life course perspective of future orientation, providing the first truly developmental perspective in this area. He postulates that adolescents hold future-oriented cognitions regarding anticipated tasks to be completed in early adulthood. These tasks would include educational goals, possible occupations, relationships, intrapersonal characteristics, and social/political beliefs about the future. Similar to possible selves, Nurmi and colleagues have suggested that adolescents hold *hopes*, or idealistic views of the future they would like to attain; they also develop *fears*, or things adolescents want to avoid in their futures. With this perspective, there is no distinction between hopes and expectations, as there is with possible selves. In addition to the dimensions of hopes and fears, which is similar to that of possible selves, Nurmi (1989) also postulated that, based on his perspective of future orientation, hopes and fears should include the dimensions of motivation, planning, and

evaluation. In this way, Nurmi combines content of a future-oriented cognition (i.e., the domain, the affect) with process (e.g., how an individual plans to accomplish a goal). To examine the developmental process underlying future orientation, Nurmi (1989) examined the content, motivation, planning, and evaluation of hopes and fears in a sample of adolescents. The results suggested that adolescents tend to extend into their 20s, with occupational, educational, and family domains being most common. These results parallel the findings from possible selves theory described above (Yowell, 2000). Nurmi also found evidence that mechanisms for planning and evaluation increase with age, but that even young adolescents could provide hopes and fears that are accompanied by complex strategies for achievement. Thus, these findings would suggest that, at least by age 11, children are capable of reasoning about what they want for their future and how to accomplish future goals, although these processes may be more refined with age and experience.

Hopes and Fears are typically measured using the Prospective Life Course Questionnaire (Seginer et al., 1999). This measure includes questions that specifically address domains (e.g., education, family). The measure first provides a domain for the participant to reference and then asks questions about the value placed on that domain, the perceived likelihood of achievement in that domain, and the sense of control in that domain, all using Likert-scale responses. Participants are then asked to respond to questions about that domain (e.g., I hope to complete X amount of education), the behavior engaged in to achieve in that domain (e.g., When it comes to education, I have explored my options), and the level of commitment to a current goal. All responses are

on a Likert-type scale ranging from 1 to 5. In variations of this measure, participants are also asked to report the age they expect to complete goals in a specific domain.

In addition to linking the content of future-oriented cognitions with process, hopes and fears have been linked to a myriad of other constructs that are important for adolescent development. This includes culture, where a comparison of Jewish and Druze adolescents indicated that 17% of the variance in number of cognitions provided by adolescents was accounted for by cultural group (Seginer & Halabi-Kheir, 1998). In another study, Seginer and colleagues have also identified parental support and autonomy-granting as important in shaping future orientation (Seginer, Vurmuls, & Shoyer, 2004).

While hopes and fears addresses some of the limitations of possible selves theory, in that it provides more detail on the processes by which future orientation may develop in adolescence and adulthood, as well as the mechanisms linking cognitions, behavior, and achievement, there are some limitations that still need to be addressed with this perspective. First, the mechanisms by which hopes and fears may change across time does not provide any insight as to when and how the ability to consider the future develops, or whether there are meaningful changes from childhood to adolescence. Second, hopes and fears blends the cognition and the process together, but this may not necessarily be appropriate. It may be the case that the content of the cognition and the process, while related, are in fact distinct constructs. If distinguishing between having a future-oriented cognition and the process by which that cognition impacts later behavior or experiences is important, then that distinction is not possible within the context of this theory. Whether content and process should be considered separately is an empirical question that still needs to be answered.

Aspirations and expectations. Aspirations and expectations are related constructs housed within sociological perspectives. Research conducted in the aspirations and expectations framework tends to emphasize educational and occupational domains almost exclusively (Gottfredson, 1981). Interestingly, there are two distinct definitions of *aspirations* and *expectations* within the sociological literature on future orientation. The most common conceptualization defines *aspirations* as similar to *hoped for selves* in possible selves theory (above), where these are the idealistic goals for future attainment (Meersmith & Schulenburg, 2008). Similarly, *expectations* and *expected selves* both capture those anticipated outcomes that seem most probable to the individual. Much of the literature in this area focuses on describing the domains of aspirations and expectations (e.g., occupational aspirations of rural and urban populations; Brooks & Redlin, 2009), frequencies of various future oriented cognitions (e.g., how many occupational aspirations girls hold related to science; Stevens, Puchtell, Ryu, & Mortimer, 1992), and whether those change across adolescence (e.g., number of occupational aspirations in middle school versus high school students; Armstrong & Crombie, 2000).

A second conceptualization of *aspirations* and *expectations* describes *aspirations* as the range of possible future outcomes an adolescent can conceptualize. As adolescents gain more experience, the range of *aspirations* narrows. This focusing eventually results in one specific future self, the *expectation*, that adolescents commit to and work toward achieving (Gottfredson, 1981). *Aspirations* are initially restricted based on social context: the gender of the child, what opportunities are available, and socio-economic status, among others. Narrowing the range of possibilities is based on

personal likes and dislikes, skills, and abilities. There is some evidence to suggest that the narrowing process in early adolescence often uses inaccurate information about the self and opportunities, resulting in an elimination of viable future options or increasing the potential for unrealistic expectations later in adolescence (Armstrong & Crombie, 2000). In a longitudinal study of 8th -10th grade students in Canada, participants reported occupational aspirations and expectations which were then coded for gender typicality and SES. Armstrong and Crombie found larger aspiration-expectation discrepancies, in gender typicality (e.g., girls holding aspirations for male-dominated occupations, expectations for female-dominated occupations) and SES for participants in 8th grade than at later times of measurement. In most cases, discrepancies were resolved by reducing aspirations to match expectations, suggesting that initially aspirations are chosen without considering gender typicality and social status, and are then options are either eliminated or replaced by choices that more closely reflect the adolescents' context (e.g., gender, SES). Like other sociological perspectives on future orientation, the process by which attainment occurs was not explored. However, there is longitudinal evidence of aspirations and expectations predicting goal attainment in the domains of education (Beal & Crockett, 2010; Sciarra & Ambrosino, 2011), occupation (Mello, 2008), and weight loss (Finch, Linde, Jeffery, Rothman, King, & Levy, 2005), for example.

In both conceptualizations, aspirations and expectations are typically measured using open-ended prompts, typically within a specific domain (e.g., what kind of occupation do you think you will probably do?). Responses are usually then coded to reflect some sort of continuum – for occupation, prestige scores are often used; for

education, time spent pursuing a degree. In some cases age is also assessed, asking participants how old they expect to be when a specific event occurs (e.g., at what age do you think you will get married?).

Future time perspective. Among the most frequent terminologies employed within cognitive and social psychology, *future time perspective* is used in a variety of ways to describe multiple aspects of future orientation. For some researchers (e.g., Lens & Moreas, 1994) *future time perspective* is seen as a personality trait, where individuals hold an orientation that is either toward the future, in the past, or in the present. Having a future-oriented personality results in highly motivated individuals who tend to be more successful and hold many long-term goals for themselves when compared to those who do not extend as far into the future. Operationally, this conceptualization of *future time perspective* is captured by measuring the proportion of long-term (i.e., 4 years or more into the future) to short-term goals individuals hold for themselves, with higher proportions of long-term goals indicating a future-oriented personality.

Another way *future time perspective* has been used is in discussing an individual's need to reduce uncertainty (e.g., Trommsdoff, 1994). In this instance, *future time perspective* is seen as a coping mechanism where individuals who have a difficult time adjusting to the unknown develop a list of possible outcomes - thereby narrowing potential future events from an infinite number of possibilities. While this potential link between future orientation and anxiety has not been empirically tested, the notion provides a different perspective of future orientation, where these researchers are primarily concerned with the level of control an individual is attempting to assert over his or her future and how that control will be executed. Measurement includes asking about

future goals, followed by questions about what steps, in chronological order, an individual plans to take in order to accomplish that goal, how long it will take to accomplish each step, and how much control an individual feels he or she has at each step. If it is the case that some individuals are more prone to consider the future in an attempt to both limit uncertainty and gain a sense of control, this may provide some insight into individual differences in future orientation and the motivation to invest time in considering and planning for the future.

Lens and Moreas (1994) used 40 positive and 20 negative stems (e.g., “I strive for”) to gather future-oriented cognitions from college students, using a future time perspective approach. Participants were then asked how long it would take for them to accomplish the goal, how invested they were in the goal, and how motivated they were to achieve it. Results suggested that motivation stemming from future time perspective is subjective, where an individual’s perception of the length of time to goal accomplishment is more important in predicting motivational effects of these cognitions than researcher-assessed objective time to attainment. For example, if an individual believes that he or she will complete a goal in five years, but an objective evaluator assesses that the goal will take 10 years to complete, the individual’s perspective (i.e., 5 years) predicts motivation to achieve more so than the perspective of the objective observer. Underlying this research is the notion that motivation is higher for more proximal rather than more distal goal. Taken together, this would suggest that the perceptions of a goal being proximal are more important in predicting motivation than the reality of a goal being proximal. Further, their findings suggest that while distal goals may be more meaningful and worthy of investment, they are less motivating than proximal goals because of the

length of time needed to accomplish them. In order to compensate for these effects, it appears that individuals with high levels of future orientation tend to break larger goals into smaller, more attainable steps, resulting in a hierarchy of future-oriented cognitions. Lens and Moreas suggest that this allows individuals to capitalize on both the long-term payoff of goal accomplishment and the short-term motivations needed to successfully complete the larger goal. The ability to create a hierarchy of goals is important to consider when testing relations between future-oriented cognitions and later behaviors, especially during adolescence, when skills in identifying interim steps tend to be less developed (Massey, Gebhardt, & Garnefski, 2008).

A comparison of future orientation models. While the conceptual and operational definitions of future orientation used in the literatures described above vary, some similarities in concept and measurement clearly indicate a potential for a cohesive definition of this construct. For example, there are slight distinctions in definition between Possible Selves' *hoped for*, *expected*, and *feared* selves as compared to *hopes* and *fears* or *aspirations* and *expectations*. It could be the case that differences between these future-oriented cognitions themselves are not meaningful, but that meaningful differences do emerge when other components (e.g., value and sense of control present in Hopes and Fears but not in Possible Selves Theory) are taken into account. Unfortunately, as can be seen in Table 1, the various components proposed to be part of future orientation are not captured consistently within or across theoretical models, which limits comparability in the current literature. Identifying which components are related to one another and which are important for a complete understanding of future orientation is essential for moving this area of study forward.

The comprehensive definition of future orientation provided by Trommsdorff (1983) suggests that future orientation is comprised of eight components: future extension, domain of cognitions, number of cognitions, detail, affect, motivation, control, and sequence of events. Each of the major theories/models of future orientation described above include some, but not all, of the components as part of their operational definitions of future orientation (see Table 1). It is important to note that the definitions offered by other theories of future orientation do not incorporate Trommsdorff's definitions as part of their own; however, when theories are examined through the lens of Trommsdorff's definition some overlap is found. Possible Selves theory (Markus & Nurius, 1986) includes domain, detail, affect, and motivation in its definition; Hopes and Fears (Nurmi, 1987) address components of extension, domain, detail, affect, motivation, and control. Aspirations and expectations (Gottfredson, 1981) include extension, domain, number of cognitions, and sometimes affect as part of the operational definition. Thus, it is clear that, while none of the theories/models of future orientation are identical in how they define and measure the construct, there is some overlap in components across theories. This overlap allows for the potential to develop a shared definition that includes multifaceted dimensions of the cognition (e.g., domain, affect, detail) and the process (e.g., motivation, control); however, it is currently unknown whether the inferred conceptual overlap among theories translates to empirical overlap. Further, Trommsdorff's definition of future orientation has yet to be empirically tested. The goal of Study 1 was therefore to test whether the eight components of Trommsdorff's definition relate to one another in confirmatory factor analysis models, using measures drawn across theories of future orientation.

Where Does Future Orientation Come From?

While Study 1 is an important step in understanding future orientation as a construct, it is equally important to understand future orientation from a developmental lens, to identify how future orientation emerges and changes over time. Before delving into particular constructs that may be important in predicting or influencing future orientation in some way, it is important to consider why researchers should be interested in future orientation during adolescence specifically, as opposed to future orientation at any point in the lifespan. There are two key literatures that provide support for adolescence as a unique period of development with regard to future orientation, making this period unique from both childhood and adulthood. First, research drawn from the cognitive development literature would suggest that adolescents may have a capacity to consider their futures in a way that children do not. As cognitive development occurs, Piaget has argued that individuals transition from a period labeled *concrete operational* in childhood to *formal operations* toward the end of childhood and into adolescence. The characteristics typically associated with concrete operations include the cognitive ability to reverse or change direction in the order of experiences that are not in the abstract. While children can easily identify future goals (e.g., what they want to be when they grow up), it is likely the case that children with concrete operational functioning would have difficulty considering multiple future outcomes simultaneously and how those future outcomes may interact to influence one another, for example, because this would require a level of reasoning in the abstract that concrete operational thinkers would struggle to achieve (Kuhn, 2008).

Formal operations is typically associated with the ability to reason contrary to known fact (e.g., “feather breaking glass task”), to systematically combine facts,

categories, and concepts, and then use those pieces of information to create something new, and to do the reverse logic processes. The central theme underlying these abilities is that of *metacognition*, or the ability for individuals to think about their own thoughts: to allow the thought itself to become the object one considers and manipulates (Kuhn, 2008). When taken together, these emergent cognitive abilities would allow adolescents to simultaneously consider hypothetical future states without accepting any of them as reality and then use each of those individual ideas to consider the consequences of pursuing one or more future selves in combination. This ability appears to emerge around in late childhood/early adolescence (Moshman, 2009), and is likely essential in planning for and evaluating multiple future-oriented cognitions simultaneously.

If cognitive development distinguishes future orientation in children from future orientation in adolescence, developmental tasks in adolescence may provide a distinction between adolescence and adulthood. Nurmi (1993) points out that in many cultures, adolescence is a period where societal norms and expectations push adolescents toward future-oriented thinking, where they are preparing for a transition into adulthood, learning about preferences and interests that will shape their choices with regard to education, occupation, and personal relationships, among other domains. As adolescents begin to engage in consideration of their future goals and desires, they become active participants in shaping their own development, choosing which options to pursue based on what is available (Gottfredson, 1981).

Given the importance of future orientation during adolescence, a second important issue that needs to be addressed with regard to future orientation is where the cognitive ability and social motivation to consider the future comes from. While the

underpinnings of future orientation are currently unknown, several bodies of research in related areas provide some insight into what factors might contribute to the emergence of future orientation. For the purpose of this dissertation, research that seems theoretically and conceptually relevant to future orientation in adolescence is reviewed, as these areas are most relevant for the current set of studies. Research addressing various correlates of future orientation and other constructs of interest has been organized into three conceptually distinct sets of predictors: correlates that likely contribute to the capacity for future orientation (i.e., underpinnings), correlates that likely contribute to individual differences in future orientation (predictors), and factors known to be related to future orientation that are likely to develop simultaneously (i.e., correlates). The constructs included are based on empirical research demonstrating a link between the construct and future orientation, either cross-sectionally or longitudinally.

Underpinnings of the capacity for future orientation. There are several correlates of future orientation established in the current literature that seem plausible candidates for constructs that underpin future orientation – that is, these constructs may be necessary in order for an individual to have the capacity to orient toward the future. This would include executive function (Miyake, Friedman, Emerson, Witzki, & Howerter, 2000) and self-regulation (Carver & Scheier, 2011) which can all be linked conceptually, and in some cases empirically, to future orientation.

Executive function. It is no coincidence that changes in an adolescent's cognitive ability are occurring at the same time as improvements in executive functions, including abilities in attentional shift/planning, inhibitory control, and working memory (Flavell, Miller, & Miller, 2002; Miyake et al., 2000), which are presumably tied to brain

development (Blakemore & Choudhury, 2006). Additional gains in strategy selection and analytic ability (Kuhn, 2006) as well as multi-tasking (Blakemore & Choudhury, 2006) make this period unique in developing and extending views of the self into the future (Blair & Ursache, 2011). As part of future-oriented cognition, individuals must consider the steps they should engage in to attain their future state of interest, inhibit behaviors that would move them away from their ultimate goal, and be able to recall those processes as needed.

It goes without saying that executive function in and of itself is not sufficient for future-oriented thinking; an individual may be able to engage in planning over a limited period of time (e.g., moves on the Tower of Hanoi task) but not be able to extend that process over multiple months or years. Similarly, an individual may be able to retain a plan or strategy in short-term memory for a time-limited task but not be able to encode that knowledge into long-term memory and recall it as needed, which would be necessary for future-oriented cognitions spanning longer periods of time. Further, in order to inhibit behaviors that would prevent or delay goal attainment, individuals must be able to recognize particular behaviors as potentially detrimental. One limitation of this literature is that the underlying assumption of the current strategies used in measuring executive function is that short-term performance is somehow indicative of long-term performance, where individuals who perform well on short-term tasks would also do better in more applied or “real-world” settings. We are forced to make similar assumptions when linking future orientation and executive function.

Self-regulation. Another mechanism involved in future orientation is self-regulation, which is necessary for setting and achieving future goals. Several definitions

of self-regulation have been provided. One definition suggests that self-regulation and self-control can be used interchangeably to refer to an individual's ability to limit or prevent one action in order to gain a desired outcome (Carver & Scheier, 2011). In this sense, self-regulation could be conceptualized as similar to inhibitory control, discussed previously as an aspect of executive function. Carver and Scheier have provided a narrower definition of self-regulation. Specifically, Carver and Scheier argue that self-regulation should refer to a self-corrective process in order to keep individuals on-track toward a particular outcome. The outcome could be attaining a future-oriented goal or maintaining attention during class. The important aspects of this definition are that correction of cognition or behavior is self-driven, and that self-regulation is the correction or maintenance (i.e., engaging in, preventing, etc.) of a particular cognition or action, and is not meant to be conflated with the goal of that correction or maintenance. This conceptualization of self-regulation is adopted for the rest of this dissertation, where self-regulation is necessary in order to maintain an action identified as necessary to complete a future goal.

Thus, self-regulation and future orientation are conceptualized as separate but related constructs. Self-regulation, like the other cognitive capacities discussed, seems essential in order to engage in future-oriented thinking, where an individual would have to limit immediate action and cognitions of the present in order to consider future possibilities, ignore distraction or competing ideas, and certainly self-correct in behavior engagement when moving toward attainment.

Predictors of individual differences in future orientation. While certain cognitive capacities are likely necessary for future orientation, there are also several

factors that likely relate to individual differences in future orientation. This likely includes constructs such as belief about future outcomes and opportunities provided within the individual's environment.

Optimism. The degree of optimism an adolescent holds about her future also appears to impact future orientation. Not surprisingly, there is some debate about how optimism should be defined, and, perhaps more importantly with regard to future orientation, whether optimism and pessimism are two ends of the same spectrum or distinct constructs. Specifically, optimism tends to be conceptualized as the extent to which individuals believe that they will experience positive or good things in the future (Garber, 2000). What is currently unclear is whether the opposite of optimism is thinking things will not be positive in the future, or believing that things will work out poorly in the future (i.e., pessimism). This distinction has bearing on the relations between future orientation and optimism for two reasons: first, the measurement of optimism is dependent on the definition being used, and therefore associations between optimism and future orientation may vary by measure used; and second, whether definition and measurement of future orientation includes an aspect of a *feared* or *avoided* future state may result in differences in the relations to optimism. Future research is needed to disentangle these issues. For the purpose of this dissertation, optimism is conceptualized as one-dimensional and continuous, which is more consistent with prior work in future orientation (e.g., Seginer, 2000).

Research has indicated that adolescents who hold an optimistic view of their abilities in the future tend to also consider developmental life tasks more frequently (Seginer, 2000) and to explore more options with regard to education. Interestingly,

Seginer reports that optimism was not related to motivation to achieve in educational domains. There is also some evidence that optimism and future orientation interact to provide a coping mechanism for negative life events, where optimistic individuals who perceive negative events as learning opportunities report less negative affect (Strathman et al., 1994). Unfortunately, directionality in these relations cannot be inferred, as these studies have been cross-sectional.

Opportunity. One threat to an individual's belief in his or her ability to impact outcomes is a lack of resources. Opportunities available to adolescents, and their expectations for success, vary by social class, creating trajectories for adolescent development that are somewhat distinct (Gottfredson, 1981; Nurmi, 1987; 2009). For example, Nurmi (1987) found that adolescents from higher social classes perceived more opportunities in education and occupation, and were able to extend farther into the future than those from lower social classes. Notably, much of the research with regard to future orientation and social class has involved describing differences in the number or content of future-oriented cognitions across social classes, and little is known about how the process of identifying future-oriented cognitions may vary across socio-economic statuses. There is some evidence to suggest that adolescents from higher social classes tend to believe more in their own abilities to shape their futures, resulting in a more internalized sense of control and increased motivation to regulate behaviors (Nurmi, 1987). It may also be the case that there are more opportunities in higher classes to gain experience in planning and to discuss future goals, resulting in more refined future-oriented processes for these youth. This is supported by findings that adolescents from higher social classes project further into the future (Nurmi, 1987).

Correlates of future orientation. It is also likely that some constructs are related to future orientation, but are not necessarily predictors of future orientation. Unlike the previous domains discussed (i.e., underpinnings, predictors), correlates likely interact with future orientation and develop simultaneously, influencing and being influenced by other constructs, but do not necessarily precede future orientation temporally. Identity, for example, would seem to be an important correlate of future orientation, but seems to develop along with rather than come before future orientation and is thus not a temporal predictor of future orientation. For the purposes of this dissertation, the correlates being highlighted are identity and self-efficacy.

Identity. The progression of development in future-oriented cognitions may very well follow patterns similar to that of self-understanding (Damon & Hart, 1988) and identity (Erikson, 1968) development. Specifically, Damon and Hart (1988) propose a developmental model of self-understanding where identity is initially based on categorical identification in early childhood (e.g., membership in a specific group, physical appearance). Later in childhood children make comparisons between what they know about themselves and what they know about others or about normative standards. It is not until adolescence that individuals begin to use self-understanding to determine how to operate within their environment and to organize their self-understanding based on beliefs and plans for the future. Further, a cohesive sense of identity begins to develop in adolescence, where current and future selves become more integrated, and a multi-dimensional sense of self is clarified (Damon & Hart, 1988). It may also be the case that later in childhood, future-oriented cognitions are based on patterns of cultural norms (e.g., gender stereotypes), but that in adolescence additional elements, including the

understanding of potential opportunities and limitations available to the individual and the individual's beliefs about personal abilities, would be integrated into the selection of future-oriented cognitions. Finally, while early adolescents might hold future-oriented cognitions in multiple domains (e.g., education, occupation), it is possible that integration among future selves does not occur until later in adolescence. This would parallel integration of self-concept found in other literatures (e.g., Harter, 2006) where seemingly disparate aspects of self in early adolescence is integrated into a more cohesive self for older adolescents.

In a series of studies exploring the relations between future orientation and identity development during adolescence, Dunkel (2000, 2001) proposed that adolescents develop hypotheses about themselves in the future, which can be captured using a possible selves framework. Results indicated that the number of possible selves an adolescent held was predictive of identity status, with greater numbers of possible selves for adolescents in Moratorium (i.e., a state of exploration without commitment to any identity) and more positive or prestigious selves for adolescents in Foreclosure (i.e., a state of commitment to an identity without any exploration). Additionally, holding balanced hoped for and feared selves was predictive of adolescents being in the Achieved status group. Higher levels of identity commitment were also associated with higher levels of stability in possible selves across two times of measurement (Dunkel & Anthis, 2001). Finally, results indicated that identity exploration was associated with increases in the number of hoped for and feared selves reported by adolescents, supporting the notion that possible selves are playing a role in identity development. Additional research is needed to explore the causal direction of these relations.

Self-efficacy. Self-efficacy, or the belief that an individual has the abilities needed to produce a particular outcome in a particular domain or situation by his or her own actions, has been used to predict a variety of outcomes, including children's career goals (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001). Bandura and colleagues have proposed that self-efficacy is one mechanism by which individuals shape their own development, where an individual's beliefs about his or her abilities and preferences becomes essential in determining the types of activities he or she engages in. Self-efficacy is proposed to shape the content, level of commitment, and amount of motivation to achieve a particular aspiration (Bandura et al., 2001). While Bandura and colleagues have only tested this process with regard to academic and career aspirations in adolescence, it is possible that self-efficacy relates to aspirations in other domains similarly.

The specific model for academic and career aspirations tested with adolescents was conducted with 11 to 15 year old students (Bandura et al., 2001). Results suggested a process by which socio-economic status and parental efficacy and aspiration beliefs predicted children's efficacy in academics, social interactions, and self-regulation. Efficacy, which was operationalized to include all three domains, then predicted academic aspirations and achievement, which contributed to beliefs about efficacy in specific job-related skills (e.g., science and technology, education and medical) which predicted career aspirations. It is important to note two limitations with regard to this study: first, the model included a 5-step process contributing to career aspirations, and those 5 steps were tested at a single time point rather than longitudinally. Therefore, the only temporal precedence provided in this model was between efficacy in skills related to

a particular career type at time 1 and the career aspiration identified at time 2. Second, efficacy in specific domains related to career choice did not always reliably predict relevant career aspirations (e.g., education efficacy was not predictive of aspiration for being a professor). Whether this is reflective of a lack of knowledge on the part of the youth about what skills are involved in a particular career, or whether this is indicative of other measurement or structure-related issues is not clear.

In summary, several literatures conceptually and empirically related to future orientation provide some insight into the potential underpinnings of future orientation (self-regulation: Robbins & Bryan, 2004; optimism: Seginer, 2000; executive function: Blakemore & Choudhury, 2006; self-efficacy: Pulkkinen & Ronka, 1994; identity: Nurmi, 2004; poverty: Nurmi, 1987). At a minimum, these domains have been correlated with future orientation in past research. Further, while there is some debate about when future orientation can be meaningfully measured, each of the constructs related to future orientation can be measured before adolescence, allowing for a potential exploration of precursors to future orientation and providing some insight into how the ability to consider one's future in a meaningful way occurs.

Current Studies

In order to move theory and research in the area of future orientation forward, a cohesive definition and measurement of future orientation is needed. Various models of future orientation have proposed components that include length of future extension, domain (i.e., education, occupation), number of cognitions, detail, affect, motivation, sequence of events, and control (i.e., confidence of achievement; Trommsdorff, 1983). Whether all of these components are distinct and where theories of future orientation

overlap across dimensions of the construct are unclear. A cohesive measurement model and operational definition of future orientation is essential.

Study 1 was specifically designed to address issues of measurement and definition of future orientation, using a college sample. Measures of future orientation that reflect varying operational definitions established in the literature (e.g., extension, content, etc.) were administered to a sample of undergraduate students. Constructs known to be associated with future orientation based on the literature were also included for the purpose of establishing construct validity. The purpose of this study was to explore whether multiple conceptualizations of future orientation can be used to create a unified definition that is empirically supported, by identifying how measures currently used to study future orientation overlap, where measures and definitions differ, and how various components of future orientation relate to each other and to other important constructs.

Equally important is enhancing our understanding of what mechanisms might contribute to the emergence and development of future orientation. Scholars have speculated that factors including self-regulation (Robbins & Bryan, 2004), optimism (Seginer, 2000), executive function (Blakemore & Choudhury, 2006), self-efficacy (Pulkkinen & Ronka, 1994), identity (Nurmi, 2004), and poverty (Nurmi, 1987) are correlated with future orientation in adolescence. While there is evidence of correlation with future orientation, whether these factors *predict* future orientation from childhood to adolescence is unknown. It is possible that some of these components contribute to the emergence of future orientation in adolescence. Specifically, it seems plausible that self-regulation and executive function, which can both be measured in early childhood, may be contributors to the emergence of future orientation in adolescence (i.e., executive

function is necessary in order for future orientation to occur). In contrast, optimism, self-efficacy, and poverty may be childhood predictors of individual differences in future orientation.

Study 2 identifies childhood predictors of future orientation at age 15 using the NICHD Study of Early Child Care and Youth Development (SECCYD). Given previous research correlating future orientation to poverty, executive function, self-regulation, optimism, and self-efficacy, measures of these constructs in childhood were used to predict future orientation in adolescence, assessed at age 15. It is likely the case that some predictors (i.e., executive function and self-regulation) will relate to an individual's ability to orient toward the future, while others (i.e., poverty, optimism, self-efficacy) will related to individual differences in future orientation. While the study design does not allow for distinguishing underpinnings from predictors, it is an important first step in understanding what childhood constructs are associated with future orientation in adolescence.

The measure of future orientation used in the SECCYD captures future extension, motivation, and control; this allows for some preliminary exploration into whether potential developmental underpinnings are related to some proposed components of future orientation. Understanding which predictors relate to specific components of future orientation is useful for advancing our understanding of future orientation, as it provides some insight into where individual differences in future orientation may originate and how different dimensions of future orientation may relate to other areas of development. It is also useful for understanding the relations between abilities and experiences in childhood and future orientation in adolescence. Ultimately, we currently

do not understand the processes by which some adolescents are more future-oriented than others. Given the long-term implications of future orientation on adult outcomes (e.g., education, occupation, health), understanding what mechanisms contribute to adolescents being more or less oriented toward the future is an important first step in understanding this process.

