The role of general causality orientations in the development of goal engagement and adjustment capacities in emerging adulthood

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ABSTRACT

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Kathryn Mulvihill

A longitudinal study examined individual differences that affect the development of adaptive goal regulation capacities in emerging adulthood. Self-determination theory was used to derive hierarchical linear models in which autonomous, controlled, and impersonal causality orientations differentially predicted baseline levels and rates of yearlong change in three adaptive goal regulation outcomes – goal engagement (operationalized as persistence in goal striving), goal disengagement capacities, and goal reengagement capacities. University enrolled emerging adults reported their levels of the three causality orientations and completed measures of persistence, disengagement, and reengagement at the start of the fall term. Goal regulation outcomes were assessed again at the start and end of the winter term. Results showed that self-determination theory is a relevant framework for understanding not only goal engagement, but also goal adjustment processes in emerging adulthood. Interestingly, the autonomy orientation, which is typically associated with benefits for striving, was negatively related to adaptive goal disengagement capacities. Implications for future research on the associations between motivational style and goal regulation in emerging adulthood are discussed.

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Chapter 1: Introduction

Self-determination theory (SDT; Ryan & Deci, 1985a; Deci & Ryan, 2000) distinguishes three broad classes of motivation – autonomous, controlled, and amotivation – that differ in the degree to which reasons for motivated behaviors are internalized and integrated with the values, beliefs, and intrinsic interests that constitute an individual's core self (Deci & Ryan, 2000). *Autonomous motivation* is characterized by deeply volitional, choiceful, and self-endorsed reasons for behavior that reflect either intrinsic interests or well-internalized values and regulations. *Controlled motivation* is characterized by pressured reasons for behavior that reflect either outright control by externally administered reward or punishment contingencies or by contingencies administered by the self, the "shoulds" and "oughts" referred to in SDT as *introjects*. *Amotivation* is characterized by a lack of motivation due to individuals' beliefs that they are incompetent, challenges are overwhelming, and the relationship between their efforts and important life outcomes is essentially random.

Over the past 30 years, self-determination theory has contributed much to our understanding of how differences in the quality of individuals' motivation impact their capacity for *goal engagement*, with studies across education, health, and interpersonal domains finding that autonomous motivation leads to greater behavioral persistence, effort, progress, and attainment than controlled or amotivation (Deci & Ryan, 2000, 2008). To date, however, research in the SDT framework has not attempted to explain differences in individuals' capacities for *goal adjustment*, i.e. capacities to disengage from unattainable goals and reengage in new goals. Starting with the publication of a theoretical statement on the putative psychological benefits of abandoning unattainable goals (Wrosch et al., 2003a) and amassing a strong body of empirical evidence over the last decade, the work of Wrosch and colleagues has extended our conceptualization of adaptive self-regulation in goal pursuit to include not only a more nuanced view of capacities for goal *engagement*, but also, critically, capacities to withdraw both effort and commitment from goals that have been deemed unattainable or prohibitively costly (*disengagement*) and, ideally, to identify, commit to, and begin pursuit of new goals (*reengagement*).

Goal adjustment capacities have been linked to a broad array of positive outcomes for psychological wellbeing and physical health. Individuals who report less difficulty disengaging from unattainable goals and reengaging in new goals report lower