Specific Research Hypotheses and Questions

Study 1. It was hypothesized that future orientation is comprised of eight distinct components- future extension, domain, detail, number of cognitions, affect, motivation, sequence of events, and confidence of in achievement (i.e., control) based on the comprehensive definition provided by Trommsdorff (1983). Using data collected from an undergraduate sample, a measurement model of future orientation was developed, testing lower-order and higher-order factor structures to explore how indicators of future orientation drawn from multiple theories relate to one another. Further, correlates of future orientation were examined in the cross-sectional data to establish construct validity and strengthen the operational definition of future orientation. The hypothesized factor structure of future orientation is provided in Figure 1, and suggests that each of the eight latent dimensions of future orientation, assessed using multiple items, contributes to a higher-order latent future orientation factor. In Table 2, sample items for each of the domains of future orientation are provided, along with a description of the source of the

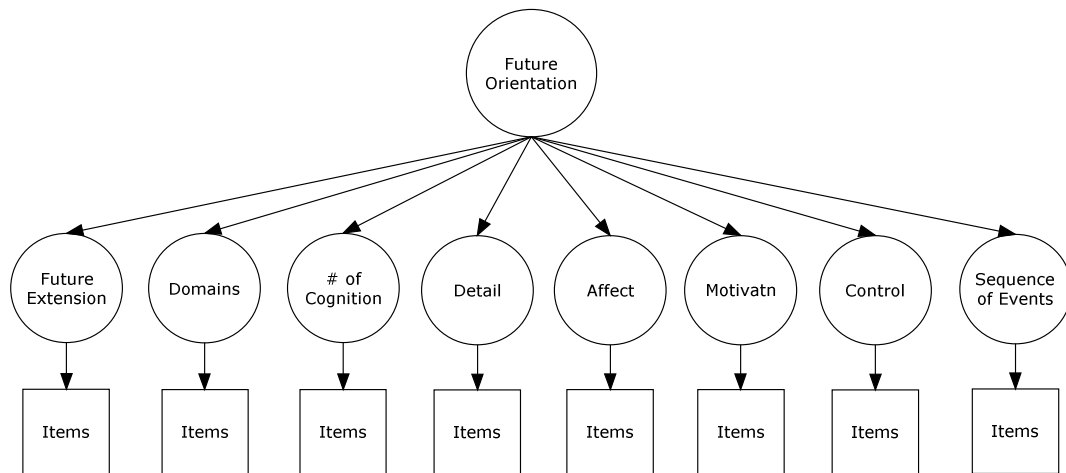
Table 2. Sample items to be used as indicators of Future Orientation sub-scales

Sub-scale	Sample Item	Measure drawn from
Future Extension	At what age to you anticipate completing ___ goal?	Future Time Perspective (Trommsdorff, 1983)
# Cognitions within each Domain*	What kind of work do you think you will probably do in the future? (Occupational domain)	Occupational expectations (Gottfredson, 1981)
# Cognitions	What do you expect to have happen in your future?	Possible Selves (Markus & Nurius, 1986)
Detail	I have clear plans for achieving this future possibility	Prospective Life Course Questionnaire (Seginer et al., 1999)
Affect	What do you fear will happen to you in the future?	Possible Selves (Markus & Nurius, 1986)
Motivation	I will keep working at a difficult, boring task if I know it will help me get ahead later	Future Outlook Inventory (Cauffman & Woolard, 1999)
Control	What effect will your personal effort have on making this goal happen?	Prospective Life Course Questionnaire (Seginer et al., 1999)
Sequence of Events	Use future-extension questions to identify anticipated order of achievement	Future Time Perspective (Trommsdorff, 1983)

* NOTE: for number of cognitions within a domain, each participant will be given the opportunity to provide as many cognitions as they wish about each of 6 domains of future orientation proposed by Unemori et al. (2004). The number of cognitions reported within each domain will be recorded and used as indicators of this factor. As part of future research, higher-order factor analyses will be estimated separately for each domain, to test whether structure of future orientation varies by domain.

item. As can be seen from the figure and table, items are being drawn across various measures of future orientation. If this factor structure holds, it would be the first empirical evidence offered in support of a comprehensive model of future orientation, and would provide a way of organizing the literature into a more cohesive set of findings.

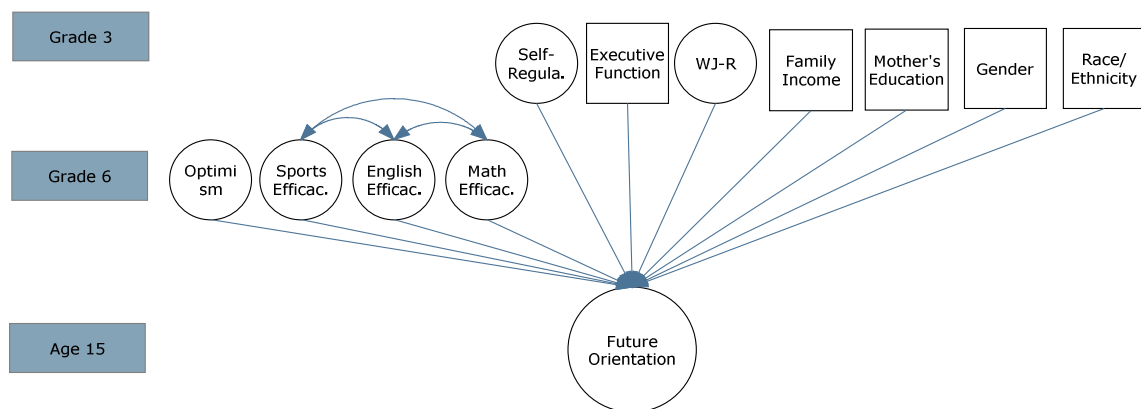
Figure 1. Proposed Factor Structure of Future Orientation tested in Study 1



Study 2. It was hypothesized that the measure of future orientation used in the SECCYD is comprised of three distinct but related components of future orientation: future extension, motivation, and control (NOTE: other aspects of future orientation are not measured with the SECCYD). It was further hypothesized that poverty, executive function, self-regulation, optimism, and self-efficacy measured in grades 3 and 6 would predict the Future Outlook Inventory at age 15. Executive function and self-regulation were thought to contribute to the capacity for future orientation, while poverty, self-efficacy, and optimism likely contribute to individual differences in the content of future orientation. Unfortunately, it is statistically impossible to distinguish a predictor of the ability to orient toward the future from a predictor of individual differences in future

orientation using these data. It was also possible that these constructs would predict some, but not all, of the three components of future orientation assessed in the SECCYD. Differences in antecedents of each component of future orientation were tested, but no specific hypotheses were made. The hypothesized analytic model for Study 2 is provided in Figure 2.

Figure 2. Proposed Analytic Model Predicting Future Orientation at age 15.



In summary, the purpose of this dissertation is to address two questions derived from the future orientation literature, using two studies. The first study explores whether multiple conceptualizations of future orientation can be used to create a unified definition that is empirically supported, and draws from Trommsdorff's (1983) definition as well as measures from multiple theoretical perspectives on future orientation. Study two identifies potential underlying factors that predict future orientation in adolescence, based on associations established in the literature. Chapter two includes a description of the methods and results for study one, as well as a brief discussion of findings. Chapter three is dedicated to a summary of methods, results, and a brief discussion of study two.

Finally, chapter four includes a lengthier discussion of the findings from both studies, a comparison of findings across the two studies, and concludes with limitations and areas for future research.

Chapter 2

Study 1: Constructing a Model of Future Orientation

The purpose of Study 1 is to explore whether Trommsdorff's (1983) multidimensional definition of future orientation is empirically supported, using measures from five different theoretical perspectives of future orientation. If the structure holds and items from a variety of measures can be used as indicators of the same latent factors, this would provide some initial evidence to suggest that theories, or at least domains captured within a theory, may be comparable and that discussions of future orientation are generalizable across the current literature.

Method

Participants. Undergraduates were invited to participate in this study and were compensated either course or extra credit points in their psychology courses for participating. They ranged in age from 18 to 31, with a mean age of 20.09 (SD = 3.13). One participant reported an age of 60, and was excluded from the analyses. Approximately 75% of participants were women, and 85% of the sample self-identified as White, non-Hispanic. The remaining 15% self-identified as Hispanic/Latino (5%), Black (2%), Asian (6%), Native American/American Indian (1%), and Other (1%). The majority of participants (42%) identified themselves as freshmen in college. Further, most students were either unemployed (46.5%) or employed for less than 20 hours per week (41.2%). Approximately 80% of participants had mothers who attended some college or had received a college degree, and 75% had fathers who had attended some college or received a college degree. Finally, 75% of participants identified their family of origin as being "middle income."

Procedure. Undergraduates at the University of Nebraska-Lincoln were recruited to participate in Study 1 using the undergraduate participant pool, and were compensated with two credits that either met requirements or were considered extra credit for their classes, as determined by course instructors. A total of 284 students volunteered to participate, with one student declining participation after reading the consent form. Power analyses had indicated that 191 participants would be necessary to detect the smallest effect size found in previous studies of future orientation with adolescents and young adults. The questionnaire, which was available online, took approximately one hour for students to complete.

Measures. The questionnaire used in Study 1 consisted of measures of demographic variables and future orientation. Constructs known to relate to future orientation, including self-regulation (Robbins & Bryan, 2004), optimism (Seginer, 2000), self-efficacy (Pulkkinen & Ronka, 1994), and identity (Nurmi, 2004), were also measured. A copy of the survey used in this study is provided in Appendix A, with items for all predictors and the occupational domain of future orientation (other domains available by request).

Participant Background. Participants were asked to report their gender with the question “What is your gender?” followed by the options Man (1), Woman (2), and Prefer not to answer (3). The third option was not chosen by any participants. Race and ethnicity were measured using a check-list format with the question “Which of the following racial/ethnic groups are you a member of? Check all that apply” followed by options for White, non-Hispanic, White, Hispanic/Latino, Black, Asian/Pacific Islander,

Native American, Other, and Prefer not to specify. Age was assessed using the question “What is your age?” followed by a line for participant’s to respond.

Participants’ educational history was also assessed. Participants were asked “How many years have you been attending college?” with a blank field to capture responses. Participants were also asked what year they were in school, with responses for Freshman (1), Sophomore (2), Junior (3), Senior (4), and Other (5). Participants reported their college grade point average (GPA) with the question “What is your current Grade Point Average?” followed by blank fields for entering responses. These items were used as indicators of college experience and academic investment, which is likely important for educational goals.

Economic history was assessed using questions about employment, parent education, and parent income. Participants were asked “What is your current employment status?” with responses from 1 (*Not currently employed*) to 4 (*Employed full-time, 40 or more hours per week*). Parent education was assessed separately for mother and father with responses from 1 (*Attended but did not complete high school*) to 6 (*Completed graduate school/professional training*). These items were used as proxies for socio-economic status.

Future Orientation. Items from the Future Outlook Inventory (Cauffman & Woolard, 1999), Possible Selves Theory (Markus & Nurius, 1986), the Prospective Life Course Questionnaire (Seginer et al., 1999), Future Time Perspective (Trommsdorff, 1983), and the Aspirations/Expectations (e.g., Gottfredson, 1981) were used to assess each of the dimensions of future orientation (i.e., future extension, domain, affect, detail, motivation, control, sequence of events, number of cognitions) proposed by Trommsdorff

(1983). Table 3 provides sample items from these scales that would contribute to each of the eight lower order factors of future orientation. Items were assigned as indicators of each dimension based on the consistency with which the items appeared to align with dimensions on face validity. This approach allowed for the detection of similarities in dimensions addressed across the measures of future orientation currently used in a variety of literatures. Each of the eight dimensions are described below, with item information for each.

Table 3. Sample items to be used as indicators of Future Orientation sub-scales

Sub-scale	Number of Items	Sample Item	Measure drawn from
Future Extension	18	At what age to you anticipate completing ___ goal?	Future Time Perspective; Future Outlook Inventory
Number of cognitions within each domain	5	What kind of work do you think you will probably do in the future? (Occupational domain)	Aspirations and Expectations; Possible Selves
Detail	75	I have clear plans for achieving this future possibility	Prospective Life Course Questionnaire
Motivation	19	I will keep working at a difficult, boring task if I know it will help me get ahead later	Future Outlook Inventory; Prospective Life Course Questionnaire
Control	20	What effect will your personal effort have on making this goal happen?	Prospective Life Course Questionnaire; Future Outlook Inventory
Sequence of Events	4	Use future-extension questions to identify anticipated order of achievement	Future Time Perspective; Future Outlook Inventory

Extension. Extension was hypothesized to be comprised of 18 items: three items from the Future Outlook Inventory (Cauffman & Woolard, 1999), and 3 items within each of the 5 domains of future orientation assessed (i.e., education, occupation) asking participants how long they anticipate it will take for the future-oriented cognition they provided to occur (timing; Trommsdorff, 1983). Items from the Future Outlook Inventory contributing to extension included “I think about how things might be in the future,” “I can see my life 10 years from now,” and “I think often about what tomorrow will bring.” Participants’ responses to the question about timing ranged from “already happened” or “currently happening,” which were both coded as 0, to responses in months or years. In the instance of feared events across domains, between 9% and 18% of participants responded that they believed the event would never happen, depending on the domain (e.g., twice as many participants reported “never” to occupation than to education). Those responses were excluded from these analyses.

Number of cognitions. To capture the number of cognitions provided by participants, binary variables were first created for each possible field of entry (e.g., hoped-for occupational entry) to count the number of cognitions provided within a given domain (e.g., occupation) as measured using the model for Possible Selves (Markus & Nurius, 1986). Responses were reviewed to ensure that the binary coding reflected a meaningful entry (i.e., “I don’t have one” would not be counted as a response). Meaningful entries were then summed to create a continuous variable. Participants could have reported between zero and six future-oriented cognitions within a domain, for a total of 30 possible cognitions total. The total number of items within each of the five

domains was then used as indicators of a latent construct, and ranged from 0 to 6 cognitions within a given domain.

Detail. Items used to measure detail, or elaboration of a particular future-oriented cognition, is based on Hopes and Fears, and came from the Prospective Life Course Questionnaire (Seginer et al., 1999), and included five items across five domains (e.g., relationships) and three affects (e.g., feared). The items used for each domain included “How much have you thought about how likely it is that this will happen to you?” “How often do you find yourself thinking about that future possibility?” “How often do you talk with others about that future possibility?” “I am making serious preparation for that future possibility.” and “I have clear plans for achieving [avoiding for feared selves] this future possibility.

Motivation. Motivation, or how much an individual is willing to sacrifice or work hard to attain/avoid a future-oriented cognition, was assessed using four items from the Future Outlook Inventory (Cauffman & Woolard, 1999) and one item from the Prospective Life Course Questionnaire (Seginer et al., 1999). These items included “To what extent is this worth your effort?” which was given after each Possible Selves measure (Markus & Nurius, 1986), “I will keep working at difficult, boring tasks if I know they will help me get ahead later,” “I will give up on happiness now so I can get what I want in the future,” “I would rather save money for a rainy day than spend it now on something fun,” and “I don’t think it’s worth it to worry about what I can’t predict.”

Control. Control was modeled using one item from the Prospective Life Course Questionnaire (Seginer et al., 1999) and five items from the Future Outlook Inventory (Cauffman & Woolard, 1999). These included the items “What effect will your personal

effort have on making this happen [preventing this from happening for feared]” administered after each Possible Selves measure (Markus & Nurius, 1986), “I make lists of things to do,” “Before making a decision, I weigh the good versus the bad,” “I think about the consequences before I do something,” “I think things work out better when you’ve planned for them,” and “I run through all of the possible outcomes of a decision in my mind before I decide what to do.”

Sequence of events. To assess the sequence of events, three items from the Future Outlook Inventory (Cauffman & Woolard, 1999) were used, and included “I like to plan things out one step at a time,” “I make decisions and act without thinking about the big picture,” and “I’m pretty good at seeing in advance how things will play out.”

Ordered coding of the anticipated timing of events across domains (e.g., education before or after occupation) and within affect (e.g., order of hoped-for selves, order of expected selves) was also used. Specifically, patterns for the order of educational, occupational and relationships domains were identified based on participant responses to the question about the timing of future-oriented cognitions. These patterns were then grouped into four categories that ranged from simultaneous transitions to the most traditional order of transitions (Hogan & Astone, 1986): (1) all transitions occurring simultaneously (e.g., participants anticipated hoped-for cognitions in education, occupation, and relationships to all occur within the same year in the future); (2) transitions in occupation occurring prior to transitions in education (e.g., occupational expectation in 3 years, educational expectation in 5 years) with relationships happening prior to either education or occupation or both; (3) transition in education occurring prior to transitions in occupation (e.g., educational expectation in 3 years, occupational

expectation in 5 years) with relationships happening prior to either education or occupation or both; or (4) educational transition followed by occupational transition followed by relationship transition. These ordered categories represent sequence of transitions in these domains from least prototypical to most prototypical (Schoon, Ross, & Martin, 2009).

Domain and Affect. Due to the measurement of future-oriented cognitions within domain and affect, additional factors reflecting these areas could not be created.

Predictors and correlates of future orientation. Constructs known to relate to future orientation were assessed and modeled, and then used as predictors of future orientation and each of the dimensions. This includes self-regulation, optimism, self-efficacy, and identity.

Self-regulation. Self regulation was assessed using the Adolescent Self-Regulatory Inventory (ASRI, Moilanen, 2007), a 27-item questionnaire designed to capture both short- and long-term regulation ($\alpha = .70$ and $.82$, respectively, reported from previous research). Responses to short-term items (e.g., “When I’m bored I fidget or can’t sit still”) and long-term items (e.g., “I can find a way to stick with my plans and goals, even when it’s tough,”) on a 5-point Likert-type scale from 1 (not at all true for me) to 5 (really true for me). This measure has been previously validated, with requirements for concurrent, construct, and incremental validity met in a sample of adolescents (Moilanen, 2007).

Optimism. Optimism was assessed using the Life Orientation Test-Revised (LOT-R; Scheier, Carver, & Bridges, 1994), also used in Study 2. Responses to this 10-item questionnaire (e.g., “I expect things to go bad for me; $\alpha = .73$, reported in previous

research) were on a 4-point Likert-type scale from 1 (*not at all*) to 4 (*a lot*). The LOT-R has demonstrated both predictive and discriminant validity in relation to depression, neuroticism, anxiety, and self-esteem (Scheier et al., 1994).

Self-efficacy. To assess self-efficacy, a measure adapted from Jacobs, Lanza, Osgood, Eccles, & Wigfield (2002) was used in order to parallel the design of Study 2. Self-efficacy for each domain of future orientation (i.e., occupation, education) was assessed using four questions (e.g., “How good at your desired occupation are you?”) with responses from 1 [not at all good] to 7 [very good]. Jacobs and colleagues report a range of alphas from .78 to .85 depending on the domain.

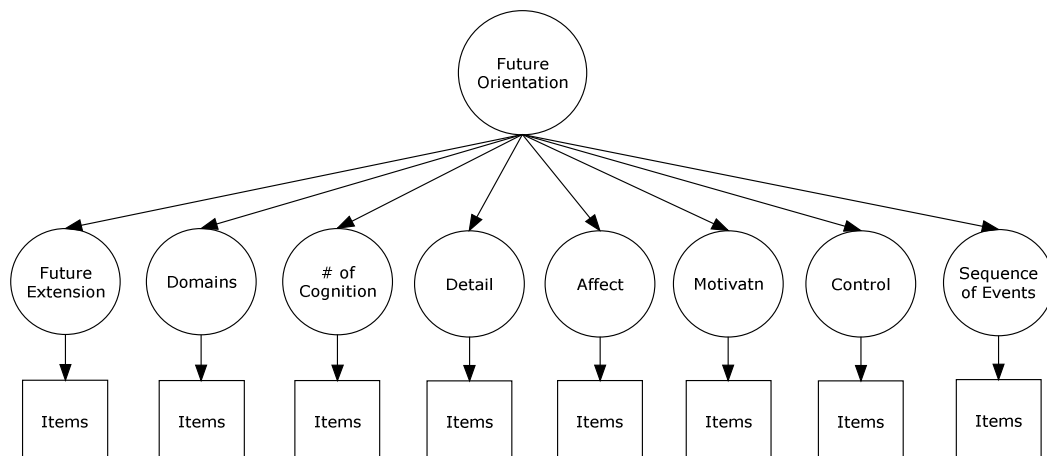
Identity. To assess identity, the Extended Objective Measure of Ego Identity Status (EOM-EIS; Bennion & Adams, 1986) was used. This 64-item measure assesses dimensions of exploration and commitment in both ideological and interpersonal content domains of identity (e.g., Occupational Diffusion sample item - “I haven’t chosen the occupation I really want to get into, and I’m just working at whatever is available until something better comes along.”). Response options range from 1 (strongly agree) to 6 (strongly disagree). The measure consists of eight subscales: achievement, moratorium, foreclosure, and diffusion in both ideology and interpersonal domains (α ranges from .58 to .80 in previous research). Analyses have been conducted and provide evidence for the validity of this measure with college students (see Bennion & Adams, 1986 for review).

To reduce the burden of completing this study on participants, items were reduced from 64 to 47. Items in the following domains were retained, as they align with the domains of future orientation assessed above: occupation, personal ideology, recreational activities, and relationships.

Analytic Plan

Analyses proceeded in four general stages. First, the factor structure for each dimension of future orientation was estimated. This was followed by a test of the higher order future orientation factor. Measurement models were then estimated for each of the constructs associated with future orientation. Finally, a model was estimated to explore how predictors related to future orientation. Informed by bivariate analyses, confirmatory factor analyses (CFA) were conducted in Mplus 5.0 to estimate factor structures for each of the hypothesized dimensions of future orientation. Model fit was assessed using significance values for chi square significance tests and cut-off values of .95 and above for CFI and .06 or below for RMSEA as indications of good fit (Hu & Bentler, 1995), and values of .90 and above for CFI and .10 and above for RMSEA as indications of acceptable fit (Barrett, 2006). It was hypothesized that this structure would be higher-ordered, where future orientation is a higher-order latent factor made up of lower-order factors that reflect each of the components of future orientation as proposed by Trommsdorff (1983; see Figure 3).

Figure 3. Hypothesized Factor Structure of Future Orientation



Initially, a separate CFA was conducted for each of the lower-order factors in the model. Indicators of each lower-order factor were items from measures of previously discussed theories/models of future orientation. After an appropriate measurement model for each lower-order factor was identified, a higher-order factor model was estimated, where the lower-order factors were used as indicators of the higher-order latent future orientation factor. The purpose of this model was to estimate whether each of the factors proposed by Trommsdorff are dimensions of the same overall construct.

Once a factor structure for future orientation was identified, relations between future orientation and demographics, self-regulation, optimism, self-efficacy, and identity were explored, in order to test relations between these constructs and the higher-order factor and sub-factors that make up future orientation. CFAs were conducted to estimate appropriate latent models for self-regulation, optimism, self-efficacy, and identity separately. These measures were then used to predict future orientation using a Structural Equation Modeling (SEM) framework. With regard to demographics, both participant age and length of time in school were included in the SEM models to account for the variability in age and college experience of the sample. All continuous variables were tested for skewness, and were found to be in ranges that would indicate a normal distribution, with guidelines of less than an absolute value of 2 for skewness when using multivariate analyses in Mplus (Muthen & Kaplan, 1985).

Results

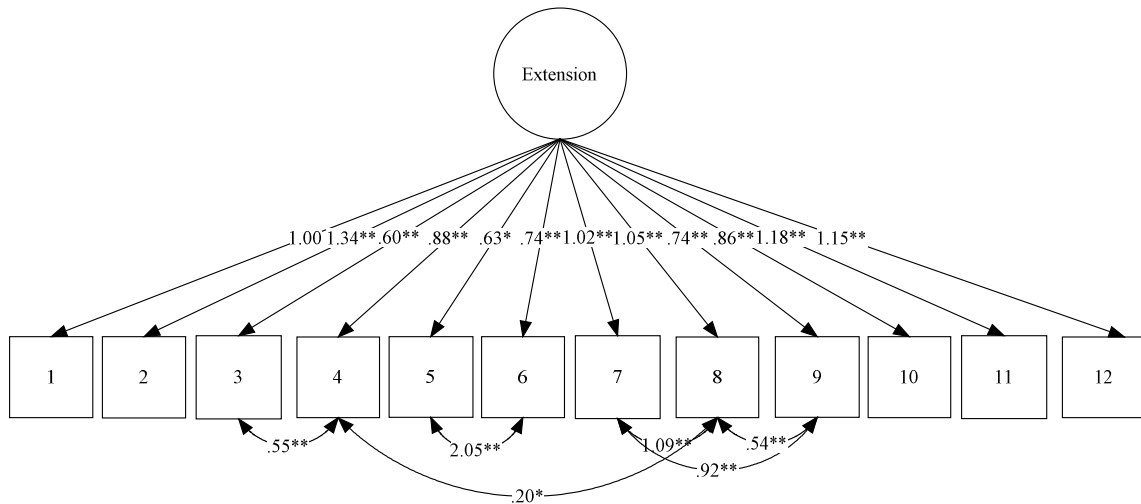
Results from univariate and bivariate analyses are provided in Tables B1 and B2. Inter-item correlations among future orientation variables across all dimension (e.g., extension, motivation) ranged from .01 to .99. Correlations between future orientation

items and participant background items ranged from .01 to .84. All of the demographic items were correlated with at least one of the future orientation items. Further, the items expected to load on each of the dimensions of future orientation were significantly correlated (see Tables B3-B8). Based on this information, analyses proceeded based on the analytic plan.

Modeling future orientation. Items measuring future orientation were classified into each of the eight components of future orientation based on the match between the item and each of the dimensions of future orientation. Each dimension of future orientation was then modeled separately, followed by a model of the higher-order factor.

Extension. Using CFA, a model was estimated with each of the 18 items described above loading onto the latent factor of extension. In order to achieve acceptable fit, additional correlated error terms were included between items across domains (i.e., all occupational items correlated, all educational items correlated) and across affect (i.e., all hoped for error terms correlated, all expected error terms correlated). Given that two of the eight dimensions, domain and affect, could not be separated from the other six, these additional correlations were not unexpected. Interestingly, none of the items from the relationship domain significantly loaded onto extension and they were therefore excluded. Timing of feared future events in the domains of occupation, education, and recreation were also not significant indicators and were thus excluded. The final model had acceptable fit, $\chi^2(62) = 136.81, p < .01$, CFI = .90, RMSEA = .10, SRMR = .10. The model is depicted in Figure 4, and information on factor loadings is provided in Table B9.

Figure 4. Model estimated for future extension

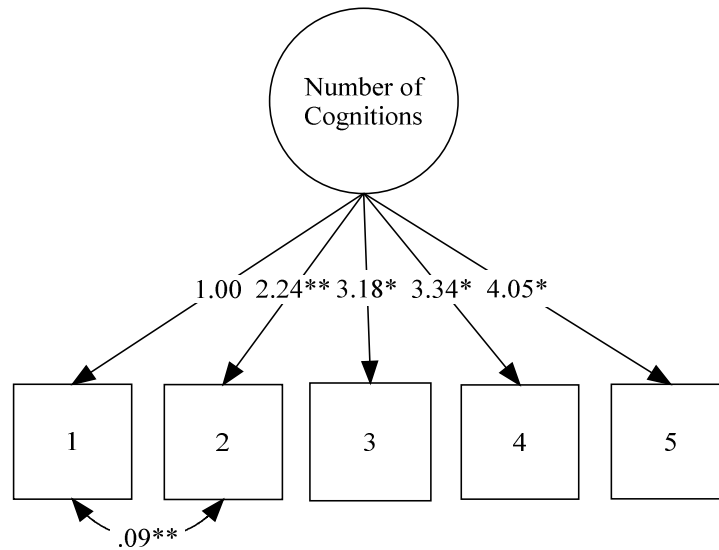


* $p < .05$ ** $p < .01$

Number of cognitions. Results from a CFA conducted to estimate the measurement of number of cognitions had good fit, $\chi^2(4) = 5.02, p = .28, CFI = .99, RMSEA = .03, SRMR = .02$. An additional correlated error term between the number of cognitions in occupational and educational domains was added based on model modification indices and established relations between occupational and educational domains (Kalakoski & Nurmi, 1998). The final model is depicted in Figure 5, with item loadings in Table B10.

Detail. To model detail, a higher-order latent factor was estimated, with domain-specific items (e.g., items about occupation) loading on each of five lower-order factors. Each lower-order factor had 15 items as indicators. Additional correlated error terms were included within each domain for items with the same affect (e.g., all occupational hoped-for items had correlated error terms among them). Further, the lower-order

Figure 5. Model estimated for the number of future-oriented cognitions



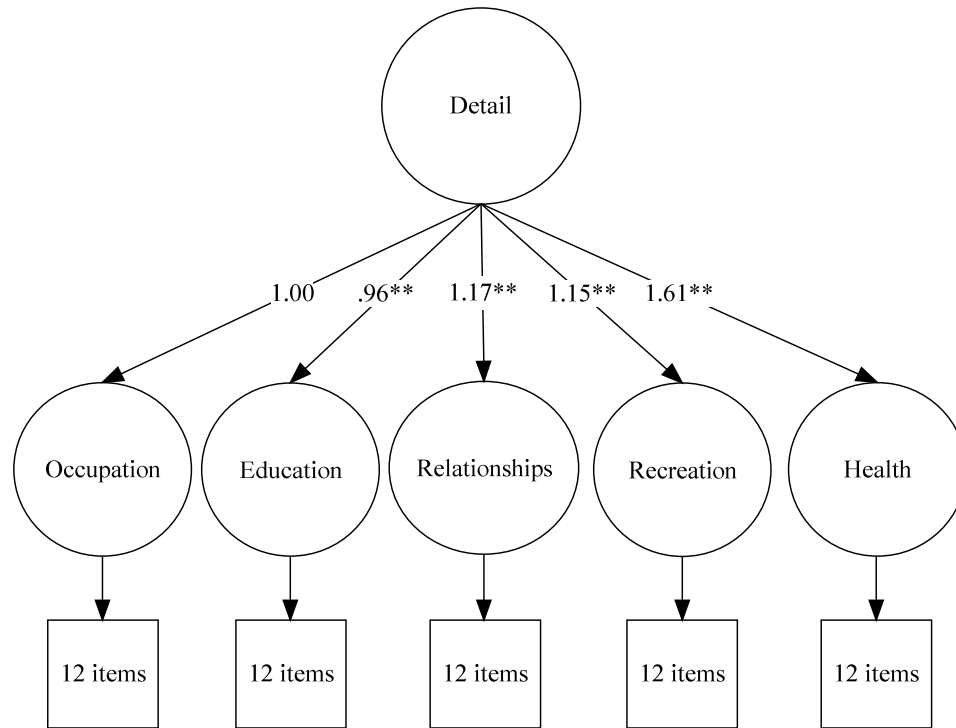
* $p < .05$ ** $p < .01$

occupational and educational factors were correlated, based on model modification indices and conceptual links between education and occupation.

The final model estimated for detail is depicted in Figure 6, with item and lower-order factor information provided in Table B11. This model had acceptable fit, $\chi^2(1548) = 2827.67, p < .01, CFI = .91, RMSEA = .06, SRMR = .08$. Each of the 15 items significantly and positively loaded on the lower-order factors, and each lower-order factor significantly and positively loaded on the higher-order detail factor.

Motivation. Using CFA, a model was estimated with the 19 items described above as indicators. Fifteen of the items were repeated across domain and affect (i.e., question asked for each response to possible selves questions); the extremely high correlation across these items resulted a lack of significance for the four items from the Future Outlook Inventory, the need for extensive correlated error terms, and poor model

Figure 6. Model estimated for detail about future-oriented cognitions

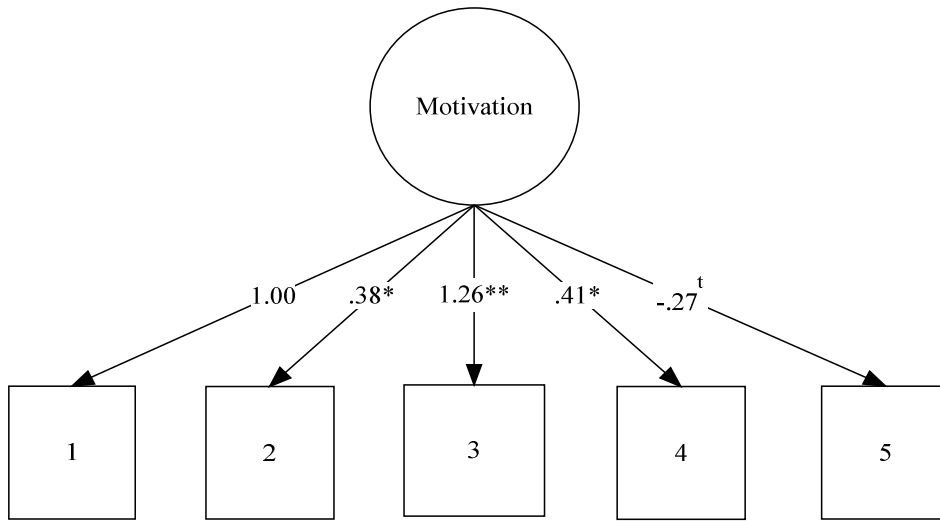


* $p < .05$ ** $p < .01$

fit. For this reason, a separate model was estimated using only the repeated items. That model had good fit, $\chi^2(105) = 1020.53$, $p < .01$, CFI = .97, RMSEA = .06, SRMR = .08. A factor score from that model was saved and then used in the model estimated for motivation, along with the four items from the Future Outlook Inventory.

The model for motivation, depicted in Figure 7, had good fit, $\chi^2(5) = 6.43$, $p = .27$, CFI = .95, RMSEA = .05, SRMR = .05. However, two of the five items, the factor score for the item “To what extent is this worth your effort?” and the item “I don’t think it’s worth it to worry about what I can’t predict,” did not significantly load onto the latent motivation factor, and were dropped. Item-level information is provided in Table B12.

Figure 7. Model estimated for motivation to achieve future-oriented cognitions



* p < .05 ** p < .01

Control. A higher-order latent model was estimated with the 15 repeated items from the Prospective Life Course Questionnaire loading on one lower-order factor, and 5

items from the Future Outlook Inventory loading on the other lower-order factor. This model had good fit, χ^2 (124) = 172.28, $p < .01$, CFI = .95, RMSEA = .06, SRMR = .08.

Item-level information is provided in Table B13, and the model is depicted in Figure 8. All items loaded positively on the lower order factor. Because the higher-order model was under-identified, both lower-order factor loadings were fixed to 1 (Brown, 2006).

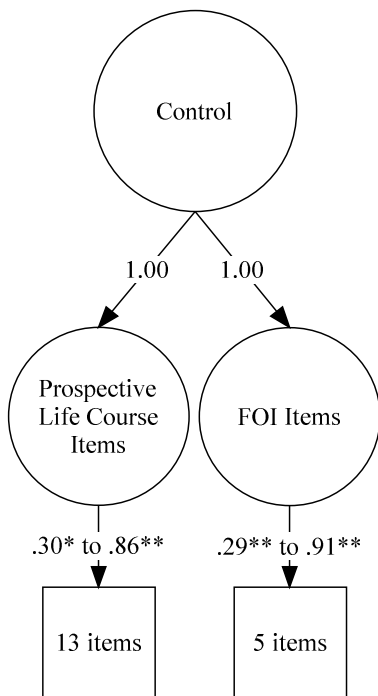
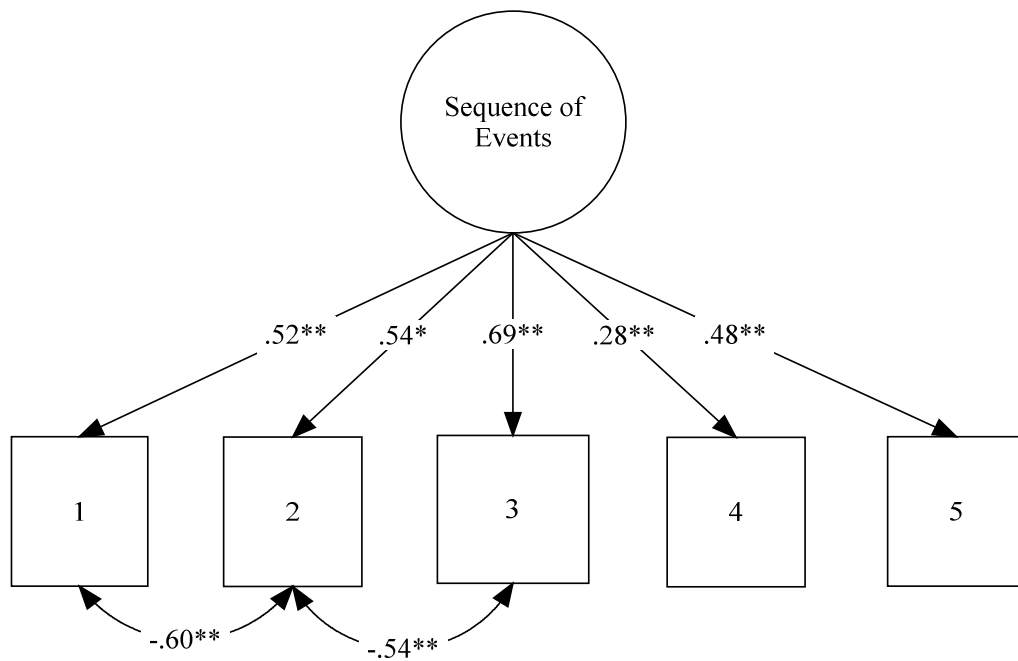


Figure 8. Model estimated for belief about control of future-oriented cognition; * p < .05 ** p < .01

Sequence of events. A measurement model was estimated that included items from the Future Outlook Inventory, as well as a rating of least traditional to most traditional sequence of transitions across occupation, education, and relationships (described above). The model had good fit, $\chi^2(7) = 5.50$, $p = .60$, CFI = .99, RMSEA = .01, SRMR = .05, and is depicted in Figure 9 with item-level information in Table B14. The only item that did not load onto the factor was sequence of hoped for selves.

Figure 9. Model estimated for sequence of future-oriented events



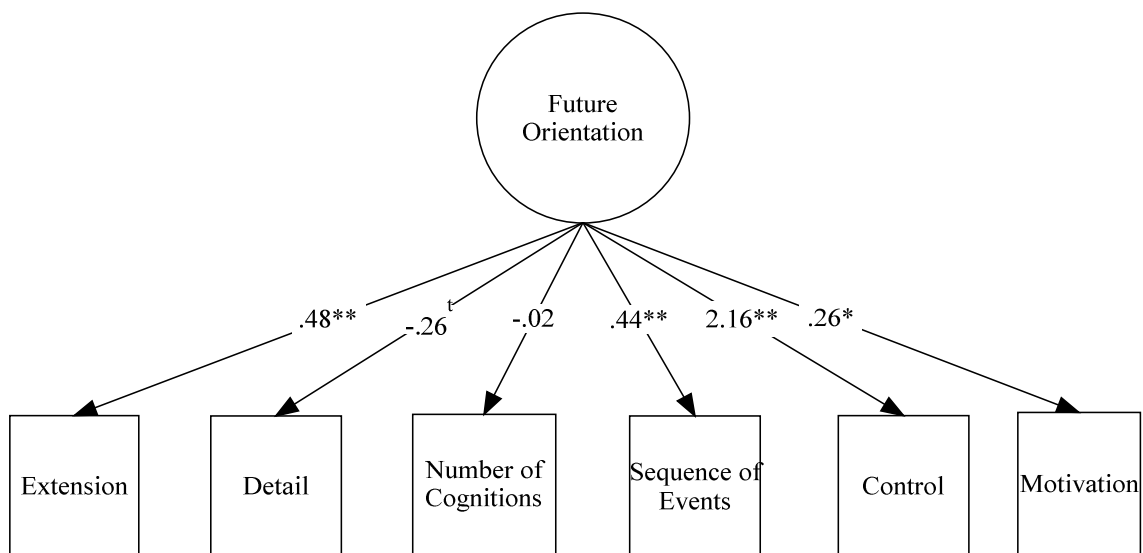
* $p < .05$ ** $p < .01$

The full model. It had initially been hypothesized that each of the components of future orientation would create a lower-order factor that would then load on the higher-order factor of future orientation. However, in modeling the lower-order factors, many of the components required more than one level (i.e., the factors were higher-order

themselves). Due to the challenges associated with estimating a three-level factor in Mplus, factor scores were output and saved for each of the six components of future orientation estimated, and those factor scores were used as indicators of future orientation. Modeling with factor scores is not ideal, as it assumes that there is no error in measurement (i.e., factor scores set error to 0). However, factor scores do allow items to have a differential impact on the overall score when it is estimated, and for this reason factor scores are a better alternative than averaging or summing across items (Kline, 2005).

Future orientation was therefore estimated using CFA with six factor scores as indicators: extension, number of cognitions, detail, motivation, control, and sequence of events. The model is depicted in Figure 10 and Table B15. It had acceptable fit, $\chi^2(8) = 12.18, p = .14, CFI = .90, RMSEA = .07, SRMR = .05$. Of the six items in the model,

Figure 10. Model estimated for future orientation, using factor scores



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

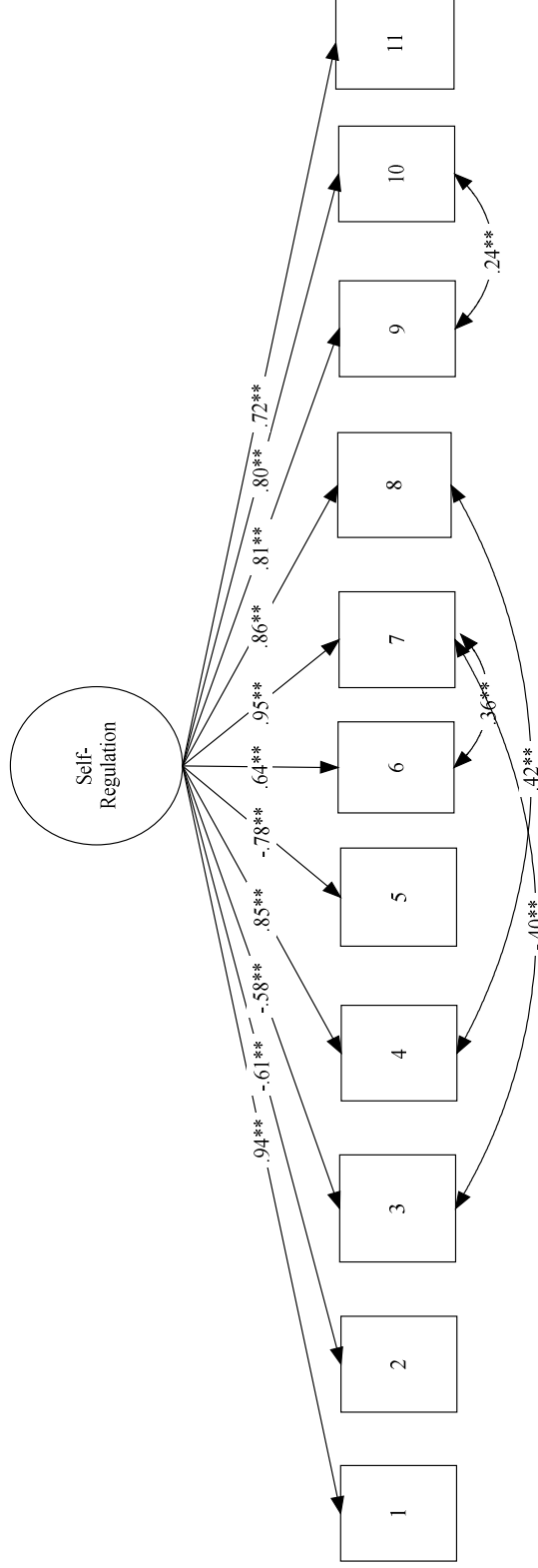
detail and number of cognitions did not load positively or significantly onto the latent future orientation factor. These findings would suggest that the single, higher-order factor of future orientation as proposed by Trommsdorff (1983) does not hold, at least for this sample. For this reason, in subsequent analyses the six dimensions of future orientation are included without the higher order factor in subsequent analyses, with correlations between dimensions included.

Correlates of future orientation. To further examine whether dimensions of future orientation described above should be considered separately rather than part of a larger future orientation construct, measures known to relate to future orientation were included as predictors of each of the dimensions of future orientation. As a preliminary step, CFAs were conducted for each latent construct to ensure that measures had been modeled appropriately. These latent constructs include self-regulation, optimism, self-efficacy, identity, with measurement models described below.

Self-regulation. Self-regulation was assessed using 27 items from the ASRI (Moilanen, 2007). An initial higher-order model was estimated that included items loading onto two lower-order factors: 13 items loading onto short-term regulation and 14 items loading onto long-term regulation, as developed and validated by Moilanen (2007). Non-significant items were removed one by one from the model until a measurement model with significant items remained. Of the 27 items initially in the model, 11 items remained as significant indicators of self-regulation. Five of those items were indicators of short-term regulation, and six were indicators of long-term regulation, providing some evidence that even with the reduced number of items, the model is still capturing both aspects of the construct. These items were then combined to load on a single latent factor

rather than a higher-order factor, to simplify the estimation process when self-regulation was used to predict future orientation. The measurement model and item-level information is provided in Figure 11 and Table B16. This model had acceptable fit, $\chi^2(39) = 72.86, p < .01, CFI = .92, RMSEA = .09, SRMR = .06$.

Figure 11. Model estimated for self-regulation



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

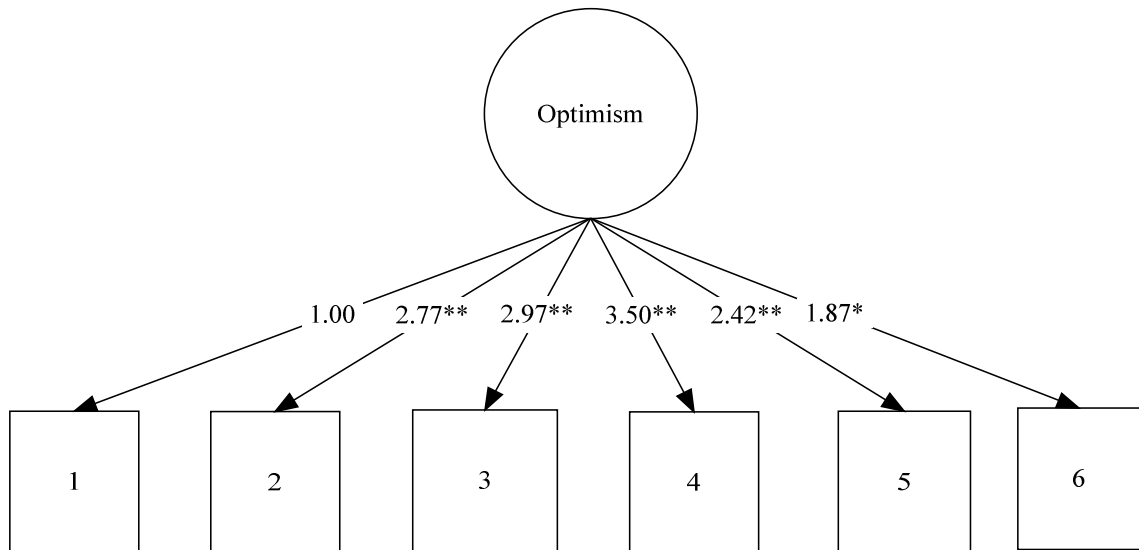
To ensure that this was the best measurement model available for this sample, a separate series of measurement models were estimated. A model of short-term regulation (13 items) was estimated. All items significantly loaded onto the latent factor; however, even after all model modifications were added, the model fit poorly, $\chi^2(61) = 126.50, p < .01, CFI = .79, RMSEA = .10, SRMR = .09$. A model for long-term regulation (14 items) was also estimated. Of the 14 items, 9 loaded significantly. Each non-significant item was dropped, one by one, until only 9 significant items remained in the model. After including correlated error terms between two sets of items, the model fit well, $\chi^2(25) = 24.58, p = .49, CFI = .99, RMSEA = .01, SRMR = .04$.

These dramatically different models result in two options for representing self-regulation: one where both short-term and long-term regulation is represented, using 11 items; and another where only long-term regulation is represented, using 9 items. Because the model representing both short- and long-term regulation most closely matches what was initially validated with the ASRI, that model of self-regulation was used in subsequent analyses.

Optimism. Optimism was assessed using 10 items from the LOT-R (Scheier et al., 1994). An initial model was estimated that included all 10 items, and non-significant items were removed from the model until a measurement model with significant items remained. Of the 10 items initially in the model, 6 items remained as significant indicators of optimism. The four items dropped from the model were either redundant with items kept in the model (e.g., “I count on good things to happen to me” was dropped, but similar to “I expect good things to happen to me” which remained in the model) or were less closely tied to the construct (e.g., “It is easy for me to relax” was

dropped from the model). The measurement model and item-level information is provided in Figure 12 and Table B17. This model had good fit, $\chi^2(9) = 14.60, p = .10$, CFI = .97, RMSEA = .08, SRMR = .04.

Figure 12. Model estimated for optimism

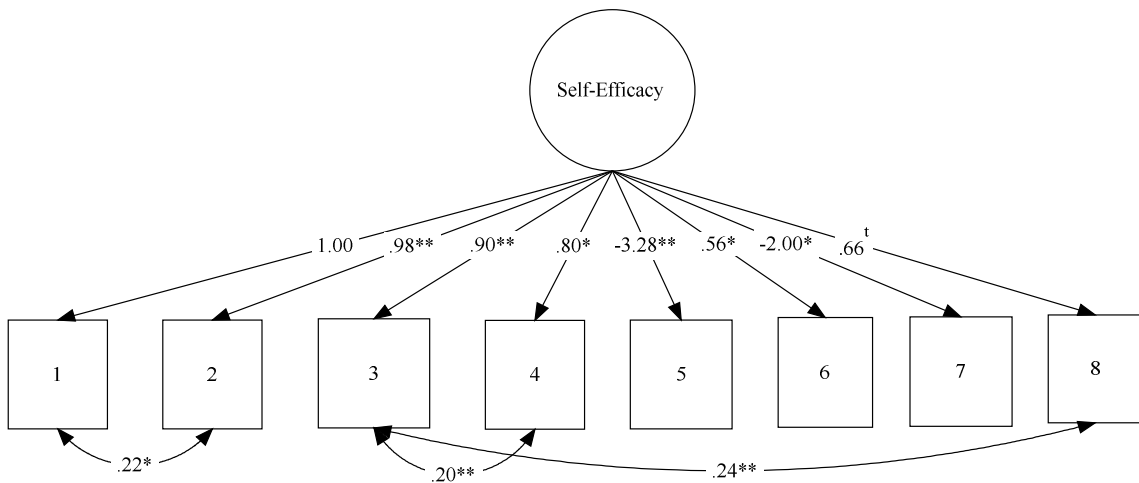


* $p < .05$ ** $p < .01$

Self-efficacy. Self-efficacy in five domains designed to match the domains of future orientation (e.g., education, occupation) was assessed using 4 items adapted from a measure by Jacobs and colleagues (2002). One domain, recreation, did not significantly load onto the latent factor, and was excluded from the model. Further, two of the four items measuring self-efficacy did not load on any of the domains. These items were “In general, how useful is [domain] to you?” and “For me, being good at [domain] is [...]” Thus, 8 items were included as significant indicators of self-efficacy, with two items from each of 4 domains included in the model. The measurement model and item-level

information is provided in Figure 13 and Table B18. This model had good fit, $\chi^2(14) = 18.88, p = .17, CFI = .96, RMSEA = .06, SRMR = .05$. The measurement model and item-level information is provided in Figure 13 and Table B18. This model had good fit, $\chi^2(14) = 18.88, p = .17, CFI = .96, RMSEA = .06, SRMR = .05$.

Figure 13. Model estimated for self-efficacy.

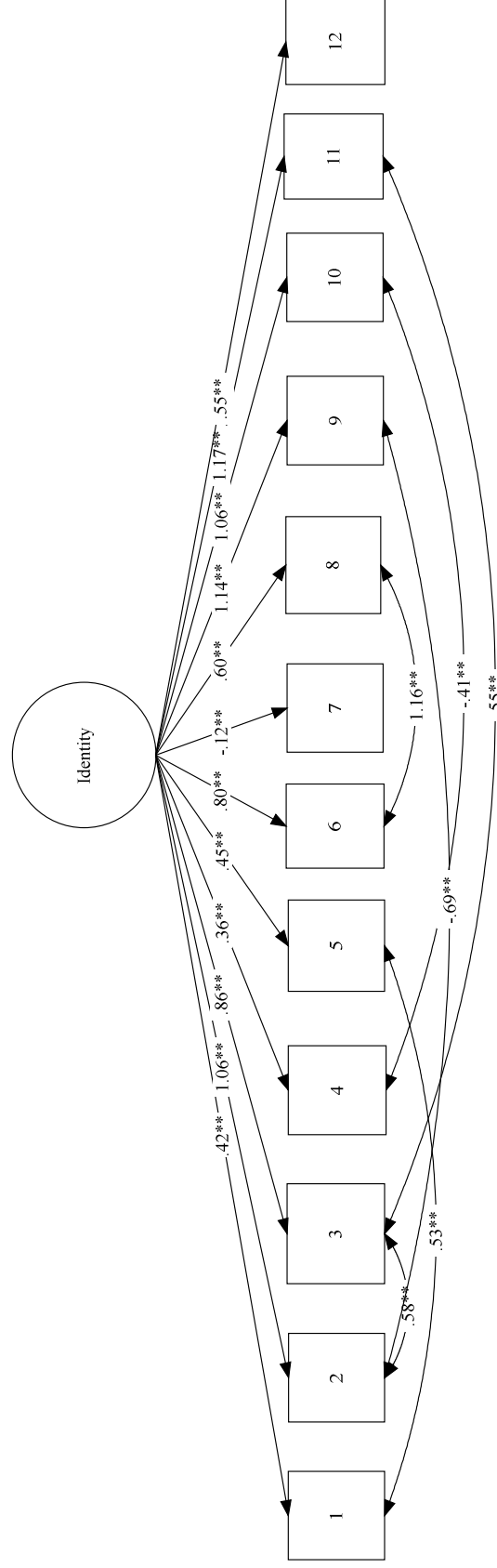


* $p < .05$ ** $p < .01$

Identity. Identity was assessed using 47 items across the domains of occupation, personal ideology, recreational activities, and relationships, taken from the EOM-EIS (Bennion & Adams, 1986). An initial higher-order model was estimated that included items loading onto each of the four domains, and non-significant items were removed from the model one by one until a measurement model with significant items remained; one item remained significant that assessed the occupational domain, two assessing

personal ideology, two assessing recreational activities, and seven assessing relationships (i.e., friendship, romantic). Further, four items represented a diffused status, four represented moratorium, two represented foreclosure, and two represented an achieved status. The measurement model and item-level information is provided in Figure 14 and Table 19. This model had acceptable fit, $\chi^2(66) = 484.28, p < .01, CFI = .90, RMSEA = .09, SRMR = .07$.

Figure 14. Model estimated for identity.



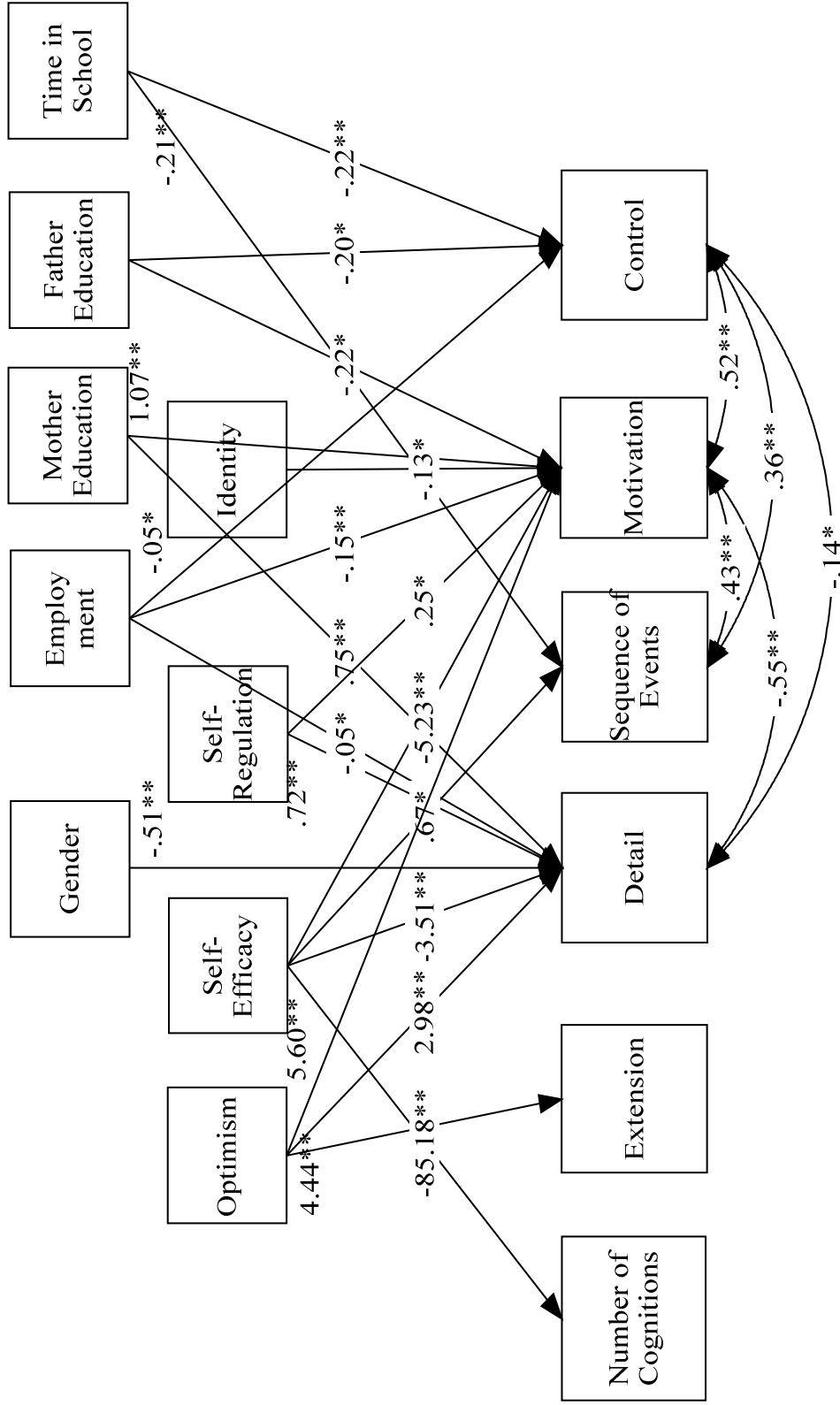
* $p < .05$ ** $p < .01$

Predicting future orientation. Participant background items, self-regulation, self-efficacy, identity, and optimism were used to predict each of the six components of future orientation described above. An initial model was estimated that used latent factors when possible; however, this model fit poorly, and required extensive correlated error terms. To address these issues, factor scores for the future orientation components and each of the latent predictors was calculated and saved for subsequent analyses.

Based on the findings that not all of the six hypothesized dimensions of future orientation loaded onto the higher-order latent factor, models were estimated where predictors loaded onto each of the dimensions without the requirement that dimensions load onto a future orientation factor. Correlations among all six components of future orientation were also estimated, to account for the relations among the constructs. Initially, a model was estimated with all possible pathways specified (i.e., fully-saturated model) to test whether (a) all predictors in fact loaded onto all of the dimensions, and (b) all dimensions were correlated with one another in the presence of predictors. Not surprisingly, not all of the dimensions were correlated, and not all predictors loaded onto all of the dimensions included. Non-significant paths were then removed from the model to allow for enough degrees of freedom to test for model fit. The model had good fit, $\chi^2(31) = 16.52, p < .01, CFI = .99, RMSEA = .01, SRMR = .03$. Information for this model is provided in Table B20 and Figure 15.

As previously mentioned, not all of these correlations among the dimensions of future orientation were significant. Specifically, extension and number of cognitions were not significantly correlated with any of the other dimensions. Detail was

Figure 15. Model using self-regulation, optimism, identity, and demographics to predict future orientation dimensions.



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

negatively correlated with control and motivation, but not with any other aspects of future orientation. Finally, sequence of events, control, and motivation were significantly and positively correlated with one another.

There were also differences in which predictors related to each of the aspects of future orientation. Extension was significantly and positively predicted by optimism, but not by any other variables. Detail was predicted by gender, where men had higher levels than women, and employment status, where full-time employment negatively related to detail. Detail was also negatively predicted by self-efficacy and positively predicted by mother's education, self-regulation, and optimism.

Number of cognitions was negatively predicted by self-efficacy, but not by any other predictors. Sequence of events was negatively related to time in school and positively related to self-efficacy, whereas control was negatively related to time in school, employment, and father's education. Finally, motivation was positively predicted by mother's education, self-regulation, and optimism, but negatively predicted by employment status, father's education, self-efficacy, and identity.

To ensure that the modified models for the predictors appropriately represented the constructs and consistently related to future orientation as would be expected, another model was estimated that used scale scores across all items for a construct, rather than the factor scores, which were based on significant items as indicated by the CFA. These results are provided in Table B21. The final model had good fit, $\chi^2(33) = 32.59, p = .49$, CFI = .99, RMSEA = .01, SRMR = .05. However, none of scale score predictors (i.e., self-regulation, self-efficacy, optimism, identity) were related to future extension, detail, number of cognitions, sequence of events, or control. The only scale score predictor to

significantly predict motivation was self-regulation, which predicted positively, consistent with the factor score used in the model described previously. Given the number of items that did not significantly load when measurement models were estimated (described above) the scale scores may include higher levels of measurement error, resulting in fewer significant results when this version of the variable is used (Brown, 2006).

Discussion

The purpose of Study 1 was to explore whether empirical evidence could be provided in support of Trommsdorff's (1983) multidimensional definition of future orientation, using measures developed and used from five different theoretical perspectives of future orientation. As was previously discussed, multiple literatures and disciplines have identified future orientation, often referred to by alternative labels and assessed with a variety of measures, as an important predictor of adult competence and attainment (Manzi et al., 2010), positive educational outcomes (Beal & Crockett, 2010), and delinquency (Oyserman & Markus, 1990). While there has been a vague sense that constructs like *possible selves* (Markus & Nurius, 1984), *aspirations* and *expectations* (Gottfredson, 1981), *hopes* and *fears* (Nurmi, 1987) are variants on a general underlying notion of future orientation, no research to date has tested whether the items from these measures are indicators of a single construct. Further, different working definitions and measures of future orientation have resulted in what could be conceptualized as a multi-dimensional construct, with dimensions included or excluded depending on the researcher examining future orientation. Trommsdorff (1983) organized these dimensions into eight components, and suggested that a complete definition of future

orientation should include extension, domain, detail, number of cognitions, affect, motivation, sequence of events, and confidence of in achievement (i.e., control). Using data collected from an undergraduate sample, this definition was tested, with indicators of each dimension drawn across theoretical perspectives of future orientation. Further, potential predictors of future orientation were examined in the cross-sectional data to establish construct validity and provide further insight into which dimensions of future orientation were similar and which were distinct.

In general, the aspects of future orientation proposed by Trommsdorff (1983) were successfully modeled, drawing from items across measures used to assess future orientation from differing theoretical perspectives in the current literature. Two components were not successfully modeled because of study design limitations: domain and affect. Specifically, because of the structure of the items, Possible Selves questions, which ask participants to provide a future-oriented cognition within a pre-determined domain and affect (e.g., hoped-for occupation), were assessed first, and other items were asked within the context of that future-oriented cognition (e.g., how much do you believe attaining that goal is within your control). Throughout the models estimated, additional correlations were required within domain (e.g., across all occupation items) and affect (e.g., across all feared items), which provides some indication that these domains are an important dimension of future orientation to consider. In the future, research should disentangle domain and affect from other dimensions, so that they can be modeled distinctly, by asking more general questions about motivation and control, for example, instead of tying those items to a specific cognition. With measures structured like the one used in Study 1, models could be estimated within a particular domain or affect (i.e.,

model the other seven dimensions of future-orientation within the context of occupation) to explore whether the structure of the models change in the context of differing domains, for example.

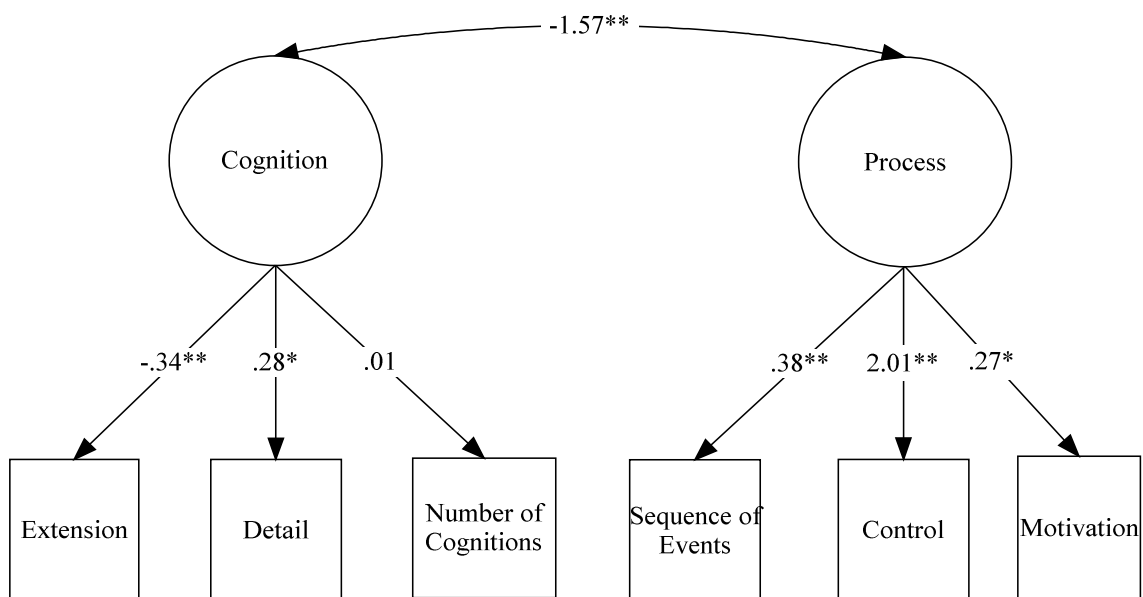
While there was some evidence to support the dimensions of future orientation proposed by Trommsdorff (1983), further support for her multidimensional definition of future orientation was not found; this is another important implication of Study 1. Instead, several of the hypothesized dimensions were not significantly related to the higher-order future orientation construct. Specifically, detail and number of cognitions did not significantly load onto a latent future orientation construct. Further, when correlations among the dimensions of future orientation were estimated in the presence of other predictors, extension and number of cognitions did not correlate with any other dimension, detail negatively correlated with control and motivation, and sequence of events, control, and motivation were positively correlated with each other. This may be providing some initial evidence to suggest that future orientation is not a single construct, as described by Trommsdorff (1983) but instead comprised of two distinct pieces: the cognition itself (e.g., the number of cognitions, extension, domain) and additional steps taken toward achieving or elaborating on that cognition (e.g., detail, motivation, control). While both aspects are likely important when predicting achievement of a future-oriented cognition, these results provide some preliminary evidence that a conceptual distinction between a future-oriented cognition and the process or elaboration of that cognition should be made here.

To explore whether there was evidence for separate models of cognition and process of future orientation in the absence of predictors, a model was estimated using

Study 1 data, where extension and number of cognitions loaded onto a “cognition” factor and detail, motivation, control, and sequence of events loaded onto a “process” factor.

Detail did not significantly load onto the process factor, and modification indices suggested that detail should instead load on the cognition factor. This alternative model was therefore estimated and found to have acceptable fit, $\chi^2(8) = 12.08$, $p = .15$; CFI = .90, RMSEA = .07, SRMR = .06. The results from this model are depicted in Figure 16.

Figure 16. Alternative model of future orientation



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

While extension and detail significantly loaded onto the cognition factor, number of cognitions did not. Motivation, control, and sequence of events all significantly loaded onto the process factor. Cognition and process were significantly and negatively

correlated. Given the mixed results and the use of the same sample (Study 1) to test both Trommsdorff's (1979) model and this alternative, the findings are not conclusive.

However, this does provide at least some tentative evidence to suggest that aspects of future orientation related to cognition should be considered separately from aspects of future orientation related to process or elaboration. This re-conceptualization of future orientation and its implications of our understanding of the development of future orientation will be discussed further in a later section.

This potential need for a distinction is not new with regard to future orientation. Previous criticisms of measures and definitions have included the conflation of future orientation with planning (Kreiter & Kreiter, 1994), for example, where planning has been identified as an important step in linking future-oriented cognitions with achievement, but is not the same as a future-oriented cognition. While these issues have been raised, in many cases a careful demarcation between the cognition and associated processes has not been maintained. For example, both the Future Outlook Inventory and the Prospective Life Course Questionnaire, which are intended to measure future orientation, include questions that include an element of planning (e.g., "I have clear plans for achieving..."). While the argument could be made that planning is an indicator of elaboration, and should therefore be part of a broader conception of future orientation, the findings from this study seem to indicate that a broader definition may not be appropriate. It is also not the only construct to have dealt with this issue; executive function, for example, has been conceptualized in several different ways as the literature has developed and matured, which includes changes in the dimensions included in commonly-used definitions of the construct (Miyake et al., 2000).

Taken together, these findings suggest that future orientation, as previously considered in the literature, may be multiple constructs rather than a single construct. It may be the case, for example, that detail, sequence of events, motivation, and control are all dimensions of the same construct, distinct from number of cognitions and extension. This provides an interesting contrast to the definition Tromsdorff (1983) offered, where instead of a single, higher-order future orientation construct, there may be two higher-order constructs that are distinct, but correlated. Specifically, one higher-order factor may be the future-oriented cognition itself, consisting of extension and number of cognitions (i.e., what the cognition is, when an individual anticipates occurrence, how many options the individual perceives to have in the future) which may be distinct from an individual's associated belief about that cognition, the second higher-order factor. This factor may be comprised of sequence of events, detail or elaboration, motivation, and control (i.e., how important the cognition is, how much they feel achieving is within their control, how multiple cognitions relate to one another, how much time they invest in exploring the cognition). While both aspects are likely important when predicting achievement of a future-oriented cognition, these results provide some preliminary evidence that a conceptual distinction between a future-oriented cognition and the associated beliefs about that cognition should be made here.

Further support for the possibility that the dimensions of future orientation described above are not indicators of the same higher-order future orientation construct comes from the findings that predictors (e.g., self-regulation, identity) related differently to each of the dimensions. While there was some overlap between specific predictors and specific future orientation dimensions, none of the predictors significantly related across

all six future orientation dimensions – that is, if the dimensions of future orientation described above were in fact lower-order factors related to a higher-order construct, one would expect that predictors of future orientation would be related to either the higher order construct or to the majority of the dimensions, but this was not the case in Study 1.

Taken together, several themes emerge from these findings. First, there is consistent evidence within these results to suggest that the comprehensive definition proposed by Trommsdorff (1983) is not the most appropriate way of conceptualizing future orientation, and that more refined definition and measurement are needed that organizes the dimensions in a way that is both conceptually helpful and empirically supported; Second, within a dimension of future orientation, measures based on multiple theoretical orientations loaded onto the same latent construct, suggesting some potential for integration across literatures. However, this comparability appears to be limited to within a dimension, where measures from different literatures are only comparable within extension, for example. That is, hopes and fears and possible selves theory may be comparable in the area of domain or affect, but may not be comparable overall, because possible selves theory does capture motivation or control, whereas hopes and fears does. These findings need to be replicated, but the preliminary evidence suggests the potential for a profound impact on future orientation theory and has implications for how research should be examined across literatures. These implications will be discussed in Chapter 4.

Limitations. As with all research, there are limitations in this study that needs to be considered. The sample was primarily white, primarily female, and consisted of college students at the same university. Thus, this population may not generalize to other age groups, individuals from other regions of the country, ethnic and social minority

groups, or those who have not attended college. Further, students were recruited through the psychology department, and in many cases were required to participate in research for the courses they were enrolled in. While this is not uncommon practice for research in psychology, it does further limit the potential applicability of findings to a broader population. It is not clear, for example, whether the findings discussed above would generalize to other ethnic or cultural groups, or to other regions of the country, or to adults who are not in college.

Study 1 was also limited in that measures were all self-report and were administered simultaneously. While direction of effects was hypothesized based on previous literatures, it cannot be assumed that future orientation dimensions were in fact the outcome rather than the predictor, or that other factors not accounted for in this study influenced both variables included in any given analysis. With self-report items, we are also forced to assume that participants were honest and accurate about their beliefs. While participants were told that their responses were confidential and all information was de-identified, bias likely remains.

The measures of future orientation used in Study 1 are further limited in that, while the measures used were drawn from a pre-existing literature, none of the measures have been previously validated in a systematic way, and to my knowledge this is the first study to combine measures across literatures or conceptions of future orientation. While this is in many ways a strength of this study, it does contribute some limitations, in that some of the measures used may be more valid or appropriate than others, but in the absence of previous validation we are left to assume they are similarly good assessments of the construct. Further, the items from each of the measures used were not applied in

the way they were intended or developed in previous studies, in that this study did not use all of the items within a measure to assess a dimension of future orientation, but instead used items from various measures to create indicators of each of the future orientation dimensions. Study 1 is also limited in that modeling domain and affect dimensions of future orientation was impossible with the design of the study, and instead domain and affect were imbedded in the other six domains. While this could not be avoided given the methodology used in Study 1, results need to be interpreted with this in mind.

It is also important to keep in mind that many of the models estimated for the predictors of future orientation did not replicate previous research. With regard to self-regulation, identity, and self-efficacy, many of the items were dropped because of non-significance; this provides reason for some concern that the constructs are not being measured effectively for this sample. Replication is needed to ensure the relations are generalizable.

With regard to the analysis, the use of factor scores, while necessary given the scope of these models, may contribute to different results than there would have been if latent factors were used. The assumed absence of error in factor scores, where the score is treated as an observed variable, can impact standard error estimates (Brown 2006).

Further replication will be essential to confirm the findings of Study 1.

While these limitations should not be discounted or ignored, this study does make some important contributions to the literature. It provides the first test of Trommsdorff's (1979) comprehensive definition of future orientation, drawing on measures across perspectives of future orientation used in the literature. This study found that while dimensions of future orientation proposed by Trommsdorff were successfully modeled,

the definition of future orientation as a single, higher-order construct did not hold, where each of the dimensions did not significantly load onto a higher-order future orientation factor, suggesting a need to further examine future orientation as a construct and explore how it should be defined, both conceptually and operationally. It is possible that a distinction is necessary between a future-oriented cognition and the elaboration or association of other thoughts or beliefs attached to that future-oriented cognition.

Chapter 3

Study 2: Childhood Predictors of Future Orientation

The purpose of Study 2 was to explore underlying factors that may predict future orientation in adolescence. Study 2 identified potential childhood predictors of future orientation at age 15 using the NICHD Study of Early Child Care and Youth Development (SECCYD). Given previous research correlating future orientation to poverty, executive function, self-regulation, optimism, and self-efficacy, measures of these constructs in childhood were used to predict future orientation in adolescence, assessed at age 15. It was conceptualized that some predictors (i.e., executive function and self-regulation) would relate to an individual's ability to orient toward the future, while others (i.e., poverty, optimism, self-efficacy) would related to individual differences in future orientation. The measure of future orientation used in the SECCYD captures future extension, motivation, and control; this allows for some additional exploration into whether potential developmental underpinnings are related to some proposed components of future orientation.

It was hypothesized that the measure of future orientation used in the SECCYD was comprised of three distinct but related components of future orientation: future extension, motivation, and control (NOTE: other aspects of future orientation are not measured with the SECCYD). It was further hypothesized that poverty, executive function, self-regulation, optimism, and self-efficacy measured in grades 3 and 6 would predict the Future Outlook Inventory at age 15. Executive function and self-regulation were thought to contribute to the capacity for future orientation, while poverty, self-efficacy, and optimism likely contribute to individual differences in the content of future

orientation. It was also possible that these constructs would predict some, but not all, of the three components of future orientation assessed in the SECCYD. Differences in antecedents of each component of future orientation were tested, but no specific hypotheses were made.

Method

Participants. This study was drawn from the NICHD Study of Early Child Care and Youth Development (SECCYD), which began with 1,364 children born in 10 cities across the U.S, selected using conditional random sampling from 5,416 eligible families. Participants were considered eligible for inclusion if mothers were 18 or older and conversant in English, families without plans to move over the first three years of the study, and children without disabilities who were able to leave the hospital within a week of birth. The SECCYD followed children from one month of age to age 15 with annual assessments; the sample was 80.4% White, 12.9% Black, and 6.7% other at the start of the study. Due to the lack of diversity, minority groups were combined so the analyses compare whites to other racial groups. In the current study, measures taken in grades 3 and 6 and at age 15 were used.

As with any longitudinal study, attrition is a concern with the SECCYD. Of the 1,364 families participating at the start of the study (1 month of age), 79% were still participating in grade 3 (T1 for the purpose of the present study). To maximize data and avoid further bias due to attrition after grade 3, full-information maximum likelihood estimation was used in all multivariate analyses. This technique, which assumes that missing responses are at random, allows for the inclusion of any participants who were present during at least one of the times of measurement.

Measures. Due to the longitudinal design of this study, different measures were used from grades 3, 6 and 10. Table 4 provides an overview of the measures administered at each time point. Below, descriptions of measures for each construct have been grouped conceptually into control variables, predictors of capacity, predictors of individual differences, and future orientation.

Table 4. Study 2 Measures.

Construct Type	Time of Measurement	Construct	Measure
Control Variables	Grade 3	Gender	Boys (1); Girls (2)
	Grade 3	Race	White (1); Other (2)
	Grade 3	Cognitive Aptitude	Woodcock-Johnson Psycho-educational Battery-Revised
Capacity	Grade 3	Executive Function	Tower of Hanoi Social Skills Rating System
	Grade 3	Self-regulation	Behavior Disorders Rating Scale
Individual Differences	Grades 3 and 6	Socio-economic status	Mother's education Partner's education Income-to-needs
	Grade 6	Self-efficacy	Efficacy in math, English, and sports
	Grade 6	Optimism	Life-Orientation Test-Revised
Outcome	Grade 10	Future Orientation	Extension Motivation Control

Control variables. Gender, race/ethnicity, and cognitive aptitude, assessed in grade 3, were used as controls in these analyses, as these constructs are known to correlate with future orientation (Beal & Crockett, 2010; Nurmi, 1987). Cognitive aptitude was assessed using the Woodcock-Johnson Psycho-educational Battery – Revised (WJ-R; Woodcock & Johnson, 1989). Reliability and validity have been established for the WJ-R, with internal consistency estimates ranging from .70 to .94.

Tests for validity conducted across the lifespan indicate that the WJ-R is predictive of reading, writing, and math achievement (McGrew & Knopik, 1993; McGrew & Hessler, 1995). Correlations between the WJ-R and comparable cognitive measures (e.g., Stanford-Binet, Peabody Picture Vocabulary Test) average to .70 (Woodcock, 1990).

Predictors of capacity for future orientation. Executive function and self regulation, both assessed in grade 3, were used as predictors of future orientation. These variables are included as predictors of capacity because, as reviewed previously, both the executive function (i.e., planning, inhibition, working memory) and self-regulation are likely necessary in order to systematically and reliably consider the future. The Tower of Hanoi (TOH) was included to assess executive function (Scholnick & Friedman, 1993). Performance scores (i.e., average number of moves to successfully complete the task) will be used in the current study, as this component of the TOH most closely assesses planning (Senn, Espy, & Kaufmann, 2004). The TOH is associated with intellectual, developmental, and neurological differences, which provides construct validity for this measure (Welsh & Hulizinga, 2001).

A higher-order factor of self-regulation was created based on previous evidence that a single factor did not effectively capture the construct (Crockett, Carlo, Wolff, & Hope, 2011). Self-regulation was therefore estimated using four latent sub-factors: physical (e.g., Child often leaves seat when remaining seated is expected) and attention (e.g., Child is often easily distracted) regulation and self-regulation with adults (e.g., Ends disagreements with parent calmly) and peers (e.g., Respond appropriately when hit or pushed by child). Items come from Social Skills Rating System (SSRS; Gresham &

Elliott, 1990) and the Disruptive Behavior Disorders Rating Scale (DBD; Pelham, Gnagy, Greenslade, & Milich, 1992).

Predictors of individual differences in future orientation. Predictors conceptualized to relate to individual differences in future orientation include poverty (SES), optimism, and self-efficacy. Parent education and income assessed in grade 3 were used as indicators of socio-economic status. Family income was assessed using 4 items describing characteristics of income and financial resources available to the family (e.g., “Do you know how much money you’ll have to live on from one month to the next?” with responses from 1 [almost never] to 5 [almost all the time]; Belle, 1982) and a calculated income-to-needs ratio (i.e., higher number indicates more comfortable standard of living based on the size, location, and needs of a particular family). Level of education for each parent was also assessed during interviews with parents, with responses ranging from 1 (*Less than 12 years*) to 5 (*Post Graduate*).

Self-efficacy related to math, English, and sports were assessed using the Achievement Motivation and Efficacy measure (Jacob et al., 2002). Each of the three domains was measured using 5 items (e.g., “How good at math are you?” with responses from 1 [not at all good] to 7 [very good]), and were used as indicators of a higher-order latent measure of self-efficacy that accounted for efficacy within (level one) and across (level two) domains. Alphas for each of the three domains range from .78 to .85 in previous research.

A measure of optimism, the Life Orientation Test-Revised (LOT-R; Scheier et al., 1994; $\alpha = .73$ in previous research) was also included in grade 6. Participants responded to 6 items (e.g., “In a new or unknown situation, I usually expect the best.”) on a 4-point

scale ranging from 1 (not at all) to 4 (a lot). Items will be used as indicators of a latent optimism construct.

Future Orientation. At age 15 a measure of future orientation, the Future Outlook Inventory (Cauffman & Woolard, 1999) was administered. This measure includes 8 items with responses on a 4-point scale from 1 (never) to 4 (always). These items were used as indicators of a higher-order latent Future Orientation factor, with n indicators of future extension (e.g., “I can see my life 10 years from now”), n indicators of motivation (e.g., “I will keep working at a difficult, boring task if I know it will help me get ahead later”), and n indicators of control (“I think about future consequences before I do something.”).

Analytic Plan

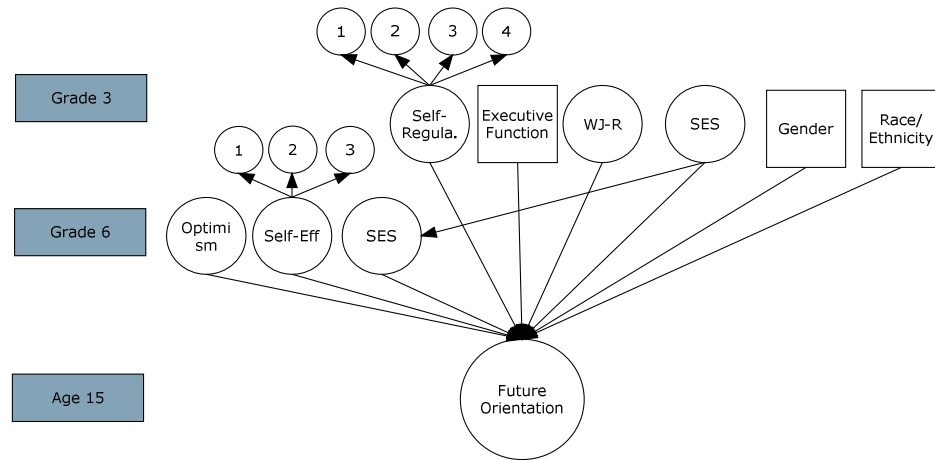
Data analysis began with an examination of univariate and bivariate statistics for all variables included in the study. All continuous variables were tested for skewness, and were found to be in ranges that would indicate a normal distribution, with guidelines of less than an absolute value of 2 for skewness when using multivariate analyses in Mplus (Muthen & Kaplan, 1985). Confirmatory factor analyses for each latent construct were then estimated, using Maximum Likelihood Robust Estimation in Mplus 5.1 and a Structural Equation Modeling approach. To test alternative measurement models for future orientation, single-factor and three-factor models were estimated that coincided with three of the dimensions of future orientation discussed previously. Latent measurement models were also estimated for cognitive aptitude and optimism. Higher-order latent models were estimated for self-regulation and self-efficacy. Gender, race, and executive function were included as observed predictors. Finally, SES was

estimated as a formative construct (Brown, 2006), where mother's and partner's education and income-to-needs were included as indicators of SES, rather than derived from SES.

Model fit was assessed using significance values for chi square significance tests and cut-off values of .95 and above for CFI and .06 or below for RMSEA (Hu & Bentler, 1995), and values of .90 and above for CFI and .10 and above for RMSEA as indications of acceptable fit (Barrett, 2006). Once good measurement models for each construct were identified, a series of three models were estimated to predict future orientation in grade 10. Gender, race/ethnicity, and cognitive aptitude were included as control variables in all models. The first model estimated included constructs hypothesized to be developmental underpinnings of future orientation to predict future orientation in grade 10. This model included self-regulation and executive function, both assessed in grade 3, in addition to control variables. The second model estimated included constructs hypothesized to be predictors of individual differences in future orientation. This included self-efficacy and optimism, both assessed in grade 6, in addition to control variables. Finally, a full model was estimated that included all significant predictors from the previous two models. The full hypothesized model is provided in Figure 17. Future orientation is depicted as a single factor to simplify the presentation.

Power analysis. Power analysis was conducted using the model depicted in Figure 2 and the known sample size for the SECCYD ($N = 1,364$). Results indicate that effects of .1 and higher will be successfully detected in Study 2, assuming 80% power.

Figure 17. Proposed Analytic Model Predicting Future Orientation at age 15.



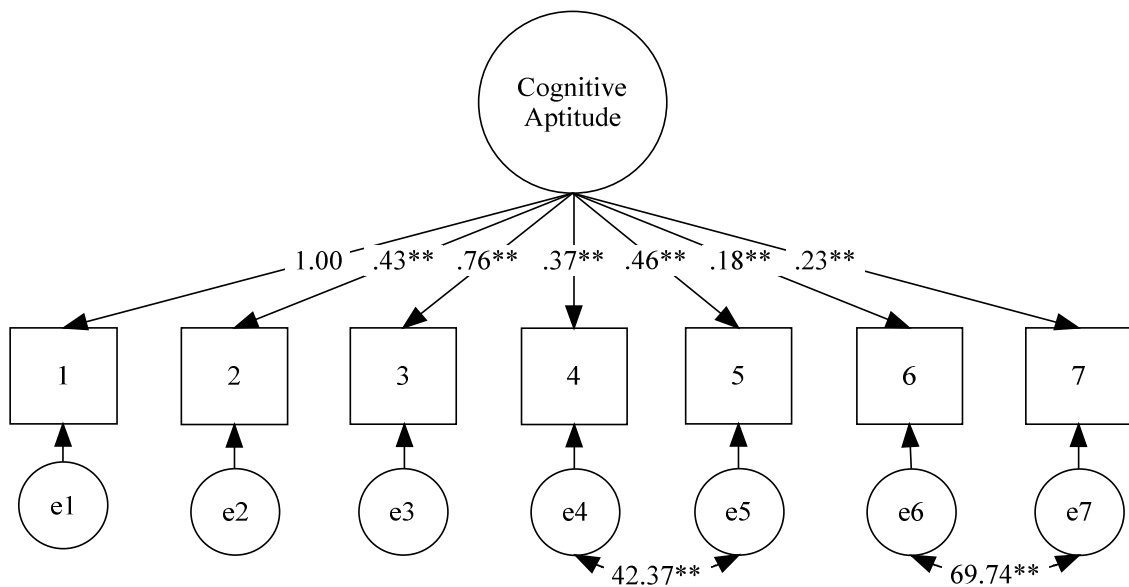
Results

Univariate and bivariate statistics for all variables included in all models are provided in tables C1-C3. As can be seen when examining the bivariate correlations, all control variables, developmental underpinnings, and individual differences predictors are significantly correlated with at least some of the items used to assess future orientation. Further, future orientation items are significantly and positively correlated with one another, with the exception of six pairs of items: “I’d rather save money for a rainy day than spend it now” was not significantly correlated with “I can see myself finishing high school,” “I can see myself starting college,” or “I can see myself finishing college.” Similarly, the item “I can imagine myself 10 years from now” was not significantly correlated with any of the high school or college items. Significant correlations among the future orientation items ranged from $r = .07$ ($p < .05$) to $r = .89$ ($p < .01$) representing effect sizes that range from trivial (below .1) to large (above .5; Cohen, 1992) and suggest that these items are statistically significantly related, allowing for further tests of loading onto latent future orientation constructs.

Measurement Models. Confirmatory factor analysis (CFA) was used to estimate latent measurement models for cognitive aptitude and optimism. Factor loadings based on the final measurement models for each of the three constructs are provided in Tables C4 (cognitive aptitude) and C5 (optimism).

For cognitive aptitude, each of the seven sub-scales on the WJ-R that indicate aptitude in reading and math were included as indicators of a latent cognitive aptitude factor. The initial model had unacceptable fit, $\chi^2(14) = 471.49, p < .01$; CFI = .78, RMSEA = .26, SRMR = .13. Upon examination of inter-item correlations, it was clear that there were residual correlations between two of the reading sub-scales and two of the math sub-scales. Correlations between error terms for each pair of reading sub-scales and math sub-scales were added, and model fit improved, $\chi^2(12) = 37.06, p < .01$; CFI = .99, RMSEA = .07, SRMR = .02. The final model for cognitive aptitude can be seen in

Figure 18. Measurement model for cognitive aptitude.

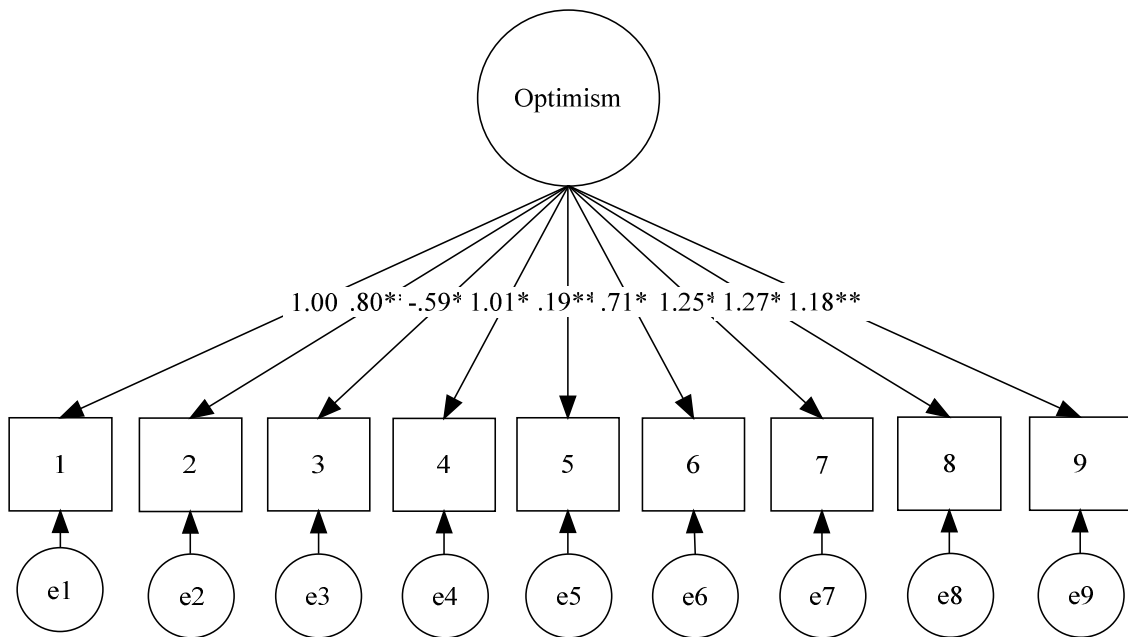


* p < .05, ** p < .01

Figure 18, and includes unstandardized weights. All items were significantly related to WJ-R.

For optimism, a CFA was conducted that included 9 of the 10 items from the LOT-R. The item “I get upset too easily” was excluded from the model due to lack of significant contribution to the latent factor. The final model had good fit, $\chi^2(27) = 52.31, p < .01$; CFI = .96, RMSEA = .04, SRMR = .04. As can be seen in Figure 19, all 9 items significantly contributed to the latent optimism factor in the expected directions.

Figure 19. Measurement model for optimism.



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

Socio-economic status was hypothesized to be a formative construct, where parent education and income-to-needs was expected to contribute to SES rather than be derived from it. A formative model was estimated, and was found to fit poorly. Several

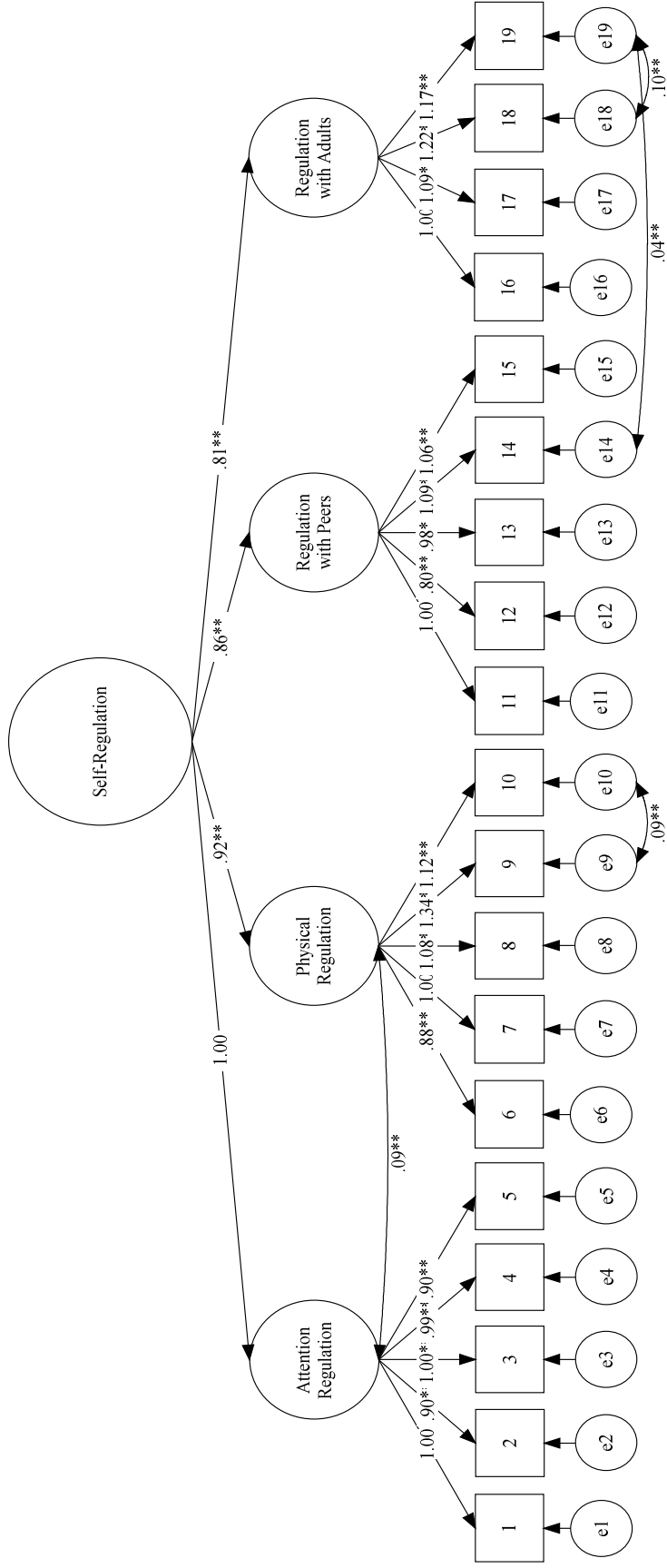
alternative models, including latent models, were also estimated and found to fit poorly. For this reason, parent education and income-to-needs will be included in all subsequent models as observed items.

Higher-order measurement models. As with the latent measurement models described above, CFA was used to first estimate the lower-order factors for self-regulation and self-efficacy, followed by the higher-order factors. Factor loadings based on the final measurement models for each of the three constructs are provided in Tables C6 (self-regulation) and C7 (self-efficacy).

Self-regulation. For self-regulation, CFAs were conducted separately for attention regulation, physical regulation, regulation with peers, and regulation with adults. Each of the latent lower-order factors had sufficient fit. Attention regulation included five items, $\chi^2(5) = 31.59, p < .01$; CFI = .97, RMSEA = .10, SRMR = .03. Physical regulation also consisted of five items, $\chi^2(5) = 15.72, p < .01$; CFI = .98, RMSEA = .07, SRMR = .02. Self-regulation with peers was consisted of five items, $\chi^2(5) = 7.68, p = .17$; CFI = .99, RMSEA = .03, SRMR = .02. Finally, self-regulation with adults was made up of four items, $\chi^2(2) = 15.21, p < .01$; CFI = .98, RMSEA = .11, SRMR = .03.

The higher-order self-regulation factor structure was then estimated, using each of the four lower-order factors described above. The initial model had adequate fit, $\chi^2(148) = 433.14, p < .01$; CFI = .91, RMSEA = .06, SRMR = .07. Upon examination of inter-item correlations, residual correlations were identified between two of the items on the self-regulation with adults lower-order factor and the physical regulation lower-order factor. Further, the latent factors for attention and physical regulation were more strongly

Figure 20. Measurement model for self-regulation



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

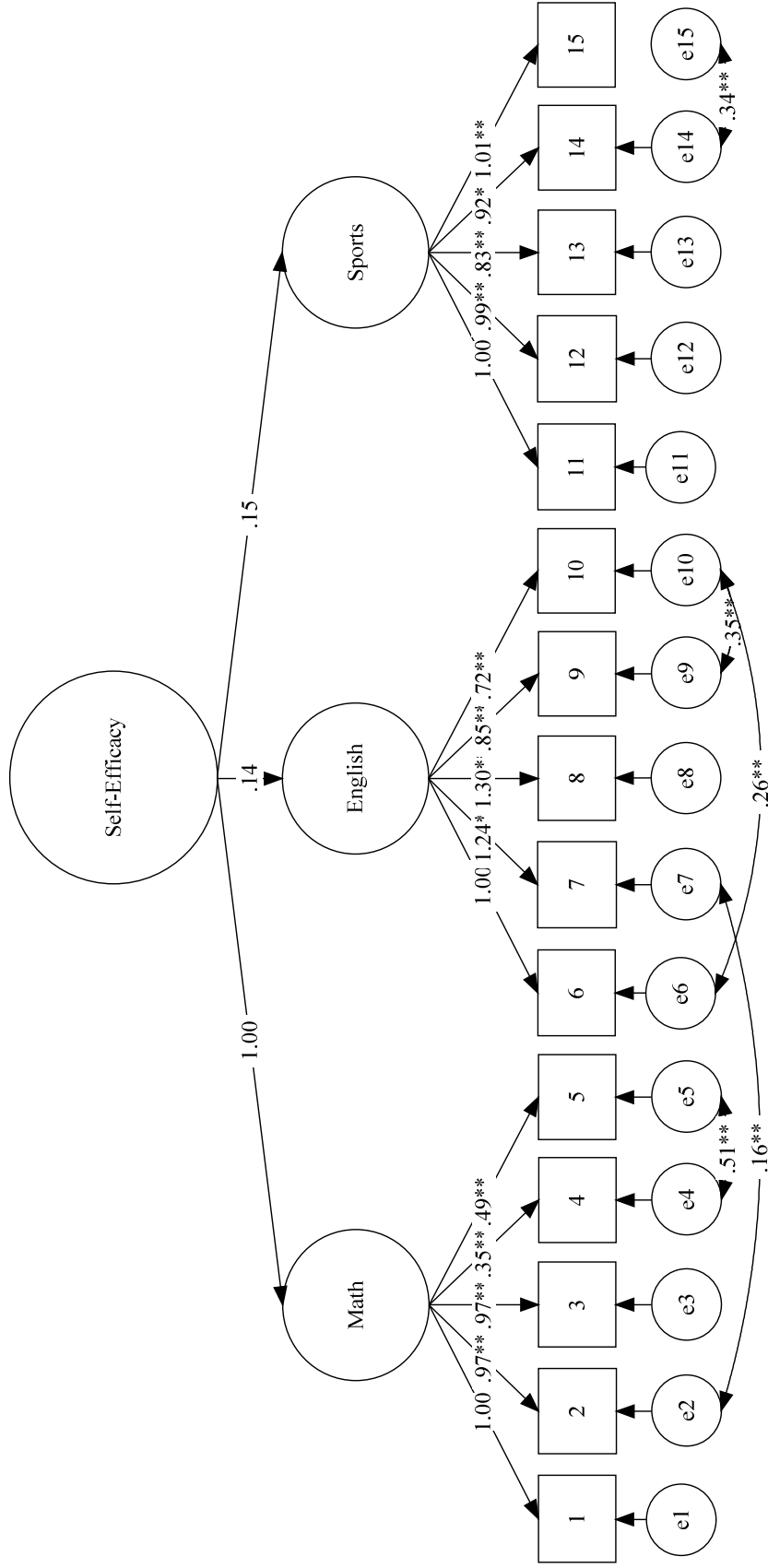
correlated with one another than with the other lower-order factors, which is expected given that these items come from the same measure (i.e., both from the DBD inventory). Additional correlations between these lower-order factors were therefore included in the model. Once these additional correlations were added, model fit improved, $\chi^2(144) = 292.60, p < .01$; CFI = .95, RMSEA = .05, SRMR = .04. The final model for self-regulation can be seen in Figure 20, and includes unstandardized weights. All items and lower-order factors were significantly related to self-regulation.

Self-efficacy. To construct the model for self-efficacy, CFAs for each of the lower-order factors were estimated separately. The model for math efficacy included five items and had good fit, $\chi^2(4) = 5.99, p = .20$; CFI = .99, RMSEA = .03, SRMR = .01. Efficacy in reading (i.e., English) also included five items and had good fit, $\chi^2(3) = 6.33, p = .10$; CFI = .99, RMSEA = .05, SRMR = .01. Finally, efficacy in sports included five items and fit well, $\chi^2(4) = 14.22, p < .01$; CFI = .99, RMSEA = .07, SRMR = .01.

The higher-order latent model for self-efficacy was then estimated, using the lower-order factors described above. The model had good fit, $\chi^2(82) = 248.90, p < .01$; CFI = .95, RMSEA = .06, SRMR = .06. All items significantly contributed to the lower-order factors. However, the lower-order factors did not significantly relate to the higher-order self-regulation factor. For this reason, each of the three self-regulation domains was included in later models, without a higher-order factor. Figure 21 depicts the models for each of the three self-efficacy domains.

Models of Future Orientation. Using CFA, two measurement models of future orientation were estimated. With the first model, all items were used to predict a single latent factor. The factor loadings for this single-factor model are provided in Table C8.

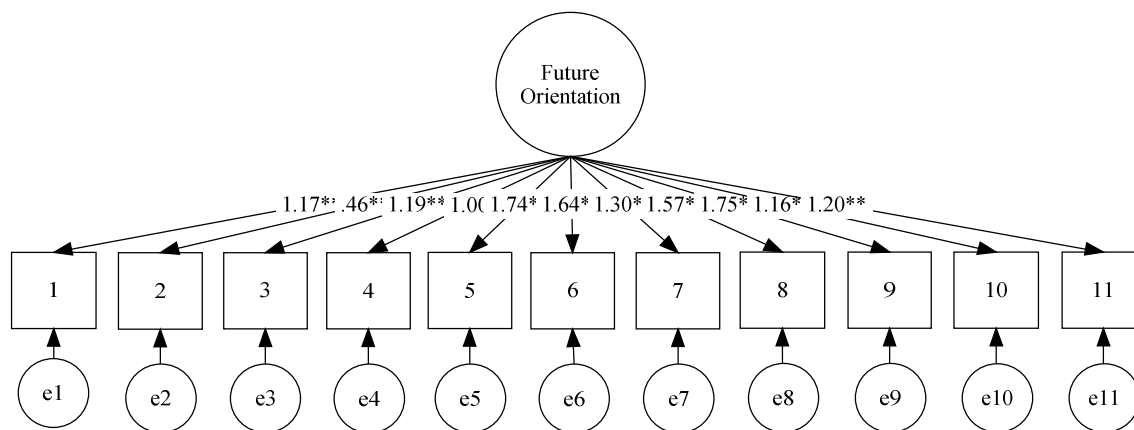
Figure 21. Measurement model for self-efficacy



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

The preliminary model had poor fit, $\chi^2(44) = 936.37, p < .01$; CFI = .40, RMSEA = .21, SRMR = .12. Several items had residual correlations, and correlated error terms were added where conceptually appropriate. Fit continued to remain poor. Model modification indices suggested additional correlations that were not conceptually justifiable; however, for the purpose of ensuring that a good-fitting single-factor model could not be identified, all possible correlated error terms were added. The final model was found to have acceptable fit, $\chi^2(38) = 170.01, p < .01$; CFI = .91, RMSEA = .09, SRMR = .08. Further, all items significantly and positively contributed to the single-factor model. This model is depicted in Figure 22.

Figure 22. Measurement model for future orientation as a single factor



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

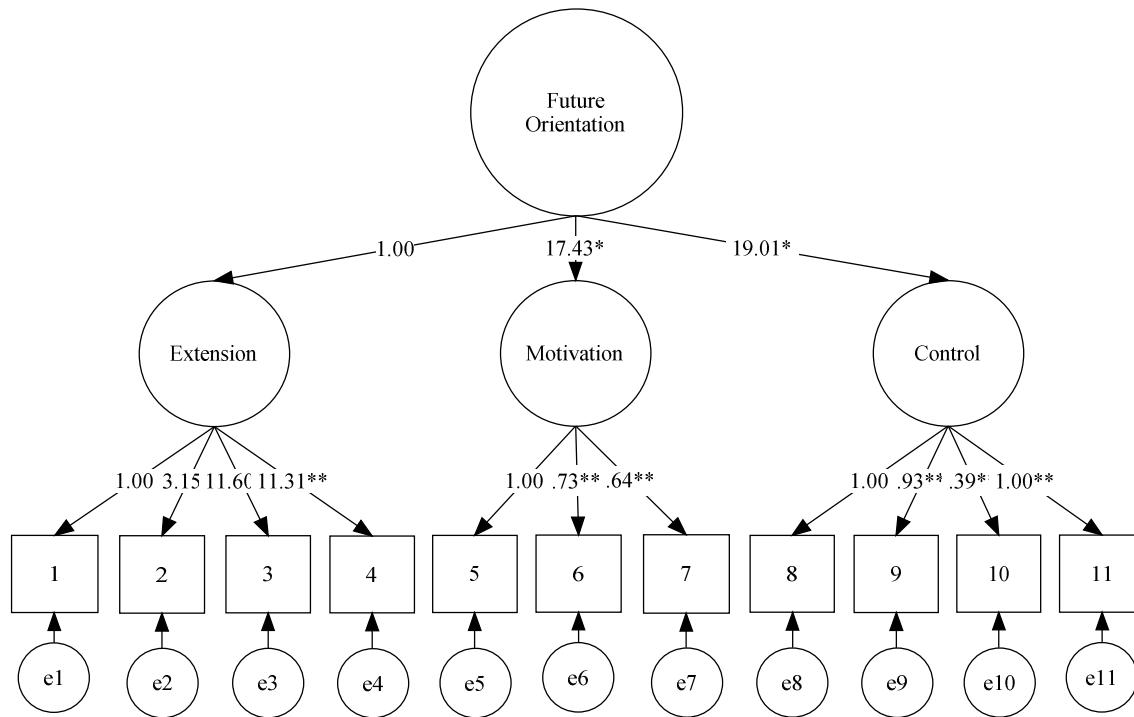
A second model was estimated allowing for three correlated factors. Based on Trommsdorff's descriptions, the terms *Extension*, *Motivation*, and *Control* were used to describe each of the three factors in this model. The factor loadings for this model are provided in Table C9. This model was estimated as a higher-order factor, and therefore each of the three lower-order factors were estimated first, followed by the higher-order factor.

Extension. The lower-order factor for extension was first estimated using five items. One of the five items, “I can imagine myself 10 years from now” did not significantly load onto the factor. Thus, extension included four items and had good fit, $\chi^2(2) = 2.54, p = .28$; CFI = .99, RMSEA = .02, SRMR = .02. Each of the four items significantly and positively predicted the latent extension factor.

Motivation and control. The lower-order factor for motivation included three items and was therefore just identified, with perfect fit (Brown, 2006). Finally, control consisted of four items and had good fit, $\chi^2(2) = 7.06, p = .03$; CFI = .98, RMSEA = .07, SRMR = .02. One of the four items was “I can imagine myself 10 years from now,” which had initially been estimated with extension and found to not be significant. This item was estimated as part of control based on Zaleski’s (1994) theory that individuals who have vivid notions of themselves in the distant future, who make lists of tasks, and consider every possible outcome do so to gain a sense of control and reduce anxiety and uncertainty about the future, by narrowing an unlimited number of possibilities to a few concrete outcomes. Each of the four items significantly and positively predicted the latent control factor.

A higher-order model. The higher-order future orientation factor was estimated using the lower-order factors described above. The model had good fit, $\chi^2(38) = 119.85, p < .01$; CFI = .95, RMSEA = .07, SRMR = .07. Each of the items significantly and positively loaded on the lower-order factors, and the lower-order factors significantly and positively loaded on the higher-order factor. This model is depicted in Figure 23. Due to the improved model fit and theoretical support for this model, it was considered to be better than the single-factor model, and was therefore used in subsequent analyses.

Figure 23. Measurement model for future orientation as a higher-order factor



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

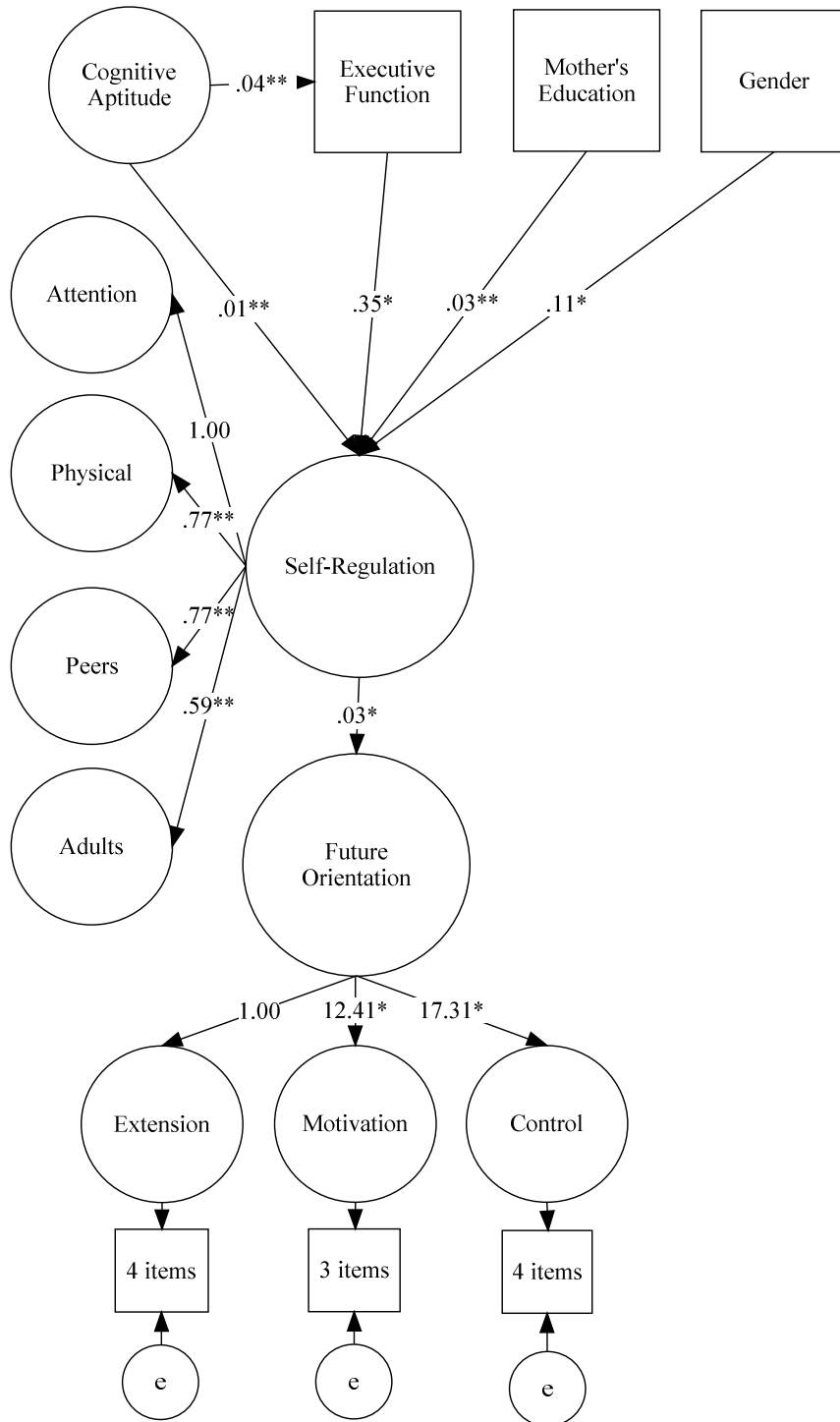
Developmental underpinnings. Once appropriate measurement models were identified, two models were estimated to predict future orientation in grade 10 from self-regulation and executive function in grade 3, controlling for SES, race, gender, and cognitive aptitude. In the first model, grade 3 constructs were used to predict the higher-order future orientation factor described above. In order to test whether each of the lower-order factors of future orientation were differentially related to the predictors in this model, a second model was estimated where each of the lower-order future orientation factors were correlated with one another, but the higher-order factor was not included (see Figure 24). The two models of future orientation are considered statistically equivalent, despite their clear conceptual differences (Brown, 2006).

The model estimated that included future orientation as a higher-order factor had acceptable fit, $\chi^2(748) = 1232.04, p < .01$; CFI = .92, RMSEA = .04, SRMR = .06. Each of the indicators of future orientation continued to contribute significantly to the lower-order factors, and each lower-order factor was significantly associated with the higher-order factor. Of the control variables included in the model, none were significantly associated with future orientation (see Table C10). Self-regulation significantly and positively predicted future orientation, but executive function did not.

To explore whether control variables, executive function, and self-regulation related differently to each of the three lower-order factors of future orientation, a second model was estimated. The results from this model are offered in Table C11. This model also had acceptable fit, $\chi^2(742) = 1170.06, p < .01$; CFI = .93, RMSEA = .04, SRMR = .06; see Figure 25.

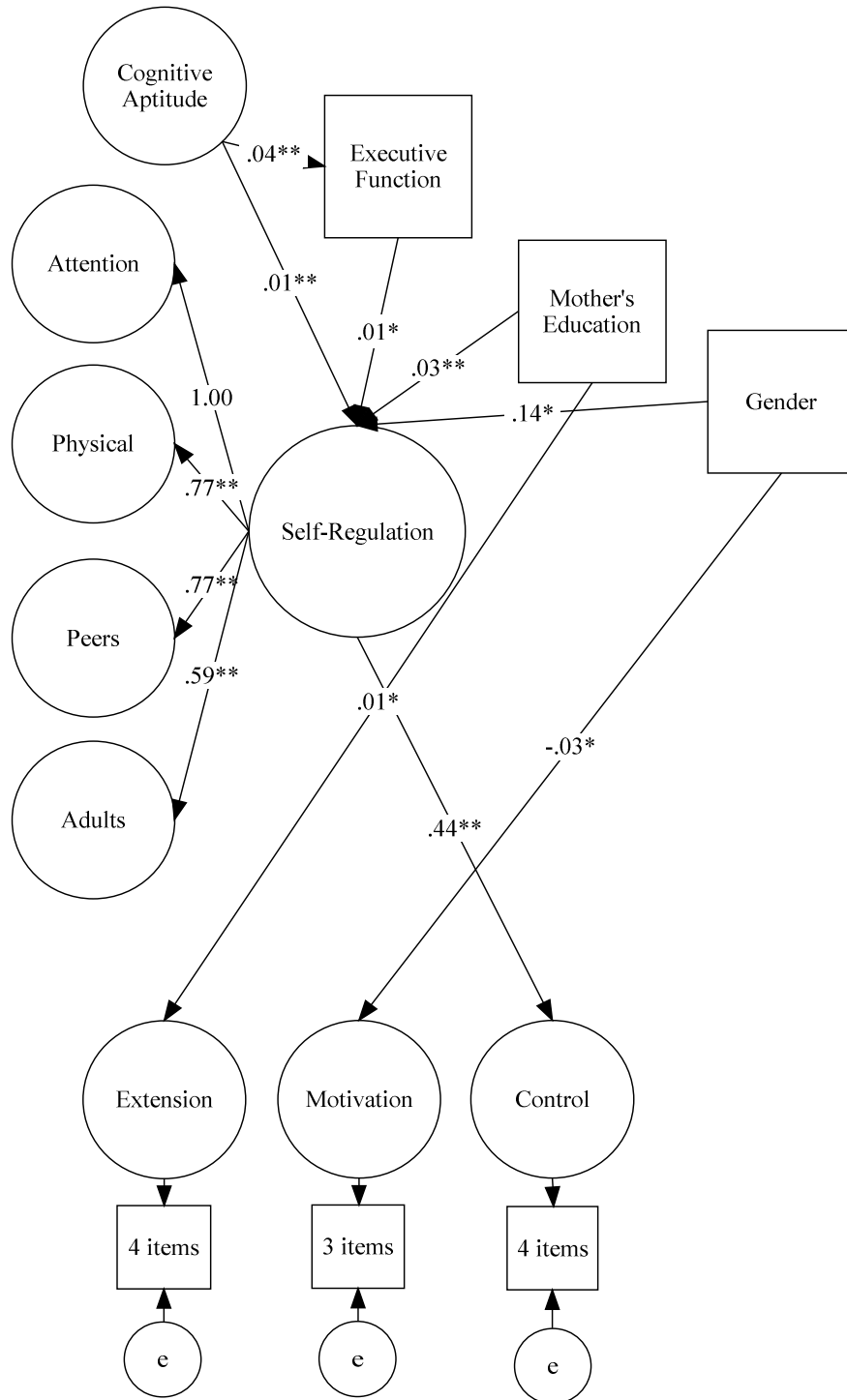
The results from this model suggest differential impact of predictors on each of the three future orientation dimensions. Specifically, extension was significantly and positively predicted by mother's education, with an additional positive effect of self-regulation on extension that was close to significance. Motivation was significantly predicted by gender, where girls were more motivated to invest in their future self than boys. Control was significantly and positively predicted by self-regulation, and was correlated with motivation, another dimension of future orientation. None of the other

Figure 24. Developmental underpinnings model with higher-order factor of future orientation



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

Figure 25. Developmental underpinnings model using a three-factor model of future orientation



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

future orientation factors were correlated. Further, self-regulation was significantly and positively predicted by cognitive aptitude, mother's education, gender, and executive function,

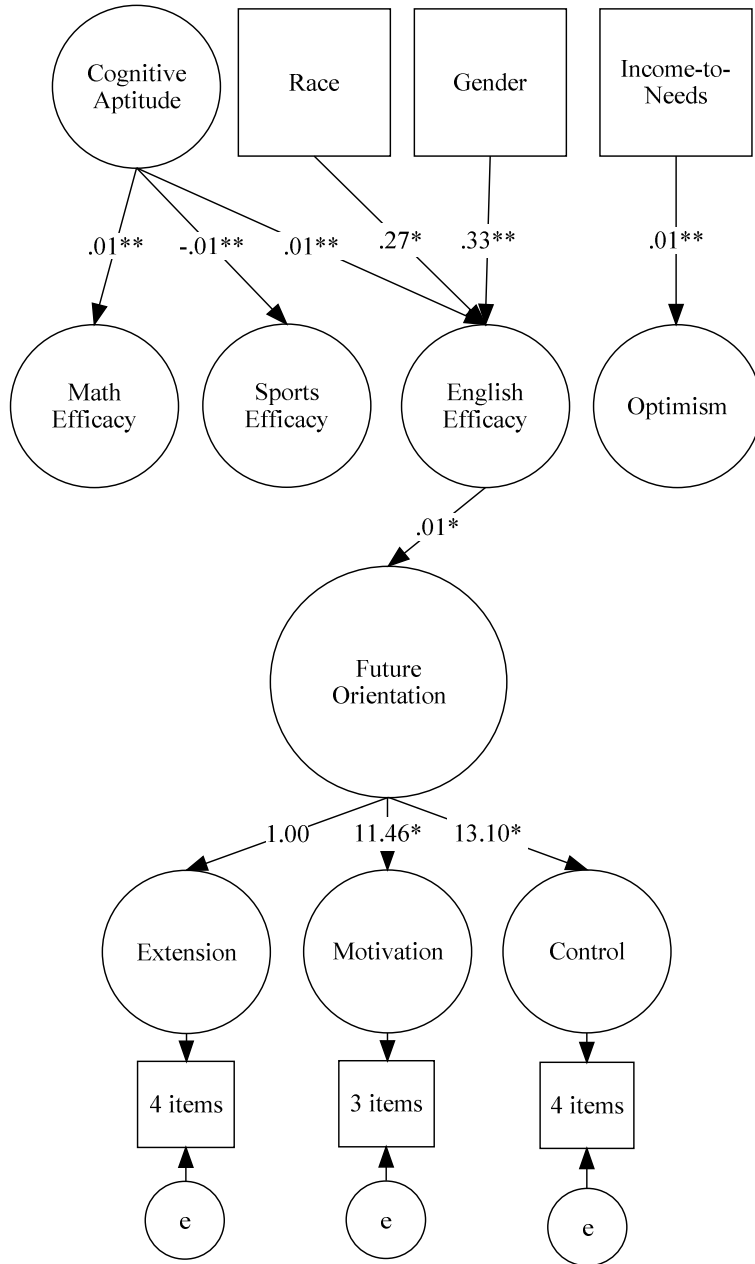
suggesting that the effect of these variables may operate through self-regulation to impact future orientation, primarily through control.

Individual Differences. To identify the impact of individual differences variables on future orientation in grade 10, two models were estimated to predict future orientation in grade 10 using self-efficacy, optimism, and SES in grade 6, controlling for the effects of race, gender, and cognitive aptitude. As previously described, the two models are distinct in that one includes a higher-order future orientation factor, and the other includes only the correlated lower-order factors.

The model estimated that included future orientation as a higher-order factor had acceptable fit, $\chi^2(984) = 1618.28, p < .01$; CFI = .91, RMSEA = .04, SRMR = .08. Each of the indicators of future orientation continued to contribute significantly to the lower-order factors, and each lower-order factor was significantly associated with the higher-order factor. Of the control variables included in the model, none were significantly associated with future orientation (see Table C12 and Figure 26). Self-efficacy in English significantly and positively predicted future orientation. Efficacy in math was close to significant (i.e., $p < .10$), but optimism and efficacy in sports were not significant.

To explore whether control variables, optimism, and self-efficacy related differently to each of the three lower-order factors of future orientation, a second model was estimated that included optimism, self-efficacy, and control variables predicting the

Figure 26. Individual differences variables predicting a higher-order future orientation factor

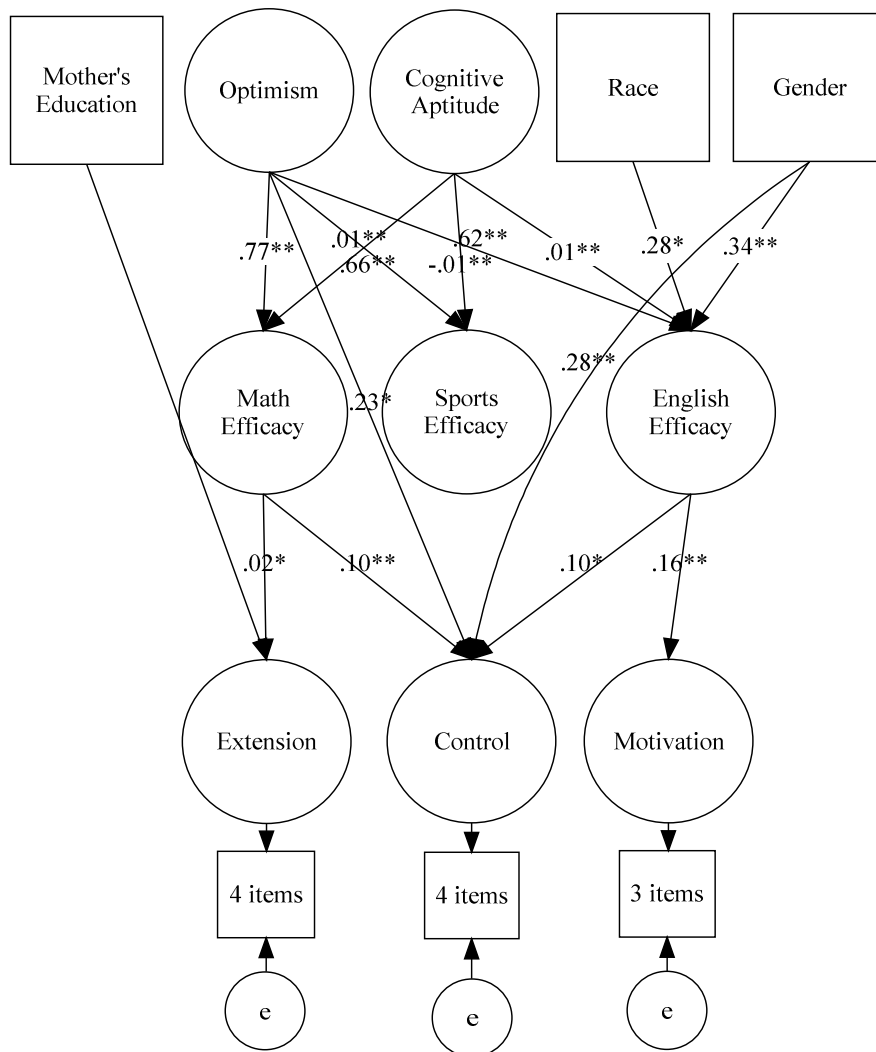


* $p < .05$, ** $p < .01$

three dimensions of future orientation. The results from this model are provided in Table C13 and Figure 27. This model had acceptable fit, $\chi^2(966) = 1390.99, p < .01$; CFI = .94, RMSEA =

.03, SRMR = .06. As with the model for developmental underpinnings, the results from this model suggest differential impact of predictors on each of the three

Figure 27. Individual differences variables predicting a three-factor model of future orientation



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

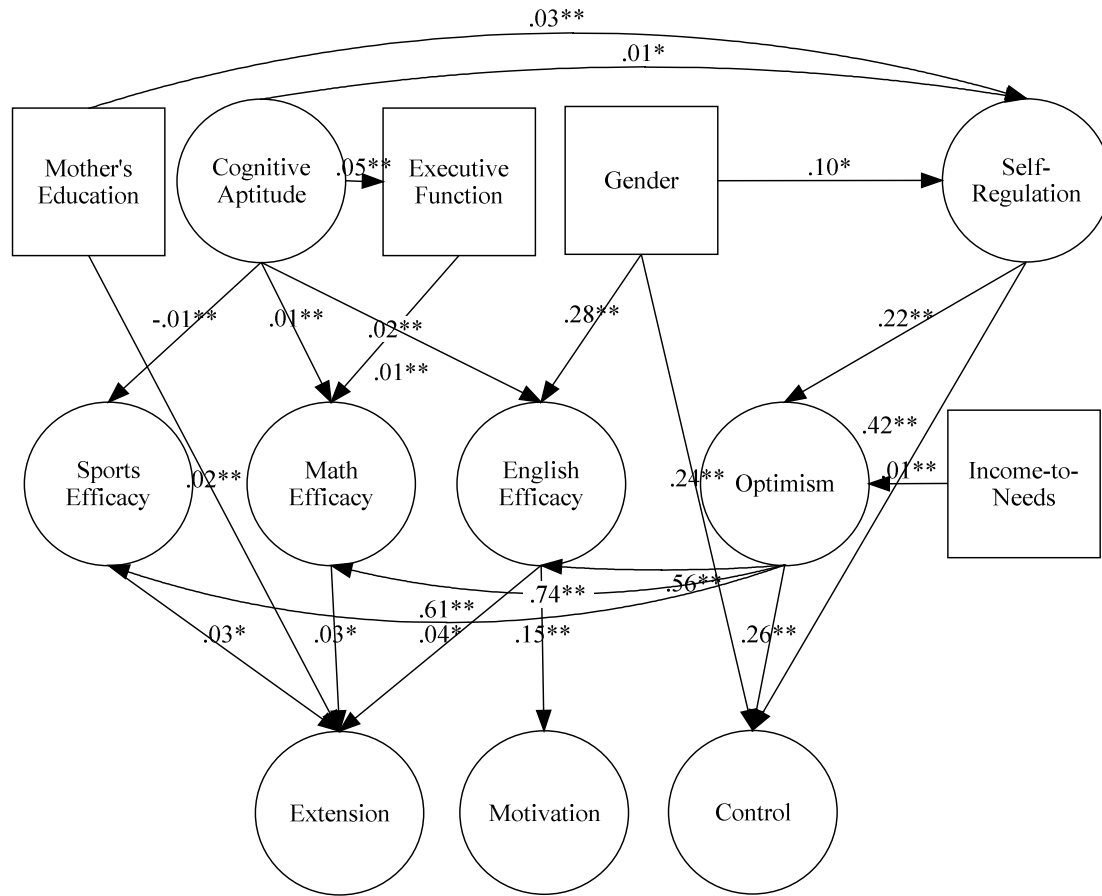
future orientation factors. Specifically, extension was significantly and positively related to efficacy in math and mother’s education, with additional positive trends for efficacy in English and sports. Motivation was significantly and positively predicted by efficacy in English.

Control was significantly and positively related to optimism and efficacy in math and English. Control was also related to gender, where girls were higher on control than boys. Motivation and control were significantly correlated; none of the other future orientation factors were correlated. Further, self-efficacy across all three domains was significantly and positively predicted by cognitive aptitude and optimism. English was related to gender and race, where girls and those classified as “other” had higher levels of efficacy in English.

Estimating the Full Model. Based on the results for the impact of developmental underpinnings and individual differences models described above, a model was estimated that included mother’s education, cognitive aptitude, gender, income-to-needs, self-regulation, executive function, self-efficacy, and optimism as predictors of the dimensions of future orientation.

Unstandardized coefficients for the final model are presented in Table C14. This model had acceptable fit, $\chi^2(2065) = 2911.54, p < .01$; CFI = .91, RMSEA = .03, SRMR = .06. As is depicted in Figure 28, each of the future orientation factors was once again predicted differently in this final model. Extension in grade 10 was significantly and positively predicted by mother’s education in grade 3, and efficacy in math, English, and sports in grade 6. Motivation in grade 10 was significantly predicted by efficacy in English in grade 6. Control in grade 10 was significantly predicted by optimism in grade 6, self-regulation in grade 3, and gender, where girls were higher than boys on control.

Figure 28. Developmental underpinnings and individual differences variables as predictors of a three-factor model of future orientation



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

Consistent with the models described previously, there was evidence to suggest that cognitive aptitude, mother’s education, executive function, and income-to-needs, all measured in grade 3, may be operating through efficacy and optimism in grade 6, and self-regulation in grade 3 to differentially impact elements of future orientation.

To explore whether there were gender differences in the measurement and factor loadings between predictors and future orientation, tests for model equivalence were conducted to establish metric and scalar invariance in the model for future orientation between boys and girls. The initial model, where girls and boys were modeled separately and everything was allowed to

be non-invariant, had good fit, $\chi^2(75) = 151.45, p < .01$; CFI = .95, RMSEA = .07, SRMR = .08, as would be expected with these models. To test for metric invariance, the factor loadings of each item onto either motivation, extension, or control were constrained to be equivalent across the two groups. This model also fit well, $\chi^2(83) = 155.88, p < .01$; CFI = .95, RMSEA = .06, SRMR = .08, and did not get significantly worse, $\Delta\chi^2(8) = 4.55, p = .80$. This suggests that the loading of items across latent constructs of future orientation is comparable across boys and girls. To test for scalar invariance, the estimates for the intercepts of each of the items was constrained to be equal across the two groups. Adding this constrain significantly altered the model, $\Delta\chi^2(10) = 108.46, p < .01$, resulting in worse fit. Several of the item intercepts were unconstrained and a test for partial scalar invariance was conducted. This did not demonstrate an improvement in the model, suggesting that the scale for these items differs across boys and girls. Due to the non-invariant nature of the measure of future orientation for boys and girls, further tests for model invariance across predictors was not conducted. The intercepts, variances, and residual variances for each of the latent factors and their indicators are provided in Table 5.

Discussion

The purpose of Study 2 was to explore potential predictors of future orientation from childhood to adolescence, to explore mechanisms by which future orientation may develop. Further, predictors were divided into two conceptually distinct groups: constructs that might predict differences in capacity for future orientation, and constructs that predict individual differences in future orientation. Specifically, executive function and self-regulation were conceptualized as being developmental underpinnings of future orientation, and self-efficacy and optimism were conceptualized as being related to individual differences in future orientation. Gender, race, SES, and cognitive aptitude were included as controls.

Table 5. Model invariance for future orientation measures

Item/Factor	Boys			Girls		
	Mean/ Intercept	Variance/ Residual	p	Mean/ Intercept	Variance/ Residual	p
Extension	0.00	.01	.22	0.00	.01	.22
Item 1	4.82	.19	.01	4.89	.12	.01
Item 2	4.30	.06	.08	4.55	.04	.10
Item 3	4.29	.16	.01	4.56	.12	.01
Item 4	3.29	.47	.01	3.42	.41	.01
Motivation	0.00	.25	.01	0.00	.06	.01
Item 5	2.93	.35	.01	2.91	.32	.01
Item 6	2.24	.52	.01	2.07	.57	.01
Item 7	2.26	.63	.01	2.15	.62	.01
Control	0.00	.36	.01	0.00	.37	.01
Item 8	2.05	.40	.01	2.56	.53	.01
Item 9	2.53	.47	.01	2.53	.44	.01
Item 10	2.43	.90	.01	2.50	.87	.01
Item 11	2.89	.22	.01	2.91	.29	.01

There are several key findings from this study that provide further insight into our understanding of future orientation and its predictors. First, there appears to be evidence that future orientation is a multidimensional construct rather than a unidimensional construct. In this study, measurement models for future orientation were estimated using a unidimensional and multidimensional construction, and the three factor, higher-order model fit better than the single dimension model. Additional support for three separate dimensions comes from the pattern of relations between the three factors and longitudinal predictors – none of the predictors included in the model related to all three dimensions of future orientation. This would suggest value in distinguishing across extension, motivation, and control, rather than referring to the three constructs as one (i.e., future orientation).

Second, the finding that both developmental underpinning and individual differences predictors related to adolescent future orientation, in some cases as distant as seven years prior, is important for considering when and how future orientation begins to be shaped and molded during the lifespan. Specifically, there was evidence to suggest that gender and cognitive aptitude are both important variables to include in models predicting future orientation. Gender significantly predicted control, where girls had higher levels than boys. Gender and cognitive aptitude also indirectly contributed to the dimensions of future orientation, operating through self-efficacy and self-regulation to influence control, motivation, and extension. This may provide some insight into the processes by which adolescent girls tend to display higher levels of future orientation than boys (Nurmi, 1987). Further, model equivalency tests revealed scalar non-invariance on items used to measure future orientation for boys and girls, suggesting that the level at which these two groups respond to these items differs, which may be an indication that the items are interpreted differently by boys and girls, or that what it means to be “more future-oriented” may be different across gender. It is also noteworthy that race was not a significant predictor in these models; future research should explore whether differences in future orientation exist across cultural/ethnic groups.

When examining the predictors of capacity for future orientation, executive function appears to operate through self-efficacy to predict extension, and self-regulation operated on control both directly and through optimism. In each instance, relations were in the hypothesized directions. Regarding predictors of individual differences, mother’s education directly and positively predicted extension, and income-to-needs operated through optimism to predict control. Considering that both mother’s education and income-to-needs are indicators of SES, and that those with higher levels of SES have more opportunities for their futures (Nurmi, 1979),

these results are not surprising. Direct effects were also found for the effect of self-efficacy on extension and motivation, all positive. An additional effect of mother's education on extension was found, where those with more educated mothers had higher levels of extension in grade 10.

Taken together, these findings provide important insights into the process by which future orientation is shaped, and informs us of some of the constructs that contribute to more- or less-future-oriented individuals during adolescence. Specifically, self-efficacy and mother's education appear to directly and positively influence extension, with additional indirect effects of cognitive aptitude and executive function. This would suggest that both a capacity for extension (i.e., being able to conceptualize what future means and reason about future events) and individual differences in beliefs about success in sports, math, and English (i.e., efficacy) contribute to the ability to consider a future self, and how far into the future that self can be conceptualized. Specifically, the findings that self-regulation and executive function were significant predictors in the final model, suggests that level of these capacities is related to level of future orientation; future research should explore whether there is a threshold of these variables necessary for future orientation to emerge in a younger sample.

Similarly, the dimension of control appears to be shaped by both a capacity to maintain or inhibit behaviors in order to achieve a desired outcome (i.e., self-regulation) and a belief that the future holds something positive (i.e., optimism), as well as the resources necessary to exhibit control over one's future state. When one considers that control is conceptualized as the belief one has about capacity to influence a future outcome (Nurmi, 1987), it is not difficult to imagine that an individual who believes they can assert control over their future is likely effective at asserting control over their own action (i.e., self-regulation, Carver & Scheier, 2011), and that control will lead to a better future outcome (i.e., optimism; Garber, 2000). Interestingly, the only

dimension not predicted by both cognitive and individual differences variables is motivation. While more research is needed, this may suggest that some aspects of future orientation are related to both capacity and individual differences predictors, while other dimensions of future orientation are not predicted by both.

The findings from Study 2 not only provide additional evidence for differentiating among the dimensions of future orientation, but also the importance of considering factors related to those dimensions, which may have practical implications. For example, approximately 15% of youth who participated in the National Longitudinal Survey of Youth believed that they were at risk of dying before age 35 (Borowskey, Ireland, & Resnick, 2009). These individuals also engaged in higher rates of substance use, unprotected sex, criminal behavior resulting in an arrest, and attempted suicide more frequently. If future extension is playing a role in this process, then efforts targeted at increasing adolescents' self-efficacy may be more effective than targeting optimism, because self-efficacy in grade 6 was related to future orientation in grade 10, but optimism was not.

Limitations. There are several important limitations to consider when interpreting the findings from Study 2. First, the sample was primarily White, which limits generalizability across populations. Further, due to the nature of secondary data, the measures available were limited and time between measures was predetermined, resulting in large gaps of time between predictors and outcomes. Research in this area could benefit from a longitudinal study designed specifically to explore future orientation as it develops in children and adolescents, where future orientation is measured over time, for example.

As with Study 1, the assessment of future orientation in Study 2 is also limited. Items from a single measure (the Future Outlook Inventory) were used. Further, the construct was not

modeled in the way the authors intended. That is, this study modeled future orientation as a multidimensional construct rather than a single factor. While evidence of improved model fit using a multidimensional model was found, it is important to note that this is contrary to the conception of the scale developer.

Despite these limitations, Study 2 demonstrated the importance of experiences in childhood and early adolescence in predicting dimensions of future orientation in adolescence, providing the field with some insight into the factors that shape adolescent future orientation. Understanding how these experiences and characteristics operate on future orientation is important for aiding our understanding of when and how to influence adolescent future-oriented cognitions, and suggests that these considerations may need to be made earlier rather than later in the process.

Chapter 4

General Discussion

The purpose of this set of studies was to examine the structure of future orientation and identify predictors which may contribute to the emergence of future orientation in adolescence as well as individual differences in future orientation. Specifically, the first study described in this dissertation was intended to examine measurement of future orientation and test whether, when measures are used from different literatures, there was support for a cohesive, multidimensional definition of future orientation. The second study was designed to identify what childhood factors contributed to future orientation in adolescence, and whether developmental predictors and correlates differed across the elements of future orientation that were available.

In addition to the insights each of these studies have provided separately, when taken together, the findings from these studies have further implications for our understanding of future orientation and its development. There are several areas where findings from these studies converge, as well as areas where findings did not replicate across studies. It is important to keep in mind that these studies differed in several important ways. First, the samples were different – one was a national longitudinal sample, while the other was a sample of college students at one university, using a single time point of measurement. Further, the measures for each of the dimensions of future orientation differed, although there was some overlap with the Future Outlook Inventory, which was used in both studies and provided indicators of extension, motivation, and control. The measurement of predictors also differed, in many instances: measures of self-efficacy varied by domain, and self-regulation was based on different measures and on different reporters (i.e., self-report for Study 1 and mother report for Study 2). The only identical measure across the two studies was optimism.

Despite these limitations, there are some areas of replication across the two studies. First, in both studies future orientation was better-modeled as multidimensional rather than as a single construct. In both cases, findings suggested distinctions between extension, motivation, and control, with additional support for distinguishing between detail, number of cognitions, and sequence of events in Study 1. A further test of the model in Study 1 suggested the potential for a distinction between dimensions of the cognition (e.g., detail, number of cognitions, extension) and process, or the way those cognitions are used or built upon (e.g., motivation, control, sequence of events). Further differences were found in the prediction of the different dimensions of future orientation in Study 2, with extension and control predicted by developmental underpinnings and individual differences variables, but motivation only predicted by individual differences predictors. While these results are mixed, future research may be able to further support the notion of a distinction between the cognition and the process by looking at whether there is more consistency in underpinnings versus individual differences predictors related to cognition versus process. Specifically, it may be the case that, overall, developmental underpinnings and individual differences predictors both relate to dimensions of the future-oriented cognition, whereas only individual differences predictors related to dimensions of process.

Conceptually distinguishing between cognition and process has several important implications for the theory of future orientation that need to be further investigated. Specifically, whether future orientation is the cognition, the elaboration of that cognition, or a combination of both needs to be decided. If, for example, both the cognition and elaboration of that cognition is necessary for future orientation, then this may resolve some long-standing debates among researchers about developmental differences in future orientation between children and

adolescents (Atance, 2008). That children have a capacity to state thoughts they have about their future (e.g., provide an answer to the question “What do you want to be when you grow up?”) is common knowledge. However, if providing a cognition is not sufficient for future orientation, and additional steps toward elaborating on and reasoning about that cognition is necessary, then this may point to a distinction in children’s and adolescents’ abilities. These differences are further supported by research on cognitive development in children and adolescents, where emergent cognitive abilities in adolescence allows for the ability to consider hypothetical future states without accepting any of them as reality and then use each of those individual ideas to consider the consequences of pursuing one or more future selves in combination (Kuhn, 2008; Moshman, 2009). It may therefore be this elaboration or further processing of a cognition that distinguishes future orientation in adolescence from future thought in childhood.

If it is determined that future orientation is in fact a combination of cognition and process, rather than the cognition alone, this would have profound implications for the field. While the potential advantage of determining developmental differences is appealing, excluding models and research on future orientation that include only a cognition would also exclude a large proportion of research in this area. Specifically, Possible Selves (Markus & Nurius, 1984) and much of the sociological literature (Meersmith & Schulenburg, 2004) only assess dimensions of the cognition, and conceptually it is easy to consider a context where a cognition occurs in the absence of elaboration and process, even with adults. Determining that these cognitions are not future orientation may result in the dismissal of cognitions that have important implications for later outcomes. Because process has not been measured with possible selves, for example, we cannot know whether the process was occurring without the researchers capturing that process, and the combination was important for influencing an outcome, or whether the

cognition in the absence of a process or elaboration influenced a particular outcome. Thus, more research is needed to determine which dimensions of future orientation are important for predicting outcomes of concern (e.g., educational attainment, Beal & Crockett, 2010).

While consistencies in future orientation as a multidimensional construct was found for Study 1 and Study 2, there were also several discrepancies across the two studies. With participant background characteristics, gender did not predict any of the three dimensions in Study 1, but significantly predicted control in Study 2, where girls displayed higher levels of control than boys. The inconsistency of these findings may suggest that gender differences in future orientation are less prevalent overall, or that differences exist in adolescence but are not present in young adulthood, at least for college students. Another participant characteristic, mother's education, significantly and positively predicted motivation in Study 1, and significantly and positively predicted extension in Study 2. Again, the lack of replication in these findings may be due to population or developmental differences, or may be due to a lack of consistency in these relations across contexts.

Self-efficacy, optimism, and self-regulation were also assessed in both studies, and again the findings are divergent. Optimism significantly and positively predicted extension and motivation in Study 1, but only predicted control in Study 2, although there was evidence in Study 2 that optimism may be operating through self-efficacy to predict extension and motivation. In Study 1, self-efficacy negatively predicted motivation, whereas in Study 2 efficacy predicted both extension and motivation positively. These differences are especially curious, given the change in direction of the relations. Future research should explore these differences in further detail. Finally, self-regulation significantly and positively predicted motivation in Study 1 and control in Study 2. Given that measures of self-regulation across the

two studies differed both in the items used and in the reporter (i.e., self-report in Study 1, mother report in Study 2) it is difficult to draw any conclusions about why these findings differed across studies.

In summary, there was consistent evidence across the two studies that future orientation is not a single construct, but rather a multidimensional construct at best and perhaps even multiple constructs that should be kept distinct. Further, predictors and correlates related differently to each of the dimensions of future orientation assessed within and across studies, providing further evidence that these dimensions are distinct. Unfortunately, these were the only similarities found across the two studies. The relations between predictors and dimensions of future orientation did not replicate between Studies 1 and 2, which may be an indication of a lack of generalization across populations (i.e., patterns of change in a national adolescent sample as compared to a college sample from a single university), differences in cross-sectional versus longitudinal studies, or a lack of robustness to the relations themselves.

Future Directions

In addition to the replication and generalization of findings from the two studies discussed in this dissertation, there are several next steps that should be taken in order to enhance our understanding of future orientation. First, an empirically supported and validated definition and measurement of future orientation is needed. While this research was a first-step in providing insight into how multiple aspects of future orientation may relate to each other, and which aspects may or may not contribute to the same underlying construct, additional support for these findings is needed. As a first step, it may be useful to explore the effectiveness of each measure of future orientation already commonly used in the current literature as it was intended, to see what empirical support is present for each of those models of future orientation.

Comparisons of the effectiveness of currently used measures with comparable samples would be ideal, to minimize other confounds.

A second important step in addressing the issue of conceptualizing future orientation is accounting for domain and affect in models. In this set of studies, there was no way to estimate a general model and simultaneously include domain and affect as dimensions. In the future, models could be estimated within a domain, to explore whether the structure and correlates of future orientation varies by domain, and within each of the three affects assessed to see whether the structure and correlates vary among hoped for, expected, and feared types of future-oriented cognitions. If models were to differ, that would raise further questions about the possibility of a single definition of future orientation, and whether the structure within a domain would hold across populations and across time. It could be the case, for example, that the structure of occupational future-oriented cognitions changes from early to late adulthood. There is already evidence to suggest that the frequency and content of cognitions within this domain changes across the lifespan (Cross & Markus, 1991); changes in structure of measurement within a domain across time would suggest further complexities to this construct.

The pattern observed in the data for Study 1 suggests that some individuals respond to questions about the content and timing of their future-oriented cognitions with events had either already taken place or would never take place in the future. This raises another important area for future research. One limitation to assessing future orientation is that you cannot ask individuals to tell you about their ideas for their own futures without forcing them to think about the future. Responding to questions about future orientation with events that individuals anticipate never happening could represent a lack of previous thought about the future in that area, or it could indicate an area where individuals really are fearful of a particular future event happening (e.g.,

not getting employment after graduation), but at the same time estimate the likelihood of that event taking place is minimal, either accurately or inaccurately. For example, believing an event will not take place, as compared to believing that an event may take place in a given time frame, may have an impact on the structure of future orientation and how future orientation relates to other constructs. This may provide further insight into how future orientation impacts motivation and planning.

Another large gap in the current literature on future orientation is an understanding of where future orientation comes from and how it is shaped during childhood and adolescence. There is currently some debate in the literature about whether children can consider the future in a meaningful way (e.g., Atance, 2008), and longitudinal research exploring future orientation from childhood to adolescence is non-existent. If children are capable of considering the future in the same way that adolescents and adults do, then looking at what shapes future orientation would require a very different study than was conducted here. Further, knowing whether the ability to consider the future aligns with social and interpersonal experiences that promote future orientation (e.g., schools, Nurmi, 2009) would be valuable from research, program, and policy perspectives.

Reconsidering Future Orientation as a Construct

While there have been many theories developed to address how future orientation should be conceptualized, it seems clear that Trommsdorff's (1983) definition may not be the most appropriate. Specifically, this comprehensive definition, which involves eight dimensions, appears to include components that are not related to one another in a way that allows for a single factor. As a result, we must be forced to question which dimensions should be part of future orientation conceptually, and which dimensions may be correlates or factors that are

important for the process of linking future orientation to outcomes of interest, but should not be considered part of future orientation itself.

There are several alternative theories that may give some guidance. For example, possible selves theory (Markus & Nurius, 1984) conceptualized future orientation as including the dimensions of domain and affect. This would suggest that motivation, control, extension, detail, number of cognitions, and sequence of events are perhaps part of a related process, but are not part of future orientation. Alternatively, Nurmi (1987) suggests that future orientation should be conceptualized as domain, affect, motivation, control, and detail; here, extension, number of cognitions, and sequence of events would not be included as part of future orientation. Finally, some researchers contributing to the future time perspective literature have used extension as the only dimension of future orientation (e.g., Zaleski, 1994).

Given that the findings from this set of studies did not support a comprehensive definition, where future orientation is comprised of extension, domain, detail, affect, motivation, control, number of cognitions, and sequence of events, a clearly laid out alternative model is needed. To determine which dimensions should be conceived as part of future orientation, we must first examine each dimension critically, and consider whether it is logical to include those dimensions as part of future orientation.

First, extension is the length of time into the future that individuals tend to imagine or plan for. Some researchers have suggested that individuals who hold the majority of their goals three or fewer years into the future are considered present-oriented, and those who hold the majority of their goals three or more years into the future are considered future-oriented (Zaleski, 1994). Second, the domain of a future-oriented cognition is often used to organize future goals

into general categories for the purpose of understanding future orientation, and includes education, occupation, relationships, and health, along with several other categories. An additional dimension, detail, is an attempt to capture the amount of elaboration on a future goal that an individual has engaged in. Fourth, affect is the emotional valence attached to a future goal. The last four dimensions from the definition provided by Trommsdorff (1987) are motivation (e.g., how willing individuals are to invest in a future goal or how much they desire to attain that goal); control (e.g., how much an individual believes that he or she can influence future events); number of cognitions (e.g., how many beliefs about the future an individual holds); and the sequence of events (e.g., the order in which future goals are expected to be achieved).

Examining these eight dimensions, I would argue that, in the absence of data, there appear to be two distinct types of constructs included, some which represent the *content* of a future-oriented cognition, or the actual goal/future self that an individual conceptualizes, which I suggest is what future orientation is. In contrast, there are also some dimensions that likely moderate the relations between future orientation and outcomes of interest, but should not be considered part of future orientation itself. At a first glance, it would seem that there has to be some sort of time component involved in what makes up future orientation— after all, this is *future* orientation. For this reason, I would argue that extension is a criterion for future orientation, and is therefore one dimension of future orientation. While extension has typically been assessed with questions about a specific timeline (e.g., number of years in the future), a more appropriate measure may be whether the individual anticipates the future status to occur in the near future or the distant future, especially for goals that individuals are in the process of

conceptualizing. While “near” and “distant” may not be precise, such a distinction would allow for some differentiation between short-term and long-term goals.

Extension is not the only dimension of the content of future orientation that I would argue should be part of the definition of future orientation. Domain and detail both represent aspects of content, where domain represents the category of the future-oriented cognition, and detail represents elaboration of the cognition; it seems logical that these dimensions should be included as part of the definition. Affect would also seem to be an important part of the future goal, because individuals likely automatically have an emotion about a particular goal (e.g., desire it or fear it). Thus, it would appear that the *content* of a future-oriented cognition includes extension, detail, domain, and affect. Interestingly, in the alternative model of future orientation tested at the end of Chapter 2, extension and detail were both significant indicators of the “content” factor (domain and affect could not be modeled). One could argue that the *content* is in fact what future orientation is, and the other four dimensions are not part of future orientation, although they may be related to it in important ways.

If motivation, control, number of cognitions, and sequence of events are not part of future orientation, then how should they be conceptualized, given that they have been considered as part of future orientation in previous research? I would argue that these four dimensions are actually correlates of future orientation, and may play a key role in moderating the relations between future orientation and outcomes of interest (see Figure 29). In many ways, motivation and control are similar to other psychological constructs, including self-efficacy, locus of control, and delay of gratification. It may be that these two dimensions in particular moderate the link between future orientation and behavior or achievement, where adolescents with higher levels of motivation and perceptions of control over a particular future-oriented cognition are

more likely to work to achieve their desired outcome. Given that affect tends to be a strong motivator, it is likely that these two components are highly correlated; however, I would argue that they are still distinct constructs. It is possible that some adolescents have affect-valenced future-oriented cognitions that are not motivating (e.g., a feared self that one does not expect to actually happen). It is also possible that motivation could come from sources other than affect; for example, financial incentives or motivation to meet basic needs. If affect and motivation are distinguishable, then affect is likely part of future orientation, while motivation is a correlate.

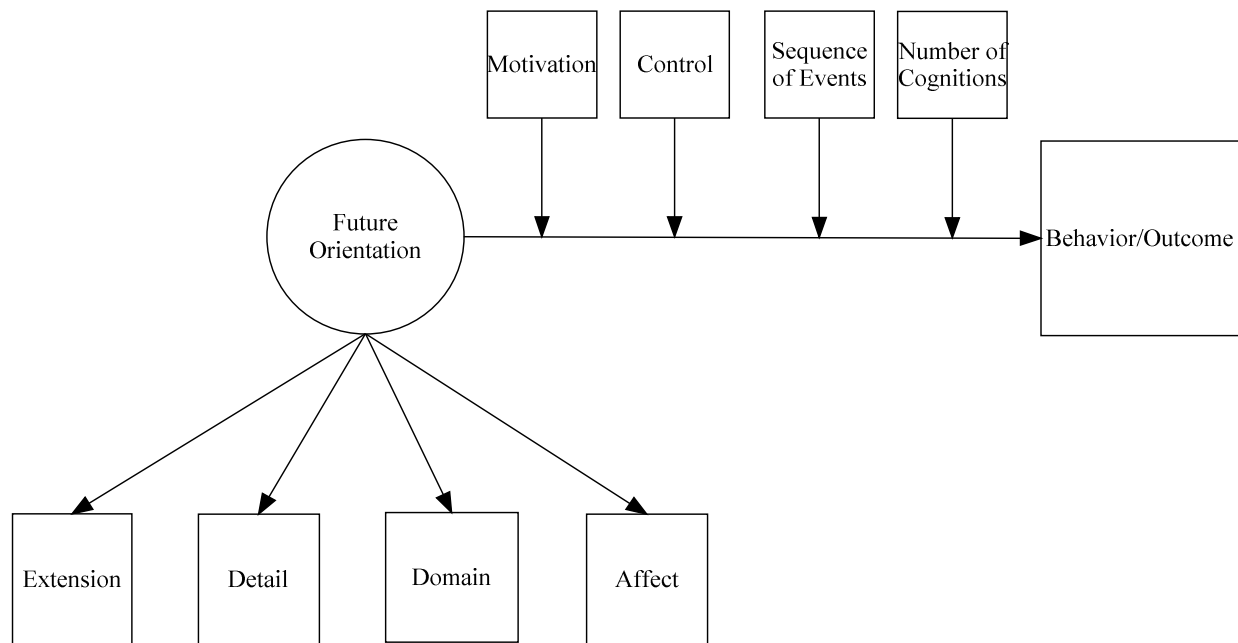


Figure 29. Alternative Conceptualization of Future Orientation

As to number of cognitions and sequence of events, these may be indicators of a more sophisticated organization of future-oriented cognitions rather than future orientation itself, and may therefore be separate constructs as well. It is possible that holding multiple future-oriented cognitions may also moderate the impact of future orientation on behavior, where having too many or too few beliefs about the future may weaken the link between belief and outcomes.

Similarly, adolescents may be more likely to achieve a particular future-oriented cognition (e.g.,

going to college) when they perceive that goal as a step in the process toward another goal (e.g., getting a job in a particular field), which would also mediate relations between future orientation and outcomes of interest.

Thus, I would propose that an alternative definition of future orientation would include extension, detail, domain, and affect. In contrast, motivation, control, number of cognitions, and sequence of events may be correlates (and potential moderators): although they are important for linking future orientation to outcomes of interest, they are less central to the construct of future orientation itself. However, future research should examine this more closely, drawing on discussions with adolescents about how they are conceptualizing their future goals.

In summary, there are several important steps that must be taken in order to move our understanding of future orientation as a construct forward. Understanding what the construct is and how development and experiences shape the construct are both critical. This set of studies represents a first step in attempting to address those issues; more research is needed to clarify and replicate findings, and to extend our knowledge beyond the populations used here. This area represents a promising and exciting area for researchers, with important implications for child and adolescent development in a variety of settings, but implications cannot be understood without first establishing a foundation for future orientation as a cohesive literature.

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Appendix A

Survey 1 – Adapted from Online Version**Informed Consent Form: Thinking about the Future**

You are being asked to participate in this research study because you are an undergraduate at the University of Nebraska-Lincoln. The following information is provided in order to help you to make an informed decision whether or not to participate. If you have any questions do not hesitate to ask. The purpose of this study is to evaluate how undergraduates think about their future, and how that is related to other aspects of student life. Researchers know that people think about their futures, but little is known about how different kinds of future-oriented thinking are related, or how that affects identity and other areas of cognitive and social development. This study is not intended to provide any personal benefit to you, but it will benefit society as we learn more about how people think about and conceptualize their futures. You will be asked questions about your thoughts about your future, your background, your beliefs about your ability to control the things that happen to you, and how you think about yourself. There is no known risk associated with this research. The questionnaires that have been designed for the study ask questions about your beliefs about your future and are not expected to be stressful. Your responses will be kept strictly confidential. Aggregate information obtained in this study may be published in scientific journals or presented at scientific meetings, but your identity will be kept strictly confidential. Although we hope you will agree to participate, you are not obligated to do so. Whether you participate or not will not affect any decisions made by the University of Nebraska, or by your instructors, and there are no negative consequences if you decide not to participate. You may withdraw agreement to participate at any time. This questionnaire is expected to take about 1 hour to complete. Participants in this study will be compensated 2 Experimetrix credits, which can be applied to the psychology course of your choosing. Participants who begin but do not complete the study will be fully compensated. You are free to withdraw from the study at any time. If you do not want to participate in this study, there are other opportunities available on Experimetrix or you can speak with your instructor about alternative options. Your rights as a research participant have been explained to you. You may ask questions of the investigator by emailing Sarah Beal at sarahbeal@huskers.unl.edu or calling 402-472-9807. If you have any additional questions, you may contact the principal investigator, Sarah Beal (402-472-9807), Lisa J. Crockett (402-472-0584) or the UNL Institutional Review Board (402 472-6965). TYPING YOUR NAME BELOW INDICATES THAT YOU HAVE READ AND UNDERSTAND THE INFORMATION PRESENTED AND HAVE AGREED TO PARTICIPATE. YOU MAY PRINT OUT THIS FORM FOR YOUR RECORDS.

<p>outcomes of a decision in my mind before I decide what to do</p> <p>I don't think it's worth it to worry about what I can't predict</p>	○	○	○	○	○	○	○
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What is your gender?

- Man (1)
- Woman (2)
- Prefer not to answer (3)

Which of the following racial/ethnic groups are you a member of? (check all that apply)

- White, non-Hispanic (1)
- White, Hispanic/Latino (2)
- Black (3)
- Other (please describe): (4) _____
- Asian/Pacific Islander (5)
- Native American (6)
- Prefer not to specify (7)

What is your age?

How many years have you been attending college?

What year are you in school?

- Freshman (1)
- Sophomore (2)
- Junior (3)
- Senior (4)
- Other (5)

What was your high school Grade Point Average (GPA)? _____

What is your current Grade Point Average (GPA)? _____

What is your current employment status?

- Not currently employed (1)
- Employed part-time (1-20 hours per week) (2)
- Employed part-time (21-39 hours per week) (3)
- Employed full-time (40 or more hours per week) (4)
- Prefer not to specify (5)

Which of the following best describes your parents' education?

	Attended but did not complete high school (1)	Completed high school (2)	Attended but did not complete college (3)	Completed college (4)	Attended but did not complete graduate school/professional training (5)	Completed graduate school/professional training (6)
Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Which of the following best describes your family of origin?

- The family I grew up in had an income that would be considered "low" or "modest"
- The family I grew up in had an income that would be considered "middle" or "moderate"
- The family I grew up in had an income that would be considered "high"

Many people have ideas and goals about what they most want for their future lives. Consider the area of your future occupation. If you could have any occupation you wanted, what occupation do you most hope to be or do in the future?

How long will it take you to complete this goal, in years?

possibility?							
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For each of the following questions, please choose the answer that best describes the goal you identified above

	Please Choose 1 Response						
	Disagree completely (1)	Mostly disagree (2)	Slightly disagree (3)	Neither agree nor disagree (4)	Slightly Agree (5)	Mostly agree (6)	Agree Completely (7)
I am making serious preparation for that future possibility.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have clear plans for achieving this future possibility.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Many people have ideas and goals about what they expect or think is most likely for their future lives. Consider the area of your future occupation. What occupation do you think you will probably be or do in the future?

How long will it take you to complete this goal, in years?

For each of the following questions, please choose the answer that best describes the goal you identified above

For each of the following questions, please choose the answer that best describes the goal you identified above

	Please Choose 1 Response						
	Disagree completely (1)	Mostly disagree (2)	Slightly disagree (3)	Neither agree nor disagree (4)	Slightly agree (5)	Mostly agree (6)	Agree completely (7)
I am making serious preparation for that future possibility.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have clear plans for achieving this future possibility.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Many people have ideas and goals about what they fear or want to avoid for their future lives. Consider the area of your future occupation. What occupation do you fear being or doing in the future?

When do you fear this will happen to you, in years?

For each of the following questions, please choose the answer that best describes the goal you identified above

	Please Choose 1 Response			
	Not at all (1)	A little bit (2)	Somewhat or Some effect (3)	A lot or Very likely (4)
To what extent is preventing this from happening to you worth your effort?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<p>I can easily continue working where I left off.</p>							
<p>If there are other things going on around me, I find it hard to keep my attention focused on whatever I'm doing.</p>	○	○	○	○	○	○	○
<p>I never know how much more work I have to do.</p>	○	○	○	○	○	○	○
<p>When I have a serious disagreement with someone, I can talk calmly about it without losing control.</p>	○	○	○	○	○	○	○
<p>It's hard to start making plans to deal with a big project or problem, especially when I'm feeling stressed.</p>	○	○	○	○	○	○	○
<p>I can calm myself down when I'm excited or all wound up.</p>	○	○	○	○	○	○	○

way to stick with my plans and goals, even when it's tough.							
When I have a big project, I can keep working on it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can resist doing something when I know I should not do it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please choose the response that you believe best describes you.

	Please Choose 1 Response				
	Not at all (1)	Just a little (2)	Some (3)	Quite a bit (4)	A lot (5)
In a new or unknown situation, I usually expect the best.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's easy for me to relax.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think that things will go wrong for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm always positive about my future.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enjoy my friends a lot.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's important for me to	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<p>style” view, but I have not really found it yet.</p> <p>There are many reasons for friendship, but I choose my close friends on the basis of certain values and similarities that I have personally decided on.</p> <p>While I do not have one recreational activity I am really committed to, I am experiencing numerous leisure outlets to identify one I can really get involved in.</p> <p>Based on past experiences, I have chosen the type of dating relationship I want now.</p> <p>I might have thought about a lot of different jobs, but my parents said what they wanted and I have not questioned that.</p> <p>I have never really seriously considered men’s and women’s roles in relationships. It</p>	○	○	○	○	○	○	○
	○	○	○	○	○	○	○
	○	○	○	○	○	○	○
	○	○	○	○	○	○	○

<p>I have spend some time thinking about men's and women's roles in a relationship and I have decided what will work best for me.</p>	○	○	○	○	○	○	○
<p>In finding an acceptable viewpoint to life itself, I find myself engaging in a lot of discussions with others and some self-exploration.</p>	○	○	○	○	○	○	○
<p>I only pick friends my parents would approve of.</p>	○	○	○	○	○	○	○
<p>I have always liked doing the same recreational activities my parents do and have not ever seriously considered anything else.</p>	○	○	○	○	○	○	○
<p>My parents decided a long time ago what I should go into for employment and I am following their plans.</p>	○	○	○	○	○	○	○
<p>I have been thinking about the roles of men and women a lot</p>	○	○	○	○	○	○	○

Appendix B

Tables for Analyses in Study 1

B1. Univariate Statistics for Study 1 Measures

	Mean	SD
Gender	23% male	
Race	83% white	
Age	20.12	3.33
Time in School	2.17	1.61
Year in School	2.13	1.18
High School GPA	3.16	1.25
Current GPA	3.55	1.49
Employment Status	1.73	.85
Mother Education	2.77	2.73
Father Education	2.32	2.87
Family Income	2.05	.50
Self-Efficacy Scale Score	3.91	1.24
Self-Regulation Scale Score	4.63	.90
Optimism Scale Score	3.85	1.83
Identity Score	3.43	1.96

B2. Bivariate Statistics for Study 1 Measures – Factor Scores

	Extension	Detail	Number of Cognitions	Sequence of Events	Control	Motivation
Family SES	.08	.03	.01	.05	-.02	.00
Gender	.07	-.01	.09	.02	-.04	.17
Time in School	.12	-.09	-.01	-.17	-.18	.03
GPA	.02	-.07	.02	.18	.08	.02
Employment	.00	.12	.10	-.05	-.10	-.03
Mother's Education	.05	.24**	-.13	.02	.00	.07
Father's Education	.02	.04	-.07	-.06	.02	.06
Self-Regulation	.19*	.28**	-.11	-.02	-.12	-.13
Self-Efficacy	.26**	-.07	-.26**	.14	.00	-.21*
Optimism	.32**	.08	-.14	.20*	.00	.07
Identity	-.13	-.02	.12	-.05	.05	.01

* $p < .05$; ** $p < .01$

B3. Univariate and Bivariate Statistics for Extension

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Time to Achieve Occupational Hope	-														
2. Occupational Expectation	.72**														
3. Avoid Occupational Fear	-0.03	0.01													
4. Educational Hope	.33**	.36**	.18*												
5. Educational Expectation	.36**	.56**	.16*	.72**											
6. Avoid Educational Fear	.26**	.39**	0.14	.30**	.41**										
7. Recreational Hope	0.03	.17*	.24**	.15*	0.11	0.11	-								
8. Recreational Expectation	0.08	.21**	.32**	0.13	0.12	.17*	.89**	-							
9. Avoid Recreational Fear	-0.02	0.13	.31**	0.07	.18*	.21*	.28**	.33**	-						
10. Health Hope	0.14	.18*	.25**	0.12	0.12	0.17	0.07	.18*	.19*	-					
11. Health Expectation	0.09	0.08	.23**	0.08	0.12	.17*	0.07	.18*	.24**	.89**	-				
12. Avoid Health Fear	0.07	0.13	.20*	0.14	.19*	0.12	.16*	.20*	.37**	.44**	.35**	-			
13. I think about how things might be in the future	0.04	0.03	-0.07	0.05	-0.01	0.11	-0.01	0.02	0.02	0.05	0.13	0.06	-		
14. I can see my life 10 years from now	-0.04	0.01	-0.05	-0.01	0.05	0.09	-0.02	0.03	0.03	0.05	0.06	0.03	.25**	-	
15. I often think about what tomorrow will bring	-0.09	-0.05	0.05	0.10	-0.01	0.03	0.07	0.08	0.06	.160*	0.13	-0.02	.43**	.25**	-
Mean	7.14	5.76	4.88	6.07	5.01	3.03	4.57	4.75	13.15	14.97	14.47	18.55	6.19	4.49	5.48
SD	4.09	3.17	5.69	3.42	3.09	2.77	5.62	6.81	16.32	25.43	23.81	18.65	0.92	1.46	1.05

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

B4. Univariate and Bivariate Statistics for Detail

	1	2	3	4	5
1. Occupational Detail	-				
2. Educational Detail	.43**	-			
3. Family Detail	0.15	.22*	-		
4. Recreation Detail	.39**	0.15	0.16	-	
5. Health Detail	0.16	.27**	.35**	.36**	-
Mean	0.00	0.00	0.00	0.00	0.00
SD	0.23	0.75	0.81	0.92	0.78

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

B5. Univariate and Bivariate Statistics for Number of Cognitions

	1	2	3	4	5
1. Occupation	-				
2. Education	.31**	-			
3. Relationships	.15*	.44**	-		
4. Health	.16*	.40**	.62**	-	
5. Recreation	.13	.36**	.56**	.67**	-
Mean	3.43	2.96	2.93	2.88	2.77
SD	.72	.59	.57	.52	.69

* $p < .05$; ** $p < .01$

B6. Univariate and Bivariate Statistics for Motivation

Item (See Note)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
2	.33**	-																	
3	.22**	.37**	-																
4	.01	-.10	.01	-															
5	.16*	.18**	.01	.10	-														
6	.10	.10	.10	.10	.28**	-													
7	-.10	.10	.01	.01	.17*	.10	-												
8	.10	.10	.01	.01	.29**	.19**	.10	-											
9	.18**	.10	.01	.10	.27**	.32**	.20**	.52**	-										
10	.01	.10	-.10	.01	.17*	.10	.42**	.19**	.25**	-									
11	-.10	-.10	.01	.01	.10	.15*	.01	.10	.10	.01	-								
12	.01	-.10	.10	.01	.14*	.28**	.01	.10	.16*	.01	.65**	-							
13	-.10	.01	.01	.01	.10	.01	.37**	.10	.01	.46**	.28**	.22**	-						
14	.01	.01	.01	.01	.19**	.28**	-.10	.10	.10	-.15*	.19**	.19**	.10	-					
15	.16*	.01	.01	.10	.16*	.28**	.01	.10	.17*	-.10	.18*	.20**	.10	.71**	-				
16	-.10	.01	.01	.01	.10	.10	.27**	.01	.17*	.39**	.10	.10	.46**	.21**	.28**	-			
17	.10	.01	.01	.15*	.10	.01	.01	.10	.29**	.01	.20**	.15*	.24**	.10	.22**	.16*	-		
18	.10	-.10	.01	.10	.10	.10	.01	.10	.16*	.01	.23**	.34**	.16*	.34**	.35**	.19**	.33**	-	
19	.01	.01	.01	-.10	.01	.01	.19**	.15*	.18**	.28**	.19**	.10	.52**	.10	.10	.42**	.27**	.20**	-
Mean	5.22	4.36	4.18	4.06	3.84	3.80	3.48	3.82	3.82	3.46	3.82	3.72	3.56	3.66	3.61	3.41	3.83	3.75	3.72
SD	1.12	1.22	1.36	1.43	0.43	0.48	0.90	0.48	0.53	0.95	0.43	0.54	0.77	0.58	0.62	0.96	0.46	0.51	0.72

* $p < .05$, ** $p < .01$ **Note: Items are as follows** - 1. I will keep working at difficult, boring tasks if I know they will help me get ahead later.

2. I will give up my happiness now so that I can get what I want in the future.

3. I would rather save my money for a rainy day than spend it now on something fun.

4. I don't think it's worth it to worry about what I can't predict

To what extent is this worth your effort? (5-occupational hope; 6-occupational expectation; 8-educational hope; 9-educational expectation;

11-relational hope; 12-relational expectation; 14-health hope; 15-health expectation; 17-recreational hope; 18-recreational expectation

To what extent is preventing this from happening to you worth your effort? (7-occupational fear; 10-educational fear; 13 - relational fear;

16-health fear; 19-recreational fear)

B7. Univariate and Bivariate Statistics for Control

	2	3	4	5	6	7	8	9	10	11	21	22	23	24	25	26	M	SD
1 I make lists of things to do.	0.33	0.18	0.29	0.20	0.07	0.14	0.11	0.09	0.20	0.08	0.20	0.22	0.03	0.21	0.25	-0.08	5.64	1.38
2 Before making a decision, I weigh the good vs. the bad.	-	0.60	0.28	0.69	0.03	0.05	-0.01	0.05	0.05	-0.06	0.10	0.10	-0.10	0.03	0.05	-0.10	5.33	1.22
3 I think about the consequences before I do something.	-	0.33	0.65	0.05	0.05	0.13	-0.04	0.09	0.08	0.00	0.18	0.10	-0.08	0.05	0.08	-0.07	5.33	1.27
4 I think things work out better when you've planned for them in advance	-	0.35	0.12	0.17	0.08	0.07	0.05	0.05	0.05	-0.04	0.24	0.29	-0.03	0.09	0.17	-0.04	5.28	1.08
5 I run through all the possible outcomes of a decision in my mind before I decide what to do	-	-0.04	-0.04	0.00	0.07	0.07	0.07	0.07	0.07	0.01	0.17	0.13	-0.07	0.11	0.15	-0.05	4.89	1.24
6 Occupational Hope	-	0.34	0.17	0.38	0.10	0.03	0.32	0.24	0.10	0.03	0.32	0.24	-0.03	0.15	0.11	0.00	3.86	.41
7 Occupational Expectation	-	-	0.15	0.23	0.31	0.15	0.21	0.36	0.31	0.15	0.21	0.36	-0.01	0.15	0.16	-0.06	3.81	.48
8 Occupational Fear	-	-	0.25	0.23	0.39	0.39	0.03	0.23	0.23	0.39	0.03	-0.02	-0.05	0.00	-0.03	-0.01	3.56	.82
9 Educational Hope	-	-	0.66	0.31	0.09	0.06	0.31	0.09	0.66	0.31	0.09	0.06	0.07	0.32	0.30	0.02	3.82	.49
10 Educational Expectation	-	-	-	0.36	-0.01	0.05	0.00	0.24	0.36	-0.01	0.05	0.00	0.00	0.24	0.36	-0.05	3.82	.51
11 Educational Fear	-	-	-	0.04	-0.03	0.01	0.05	0.12	0.04	-0.03	0.01	-0.03	0.01	0.05	0.12	0.13	3.53	.90
12 Relationship Hope	-	-	-	0.08	0.12	-0.06	0.08	0.12	0.08	0.12	0.08	0.12	-0.06	0.08	0.07	0.04	3.70	.51
13 Relationship Expectation	-	-	-	0.08	0.11	0.00	0.07	0.11	0.08	0.11	0.00	0.11	0.00	0.07	0.04	-0.03	3.65	.59
14 Relationship Fear	-	-	-	0.00	-0.07	-0.01	-0.07	-0.01	-0.07	-0.01	-0.07	-0.01	-0.01	-0.07	-0.01	0.01	3.45	.80
15 Health Hope	-	-	-	0.03	0.05	-0.09	0.03	0.00	0.05	-0.09	0.03	0.05	-0.09	0.03	0.00	-0.11	3.72	.54
16 Health Expectation	-	-	-	0.12	0.08	-0.03	0.05	0.05	0.08	-0.03	0.05	0.05	-0.03	0.05	0.05	-0.12	3.66	.60
17 Health Fear	-	-	-	0.00	0.01	0.01	-0.01	0.04	0.01	0.01	-0.01	0.04	-0.01	-0.01	0.04	-0.02	3.33	.98
18 Recreational Hope	-	-	-	-0.02	0.03	-0.02	-0.02	0.06	0.03	-0.02	-0.02	0.03	-0.02	-0.02	0.06	-0.03	3.79	.54
19 Recreational Expectation	-	-	-	-0.03	-0.02	-0.07	0.00	0.01	-0.03	-0.02	-0.02	-0.02	-0.07	0.00	0.01	-0.11	3.78	.45
20 Recreational Fear	-	-	-	-0.03	-0.09	-0.04	-0.03	-0.09	-0.03	-0.04	-0.03	-0.09	-0.04	-0.03	0.03	0.05	3.53	.79
21 Occupational Hope	-	-	-	-	0.73	0.15	0.47	0.50	0.26	0.19	0.20	0.22	0.15	0.47	0.50	0.26	5.19	1.20

22	Occupational Expectation	-	0.22	0.44	0.57	0.26	5.26	1.24
23	Occupational Fear		-	0.23	0.24	0.40	2.70	1.79
24	Educational Hope			-	0.69	0.19	5.06	1.44
25	Educational Expectation				-	0.25	5.31	1.34
26	Educational Fear					-	3.43	2.00
27	Relationship Hope						4.55	1.82
28	Relationship Expectation						4.50	1.85
29	Relationship Fear						2.77	1.67
30	Health Hope						4.51	1.78
31	Health Expectation						4.38	1.78
32	Health Fear						2.87	1.71
33	Recreational Hope						4.77	1.79
34	Recreational Expectation						4.51	1.80
35	Recreational Fear						3.52	1.86

B8. Univariate and Bivariate Statistics for Sequence of Events

	1	2	3	4	5	Mean	SD
1. I like to plan things out one step at a time	-					4.99	1.33
2. I make decisions and act without thinking about the big picture	-.19	-				3.30	1.17
3. I'm pretty good at seeing in advance how things will play out	.34	-.14	-			4.80	1.06
4. Order for hopes	-.11	-.12	-.02	-		.22	.69
5. Order for expected	-.06	-.29	.32	.57	-	.44	.82
6. Order for feared	.13	.09	-.22	.58	.39	.41	.82

B9. Unstandardized factor loadings for model of Extension

		Estimate	Standard Error	P-Value
1	Occupational Hope	1.00	0.00	0.00
2	Occupational Exp	1.34	0.17	0.00
3	Occupational Fear	0.22	0.30	0.46
4	Educational Hope	0.60	0.20	0.00
5	Educational Exp	0.88	0.19	0.00
6	Educational Fear	0.39	0.29	0.17
7	Recreational Hope	0.63	0.25	0.01
8	Recreational Exp	0.74	0.28	0.01
9	Recreational Fear	0.20	0.26	0.44
10	Health Hope	1.02	0.24	0.00
11	Health Exp	1.05	0.26	0.00
12	Health Fear	0.74	0.27	0.01
13	Think about future	0.86	0.17	0.00
14	See life in 10 years	1.18	0.24	0.00
15	Think about tomorrow	1.15	0.21	0.00
	4 with 5	0.55	0.12	0.00
	7 with 8	2.05	0.30	0.00
	7 with 9	0.45	0.21	0.03
	8 with 9	0.44	0.23	0.06
	10 with 11	1.09	0.21	0.00
	10 with 12	0.92	0.21	0.00
	11 with 12	0.54	0.20	0.01
	3 with 6	1.24	0.33	0.00
	3 with 9	0.99	0.30	0.01
	3 with 12	0.55	0.24	0.02
	6 with 9	1.23	0.30	0.00
	6 with 12	0.74	0.24	0.01
	9 with 12	0.71	0.22	0.01
	5 with 11	0.20	0.10	0.04

B10. Unstandardized factor loadings for model of Number of Cognitions

	Estimate	SE	P-Value
Occupation	1.00	0.00	999.00
Education	2.24	0.85	0.01
Relationships	3.18	1.26	0.01
Health	3.34	1.32	0.01
Recreation	4.05	1.60	0.01
Occupation with Education	0.09	0.03	0.00

B11. Unstandardized factor loadings for model of Detail

	Estimate	Standard Error	P-Value
Occupation	-0.403	0.204	0.049
Education	-4.993	18.666	0.789
Family	1	0	.999
Recreation	1.306	0.444	0.003
Health	1.325	0.37	0

B12. Unstandardized factor loadings for model of Motivation

	Estimate	Standard Error	P-Value
Factor Score for Effort	-0.15	0.14	0.28
Work to get ahead	0.38	0.17	0.02
Give up on happiness now	1.26	0.44	0.00
Save money	0.41	0.20	0.04
Worry about things I cannot predict	-0.27	0.14	0.06

B13. Unstandardized factor loadings for model of Control

	Estimate	Standard Error	P-Value
What effect your effort has			
Occupational Hope	0.43	0.17	0.01
Occupational Exp	0.57	0.13	0.00
Occupational Fear	0.29	0.17	0.08
Educational Hope	0.32	0.18	0.07
Educational Exp	0.40	0.12	0.00
Educational Fear	0.37	0.15	0.02
Relationship Hope	0.60	0.15	0.00
Relationship Exp	0.56	0.18	0.00
Relationship Fear	0.77	0.17	0.00
Recreation Hope	0.92	0.15	0.00
Recreation Exp	0.99	0.16	0.00
Recreation Fear	1.00	0.18	0.00
Health Hope	0.90	0.14	0.00
Health Exp	0.99	0.16	0.00
Health Fear	0.77	0.17	0.00
Gathering information about future event			
Occupational Hope	1.00	0.00	999.00
Occupational Exp	2.90	4.42	0.51
Occupational Fear	-0.07	0.09	0.44
Educational Hope	1.16	0.25	0.00
Educational Exp	1.85	2.75	0.50
Educational Fear	0.02	0.08	0.85
Recreation Hope	1.55	0.49	0.00
Recreation Exp	7.53	11.21	0.50
Recreation Fear	0.01	0.06	0.86
Health Hope	5.10	1.46	0.00
Health Exp	6.95	9.90	0.48
Health Fear	0.02	0.08	0.84
Future Outlook			
Make lists	1.00	0.00	999.00
Weigh good and bad	2.45	0.85	0.00
Consider consequences	2.32	0.83	0.01
Things go better when planned	0.89	0.40	0.03
Consider outcomes	2.74	0.98	0.01
Effort with Gather Information	-0.02	0.16	0.92
Future Outlook with Effort	0.11	0.06	0.06
Future Outlook with Gather Information	0.06	0.15	0.70

B14. Unstandardized factor loadings for model of Sequence of Events

	Estimate	Standard Error	P-Value
1 Plan one step at a time	0.52	0.18	0.00
2 Act without thinking	0.54	0.21	0.01
3 Good at predicting what will happen next	0.69	0.17	0.00
4 Hope	0.12	0.11	0.28
5 Expectation	0.28	0.11	0.01
6 Fear	0.48	0.14	0.00
1 with 2	-0.60	0.19	0.00
2 with 3	-0.54	0.19	0.00

B15. Unstandardized factor loadings for model of Future Orientation

	Estimate	Standard Error	P-Value
Extension	0.48	0.09	0.00
Detail	-0.26	0.15	0.08
Number of Cognitions	-0.02	0.06	0.74
Sequence	0.44	0.12	0.00
Control	2.16	0.49	0.00
Motivation	0.26	0.12	0.03
Detail with Number of Cognitions	-0.08	0.06	0.19

B16. Unstandardized factor loadings for model of Self-Regulation

	Estimate	Standard Error	P-Value
1 I can change my actions	0.94	0.13	0.00
2 I cannot keep track of a lot of things	-0.61	0.16	0.00
3 I lose control when I don't get my way	-0.58	0.14	0.00
4 I forget about other things when I'm having fun	0.85	0.13	0.00
5 Continue working when interrupted	-0.78	0.14	0.00
6 Hard to maintain attention	0.64	0.12	0.00
7 Never know what I have to do	0.95	0.12	0.00
8 Can focus when things are dull	0.86	0.15	0.00
9 Work carefully on something tricky	0.81	0.10	0.00
10 Aware of feelings	0.80	0.11	0.00
11 Concentrate when friends are talking	0.72	0.14	0.00
6 with 7	0.36	0.12	0.00
3 with 7	-0.40	0.14	0.00
4 with 8	0.42	0.15	0.01
9 with 10	0.24	0.09	0.01
4 with 5	-0.25	0.13	0.06

B17. Unstandardized factor loadings for model of Optimism

	Estimate	Standard Error	P-Value
Expect the best	1.00	0.00	999.00
Things will go wrong	2.77	0.75	0.00
Confident about future	2.97	0.84	0.00
Things will go well	3.50	0.98	0.00
Count on good things	2.42	0.80	0.00
Expect more good than bad	1.87	0.73	0.01

B18. Unstandardized factor loadings for model of Self-Efficacy

	Estimate	Standard Error	P-Value
1 How well you expect to do - occupation	1	0	.999
2 How good at learning - occupation	0.98	0.33	0.00
3 How well you expect to do - education	0.90	0.34	0.01
4 How good at learning - education	0.80	0.34	0.02
5 How good at learning - relationships	-3.28	1.08	0.00
6 Good at monitoring - health	0.56	0.24	0.02
7 How well you expect - health	-2.00	0.61	0.00
8 How good at learning - health	0.66	0.35	0.06
1 with 2	0.22	0.10	0.02
3 with 4	0.19	0.07	0.01

B19. Unstandardized factor loadings for model of Identity

	Estimate	Standard Error	P-Value
1 Cannot decide on occupation	0.42	0.10	0.00
2 Rarely try new recreational activities	1.06	0.15	0.00
3 Still deciding on type of friends	0.86	0.14	0.00
4 Hang out with crowd	0.36	0.12	0.00
5 Know the type of person I want to date	0.45	0.12	0.00
6 Ideas about gender roles same as parents'	0.80	0.16	0.00
7 Not sure how to divide up gender roles	-0.12	0.04	0.01
8 Never thought about gender roles	0.60	0.17	0.00
9 Gender roles same as parents	1.14	0.14	0.00
10 Trying to decide on gender roles	1.06	0.12	0.00
11 No single lifestyle I like	1.17	0.16	0.00
12 I have decided on a lifestyle	0.55	0.15	0.00
2 with 3	0.58	0.17	0.00
1 with 5	0.53	0.12	0.00
6 with 8	1.16	0.25	0.00
4 with 10	-0.41	0.12	0.00
2 with 9	-0.69	0.15	0.00
3 with 11	0.55	0.16	0.00

B20. Unstandardized factor loadings for model predicting Future Orientation Dimensions

Outcome	Predictor	Estimate	Standard Error	P-Value
Extension	Optimism	4.44	1.32	0.00
Detail	Gender	-0.51	0.14	0.00
	Employment	-0.05	0.02	0.03
	Mother's Education	0.75	0.18	0.00
	Self Regulation	0.72	0.12	0.00
	Self Efficacy	-3.51	0.46	0.00
	Optimism	2.98	0.51	0.00
Number of Cognitions	Self Efficacy	-85.18	31.50	0.01
Sequence of Events	Time in School	-0.21	0.10	0.03
	Self Efficacy	0.67	0.29	0.02
Control	Time in School	-0.22	0.08	0.01
	Employment	-0.05	0.02	0.02
	Father's Education	-0.20	0.10	0.05
Motivation	Employment	-0.15	0.03	0.00
	Mother's Education	1.07	0.21	0.00
	Father's Education	-0.22	0.09	0.02
	Self Regulation	0.35	0.14	0.01
	Self Efficacy	-5.23	0.51	0.00
	Optimism	5.60	0.57	0.00
	Identity	-0.13	0.07	0.05
Correlated Error Terms	Detail with Control	-0.14	0.07	0.04
	Detail with Motivation	-0.55	0.10	0.00
	Sequence with Control	0.36	0.09	0.00
	Sequence with Motivation	0.43	0.11	0.00
	Control with Motivation	0.52	0.10	0.00

B21. Unstandardized factor loadings for model predicting Future Orientation with scale scores

Outcome	Predictor	Estimate	Standard Error	P-Value
Detail	Self Efficacy	0.07	0.04	0.12
	Self Regulation	-0.23	0.14	0.10
	Optimism	0.04	0.07	0.54
	Identity	-0.08	0.05	0.07
	Gender	0.05	0.26	0.86
	Employment	-0.19	0.13	0.16
	Mother's Education	0.01	0.08	0.95
Control	Self Efficacy	0.07	0.14	0.64
	Self Regulation	-0.73	0.47	0.12
	Optimism	-0.16	0.22	0.46
	Identity	-0.05	0.15	0.72
	Time in School	-0.12	0.31	0.71
	Employment	0.48	0.47	0.31
	Father's Education	0.40	0.28	0.15
Motivation	Self Efficacy	0.01	0.03	0.68
	Self Regulation	0.32	0.11	0.00
	Optimism	-0.10	0.05	0.06
	Identity	0.01	0.04	0.83
	Employment	-0.16	0.10	0.13
	Mother's Education	-0.01	0.07	0.88
	Father's Education	0.01	0.08	0.94
Correlated errors	Extension with Sequence of Events	0.20	0.06	0.00
	Extension with Control	1.09	0.27	0.00
	Extension with Motivation	0.12	0.06	0.04
	Sequence with Motivation	0.26	0.09	0.01

Appendix C

Study 2 Tables

Table C1. Univariate and bivariate statistics for control variables predicting future orientation

	Gender (1=Male)	1	2	3	6	7	8	9	10	11	12	13	14	15	16
1. Race (1=white)	0.02	-													
2. WJ-R Reading	.07*	-.26**	-												
3. WJ-R Math	0.00	-.27**	.64**	-											
6. Work hard to get ahead later	0.03	-0.03	0.05	0.02	-										
7. Think about the future	.11**	.10**	0.05	-0.03	.31**	-									
8. Make lists of future tasks	.30**	-0.02	0.00	-0.04	.30**	.30**	-								
9. Weigh good or bad before deciding	0.04	-0.02	.16**	.08*	.34**	.29**	.42**	-							
10. Give up happiness now for later	-.07*	-0.02	0.06	.07*	.30**	.19**	.18**	.24**	-						
11. Rather save money for later	-.07*	-.07*	.079*	.08*	.25**	.08**	.15**	.20**	.22**	-					
12. I can see my life 10 years from now	0.04	0.05	0.02	-0.02	.18**	.33**	.20**	.21**	.25**	.11**	-				
13. Think about consequences before acting	.08*	0.00	.13**	.069*	.34**	.22**	.27**	.52**	.19**	.18**	.19**	-			
14. Finish high school	.08**	-.08**	.13**	.18**	.18**	.07*	.10**	.14**	.08*	0.06	0.05	.15**	-		
15. Go to college	.17**	-0.05	.19**	.25**	.21**	.07*	.16**	.14**	.09**	0.06	0.03	.14**	.50**	-	
16. Finish college	.16**	-0.04	.19**	.23**	.20**	0.06	.15**	.11**	.08*	0.05	0.04	.15**	.50**	.89**	-
Mean	1.48	1.20	16.02	11.36	2.97	3.35	2.33	2.50	2.18	2.27	2.50	2.86	4.86	4.48	4.46
SD	0.50	0.40	20.22	13.55	0.75	0.65	0.95	0.87	0.85	0.87	0.98	0.82	0.47	0.91	0.94

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

Table C2. Univariate and bivariate statistics for developmental underpinnings variables predicting future orientation

	1	2	3	4	6	7	8	9	10	11	12	13	14	15	16
Tower of Hanoi															
1. Attention reg.	.20**														
2. Physical reg.	.18**	.59**													
3. Reg. with peers	.17**	.33**	.45**												
4. Reg. with adults	.07*	.31**	.54**	-											
6. Work hard to get ahead later	0.00	.09**	.10**	0.04	-										
7. Think about the future	-0.05	.10**	0.02	0.04	.31**	-									
8. Make lists of future tasks	-0.03	.07*	0.06	0.00	.30**	.30**	-								
9. Weigh good or bad before deciding	0.05	.11**	.08*	.15**	.34**	.29**	.42**	-							
10. Give up happiness now for later	-0.03	-0.02	0.00	0.02	.30**	.19**	.18**	.24**	-						
11. Rather save money for later	.07*	0.01	0.06	0.06	.076*	.08**	.15**	.20**	.22**	-					
12. I can see my life 10 years from now	-0.06	0.05	-0.03	0.00	.18**	.33**	.20**	.21**	.25**	.11**	-				
13. Think about consequences before acting	0.04	.13**	.11**	.17**	.09**	.34**	.22**	.52**	.19**	.18**	.19**	-			
14. Finish high school	.12**	.18**	.14**	.15**	.12**	.18**	.07*	.10**	.14**	.08*	0.06	.15**	-		
15. Go to college	.17**	.16**	.13**	.18**	.09**	.21**	.07*	.16**	.14**	.09**	0.06	.14**	.50**	-	
16. Finish college	.17**	.16**	.12**	.14**	0.05	.20**	0.06	.15**	.11**	.08*	0.05	.15**	.50**	.89**	-
Mean	17.17	2.24	2.51	1.43	1.28	2.97	3.35	2.33	2.50	2.18	2.27	2.50	2.86	4.48	4.46
SD	7.71	0.63	0.51	0.39	0.40	0.75	0.65	0.95	0.87	0.85	0.87	0.98	0.82	0.91	0.94
N	1012	1028	1028	1028	955	957	956	953	948	955	952	956	973	973	973

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

Table C3. Univariate and bivariate statistics for individual differences predictors of future orientation

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. G3 Inc/Need	.50**															
2. Math Efficacy	.12**	.10**														
3. Reading Efficacy	.18**	.22**														
4. Sports Efficacy	-0.05	.16**	0.01													
5. Optimism	-0.04	.18**	.18**	.23**												
6. Work hard to get ahead later	0.05	.08*	.19**	.07*	.11**											
7. Think about the future	-0.05	-0.03	0.04	.14**	-0.02	0.03	.31**									
8. Make lists of future tasks	0.03	-0.01	0.06	.16**	0.02	.09**	.30**	.30**								
9. Weigh good or bad before deciding	.10**	0.04	.14**	.18**	-.07*	.07*	.34**	.29**	.42**							
10. Give up happiness now for later	.07*	0.02	.09**	.07*	0.00	-0.01	.30**	.19**	.18**	.24**						
11. Rather save money for later	0.04	0.03	.09**	0.05	-0.05	-0.02	.25**	.08**	.15**	.20**	.22**					
12. I can see my life 10 years from now	-.09**	-.10**	.07*	0.05	0.03	0.05	.18**	.33**	.20**	.21**	.25**	.11**				
13. Think about consequences before acting	.13**	.08*	.11**	.15**	-0.05	.09**	.34**	.22**	.27**	.19**	.18**	.19**				
14. Finish high school	.17**	.13**	.13**	.15**	0.05	.11**	.18**	.07*	.10**	.14**	.08*	0.06	.15**			
15. Go to college	.29**	.21**	.18**	.22**	.08*	.07*	.21**	.07*	.16**	.14**	.09**	0.06	.14**	.50**		
16. Finish college	.27**	.19**	.18**	.20**	.11**	.09**	.20**	0.06	.15**	.11**	.08*	0.05	.15**	.50**	.89**	
Mean	14.23	4.39	5.68	5.90	5.87	2.90	2.97	3.35	2.33	2.50	2.18	2.27	2.50	2.86	4.86	4.48
SD	2.51	3.77	1.06	0.98	1.19	0.41	0.75	0.65	0.95	0.87	0.85	0.98	0.82	0.47	0.91	0.94
N	1363	982	1012	1012	1012	1012	955	957	956	953	948	955	956	973	973	973

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

Table C4. Unstandardized loadings for cognitive aptitude.

	Estimate	S.E.	Residual Variance	Res. S.E.	P- Value
Unstandardized Loadings					
1 Memorization of names	1.00	0.00	2552.58	182.441	-
2 Memorization of sentences	0.428	0.034	259.575	20.498	0.00
3 Picture vocabulary	0.759	0.064	1160.37	86.328	0.00
4 Verbal analogy capacity	0.372	0.031	226.775	18.579	0.00
5 Letter and word recognition	0.459	0.034	164.411	16.996	0.00
6 Passage comprehension	0.178	0.016	85.83	6.151	0.00
7 Reading	0.225	0.018	75.825	5.956	0.00
Correlated terms					
6 with 7	69.74	5.685			0.00
4 with 5	42.373	13.797			0.00
Variances					
Cognitive aptitude	1598.08	224.608			0.00

Table C5. Unstandardized loadings for optimism.

	Estimate	S.E.	Residual Variance	Res. S.E.	P-Value
Optimism					
1 In a new or unknown situation, I usually expect the best	1.00	0.00	0.35	0.03	-
2 It's easy for me to relax	0.80	0.11	0.49	0.03	0.00
3 I think that things will go wrong for me	-0.59	0.09	0.38	0.03	0.00
4 I'm always positive about my future	1.01	0.12	0.49	0.03	0.00
5 I enjoy my friends a lot	0.19	0.04	0.10	0.01	0.00
6 It's important for me to keep busy	0.71	0.11	0.55	0.04	0.00
7 I expect things to go well for m	1.25	0.12	0.26	0.02	0.00
8 I count on good things happening to me	1.27	0.13	0.33	0.03	0.00
9 I expect more good things to happen to me than bad	1.18	0.13	0.42	0.03	0.00
Variances					
Optimism	0.16	0.03			0.00

Table C6. Unstandardized loadings for the higher-order self-regulation model

	Estimate	S.E.	Residual Variance	Res. S.E.	P-Value
Attention regulation					
1 Child is often easily distracted	1.00	0.00	0.34	0.03	-
2 Child often fails to give close attention to detail	0.90	0.07	0.35	0.03	0.00
3 Child often does not follow through on instruction	1.00	0.07	0.25	0.02	0.00
4 Child avoids tasks that require continued mental effort	0.99	0.07	0.30	0.02	0.00
5 Child often has difficulty organizing tasks	0.90	0.06	0.23	0.02	0.00
Physical regulation					
6 Child often leaves seat when remaining seated is expected	0.88	0.08	0.23	0.02	0.00
7 Child often has difficulty playing quietly	1.00	0.00	0.27	0.02	-
8 Child often has difficulty awaiting turn	1.08	0.09	0.20	0.02	0.00
9 Child often is on the go	1.34	0.12	0.52	0.04	0.00
10 Child often runs or climbs too much when he or she shouldn't	1.12	0.10	0.26	0.02	0.00
Regulation with peers					
11 Respond appropriately when hit or pushed by child	1.00	0.00	0.18	0.01	-
12 Politely refuses unreasonable requests	0.80	0.10	0.25	0.02	0.00
13 Avoids situations that result in trouble	0.98	0.10	0.19	0.01	0.00
14 Controls temper when arguing with other child	1.09	0.10	0.18	0.02	0.00
15 Responds appropriately to teasing from friends	1.06	0.10	0.18	0.01	0.00
Regulation with adults					
16 Uses appropriate tone of voice at home	1.00	0.00	0.19	0.02	-
17 Receives criticism well	1.09	0.12	0.20	0.02	0.00
18 Ends disagreements with parent calmly	1.22	0.14	0.19	0.02	0.00
19 Controls temper in conflict situations with parent	1.17	0.13	0.20	0.02	0.00
Self-regulation (higher order)					

A	Attention regulation	1.00	0.00	0.26	0.03	-	
B	Physical regulation	0.92	0.11	0.08	0.02		0.00
C	Regulation with peers	0.86	0.12	0.03	0.01		0.00
D	Regulation with adults	0.81	0.11	0.02	0.01		0.00
Correlations							
	A with B	0.09	0.02				0.00
	18 with 19	0.10	0.02				0.00
	9 with 10	0.09	0.02				0.00
	14 with 19	0.04	0.01				0.00
Variances							
	SR	0.11	0.03				0.00

Table C7. Unstandardized loadings for the higher-order self-efficacy model

	Estimate	S.E.	Residual Variance	Res. S.E.	P-Value
Math Efficacy					
1 How good at math are you?	1.00	0.00	0.48	0.05	-
2 How well do you expect to do in math this year?	0.97	0.04	0.39	0.04	0.00
3 How good would you be at learning something new in math?	0.97	0.05	0.69	0.06	0.00
4 In general, how useful is what you learn in math?	0.35	0.06	1.68	0.11	0.00
5 For me, being good at math is...	0.49	0.05	0.99	0.07	0.00
English Efficacy					
6 How good at reading are you?	1.00	0.00	0.97	0.07	-
7 How well do you expect to do in English class this year?	1.24	0.08	0.39	0.05	0.00
8 How good would you be at learning something new in English class?	1.30	0.09	0.51	0.06	0.00
9 In general, how useful is what you learn in English class?	0.85	0.08	1.31	0.09	0.00
10 For me, being good at reading is...	0.72	0.06	0.99	0.07	0.00
Sports Efficacy					
11 How good at sports are you?	1.00	0.00	0.45	0.04	-
12 How well do you expect to do in your favorite sport this year?	0.99	0.04	0.36	0.04	0.00
13 How good would you be at learning something new in sports?	0.83	0.04	0.65	0.05	0.00
14 In general, how useful is what you learn in sports?	0.92	0.06	1.31	0.09	0.00
15 For me, being good at sports is...	1.01	0.05	0.94	0.07	0.00
Self-Efficacy					
A Math	1.00	0.00	-0.07	2.32	-
B English	0.14	0.24	0.74	0.10	0.58
C Sports	0.15	0.28	1.22	0.12	0.58
Correlations					
4 with 5	0.51	0.06			0.00
14 with 15	0.34	0.06			0.00

9 with 10	0.35	0.06	0.00
6 with 10	0.26	0.05	0.00
2 with 7	0.16	0.03	0.00
Variances			
Self-Efficacy	1.31	2.32	0.57

Table C8. Unstandardized loadings for a single-factor model of future orientation

	Estimate	S.E.	Residual Variance	Resid S.E.	P-Value
Unstandardized loadings					
1 I think about how things will be in the future	1.17	0.27	0.34	0.03	0.00
2 Finish high school	0.46	0.12	0.21	0.01	0.00
3 Go to college	1.19	0.11	0.82	0.06	0.00
4 Finish college	1.00	0.00	0.88	0.06	-
5 I will keep working at a difficult boring task if I know it will help me get ahead later	1.74	0.37	0.36	0.03	0.00
6 Before making a decision, I weigh the good versus bad	1.64	0.38	0.59	0.05	0.00
7 I will give up on happiness now so I can get what I want in the future	1.30	0.31	0.59	0.04	0.00
8 I usually think about consequences before I do something	1.57	0.34	0.44	0.04	0.00
9 I make lists of things to do	1.75	0.39	0.65	0.05	0.00
10 I would rather save money for a rainy day than spend it now on something fun	1.16	0.29	0.66	0.05	0.00
11 I can see my life 10 years from now	1.20	0.32	0.87	0.06	0.00
Correlations					
6 with 8	0.17	0.03			0.00
6 with 9	0.13	0.03			0.00
3 with 4	0.75	0.06			0.00
1 with 10	-0.09	0.02			0.00
1 with 11	0.12	0.03			0.00
1 with 7	0.11	0.04			0.00
Variances					
Future Orientation	0.08	0.03			0.01

Table C9. Unstandardized loadings for a higher-order factor model of future orientation

		Estimate	S.E.	Residual Variance	Resid. S.E.	P-Value
Extension						
1	I think about how things might be in the future	1.00	0.00	0.44	0.03	-
2	Finish high school	3.15	1.24	0.16	0.01	0.01
3	Go to college	11.60	4.50	0.06	0.03	0.01
4	Finish college	11.31	4.37	0.13	0.03	0.01
Motivation						
5	I will keep working at a difficult, boring task if I know it will help me get ahead later	1.00	0.00	0.32	0.04	-
6	I will give up my happiness now so that I can get what I want in the future	0.73	0.11	0.57	0.04	0.00
7	I would rather save my money for a rainy day than spend it now on something fun	0.64	0.11	0.65	0.05	0.00
Control						
8	I make lists of things to do	1.00	0.00	0.51	0.06	-
9	Before making a decision, I weigh the good versus the bad	0.93	0.12	0.46	0.04	0.00
10	I can see my life 10 years from now	0.39	0.09	0.25	0.05	0.00
11	I usually think about the consequences before I do something	1.00	0.11	0.88	0.06	0.00
Future Orientation						
A	Extension	1.00	0.00	0.01	0.00	-
B	Motivation	17.43	7.79	0.08	0.05	0.03
C	Control	19.01	8.64	0.15	0.06	0.03
Correlations						
	1 with 10	0.17	0.03			0.00
	8 with 11	-0.18	0.04			0.00
	6 with 10	0.14	0.04			0.00
Variances						
	Future Orientation	0.00	0.00			0.24

Table C10. Unstandardized loadings for the model estimating a higher-order future orientation factor.

	Estimate	S.E.	P-Value
Future Orientation			
Extension	1.00	0.00	-
Motivation	12.41	5.36	0.02
Control	17.31	8.05	0.03
Self-regulation	0.03	0.01	0.04
Executive Function	0.00	0.01	0.96
Self Regulation			
Attention	1.00	0.00	-
Physical	0.77	0.10	0.00
With Peers	0.77	0.12	0.00
With Adults	0.59	0.10	0.00
Cognitive aptitude	0.00	0.00	0.00
Mother's education	0.03	0.01	0.00
Gender	0.11	0.05	0.01
Executive Function	0.35	0.17	0.04
Executive Function			
Cognitive aptitude	0.04	0.01	0.00
Mother's education	0.29	0.18	0.11
Race	-1.73	1.12	0.12
Correlations			
Mother's education with cognitive aptitude	36.14	5.55	0.00
Race with cognitive aptitude	-3.66	0.80	0.00

Table C11. Unstandardized loadings for the model predicting extension, motivation, and control as separate factors

	Estimate	S.E.	P-Value
Extension			
Self-regulation in grade 3	0.03	0.02	0.10
Mother's education at birth	0.01	0.00	0.03
Motivation			
Gender	-0.03	0.01	0.02
Control			
Self-regulation	0.44	0.11	0.00
Self-regulation			
Cognitive aptitude	0.00	0.00	0.00
Mother's education	0.03	0.01	0.00
Gender	0.14	0.05	0.00
Executive Function	0.01	0.00	0.03
Executive function			
Cognitive aptitude	0.05	0.01	0.00
Race	-1.90	1.12	0.09
Correlations			
Extension with Motivation	0.01	0.01	0.06
Extension with Control	0.01	0.01	0.06
Motivation with Control	0.17	0.03	0.00
Mother's education with cognitive aptitude	36.55	5.55	0.00
Race with cognitive aptitude	-3.66	0.80	0.00

Table C12. Unstandardized loadings for the model estimating a higher-order future orientation factor.

	Estimate	S.E.	P-Value
Future Orientation			
Extension	1.00	0.00	-
Motivation	11.46	4.68	0.01
Control	13.10	5.46	0.02
Optimism	0.01	0.01	0.12
Math	0.01	0.00	0.06
English with Sports	0.01	0.01	0.04
Sports	0.00	0.00	0.53
Math			
Cognitive Aptitude	0.01	0.00	0.00
English			
Cognitive Aptitude	0.01	0.00	0.00
Gender	0.33	0.09	0.00
Race	0.27	0.13	0.05
Sports			
Cognitive Aptitude	-0.01	0.00	0.01
Optimism			
Income-to-Needs	0.01	0.00	0.01
Correlations			
Math with English	0.08	0.05	0.12
Math with Sports	0.24	0.07	0.00
English with Sports	0.13	0.05	0.01
Mother's education with cognitive aptitude	31.86	4.91	0.00
Income-to-Needs with cognitive aptitude	1204.84	159.65	0.00
Race with Cognitive Aptitude	-2.72	0.66	0.00

Table C13. Unstandardized loadings for predictors of motivation, control, and extension dimensions of future orientation.

	Estimate	S.E.	P-Value
Math			
Cognitive Aptitude	0.01	0.00	0.00
Optimism	0.77	0.16	0.00
Gender	0.06	0.12	0.60
Race	0.28	0.18	0.12
Mother's Education	-0.02	0.03	0.64
Income-to-Needs	0.00	0.00	0.78
English			
Cognitive Aptitude	0.01	0.00	0.00
Optimism	0.62	0.12	0.00
Gender	0.34	0.09	0.00
Race	0.28	0.13	0.03
Mother's Education	0.01	0.02	0.84
Income-to-Needs	0.00	0.00	0.26
Sports			
Cognitive Aptitude	-0.01	0.00	0.00
Optimism	0.66	0.16	0.00
Gender	-0.12	0.12	0.30
Race	0.12	0.18	0.51
Mother's Education	0.04	0.03	0.19
Income-to-Needs	0.00	0.00	0.89
Extension			
Optimism	0.01	0.02	0.33
Math	0.02	0.01	0.03
English	0.02	0.01	0.05
Sports	0.01	0.01	0.06
Mother's Education	0.01	0.00	0.01
Motivation			
Optimism	0.03	0.10	0.78
Math	0.04	0.04	0.22
English	0.16	0.05	0.00
Sports	0.03	0.04	0.48
Control			
Optimism	0.23	0.11	0.04
Math	0.10	0.04	0.01
English	0.10	0.05	0.04

Sports	0.01	0.04	0.83
Gender	0.28	0.08	0.00
Optimism			
Income-to-Needs	0.00	0.00	0.01
Correlations			
Math with English	-0.02	0.05	0.66
Math with Sports	0.15	0.06	0.02
English with Sports	0.05	0.05	0.32
Motivation with Extension	0.01	0.00	0.06
Extension with Control	0.01	0.00	0.17
Motivation with Control	0.21	0.03	0.00
Mother's education with cognitive aptitude	31.94	4.92	0.00
Income-to-needs with Cognitive Aptitude	1208.12	159.85	0.00
Race with Cognitive Aptitude	-2.72	0.66	0.00

Table C14. Full model for grade 3 and 6 variables predicting grade 10 future orientation.

	Estimate	S.E.	P-Value
Self-regulation			
Cognitive Aptitude	0.00	0.00	0.01
Mother's education	0.03	0.01	0.00
Gender	0.10	0.04	0.02
Executive Function	0.01	0.00	0.06
Executive Function			
Cognitive Aptitude	0.05	0.01	0.00
Race	-1.89	1.20	0.12
Optimism			
Self-regulation	0.22	0.08	0.01
Income-to-Needs	0.00	0.00	0.00
Math			
Cognitive Aptitude	0.01	0.00	0.00
Optimism	0.74	0.16	0.00
Gender	0.07	0.12	0.53
Mother's Education	-0.02	0.03	0.59
Income-to-Needs	0.00	0.00	0.36
Executive Function	0.02	0.01	0.00
English			
Cognitive Aptitude	0.01	0.00	0.00
Optimism	0.56	0.12	0.00
Gender	0.28	0.08	0.00
Race	0.18	0.13	0.16
Mother's Education	0.01	0.02	0.52
Sports			
Cognitive Aptitude	-0.01	0.00	0.00
Optimism	0.61	0.16	0.00
Gender	-0.18	0.12	0.12
Mother's Education	0.05	0.03	0.09
Executive Function	0.01	0.01	0.19
Extension			
Optimism	0.04	0.03	0.24
Math	0.03	0.01	0.02
English	0.04	0.02	0.03
Sports	0.03	0.01	0.02
Self-regulation	0.05	0.04	0.20
Mother's Education	0.02	0.01	0.00
Motivation			

English	0.15	0.05	0.01
Self-regulation	0.12	0.11	0.28
Control			
Optimism	0.26	0.10	0.01
Math	0.06	0.03	0.08
Self-regulation	0.42	0.13	0.00
Gender	0.24	0.08	0.00
Correlations			
Motivation with Extension	0.02	0.01	0.04
Extension with Control	0.02	0.01	0.06
Motivation with Control	0.20	0.03	0.00
Mother's education with Cognitive Aptitude	33.74	5.28	0.00
Income-to-Needs with Cognitive Aptitude	1285.02	171.48	0.00
Race with Cognitive Aptitude	-2.77	0.71	0.00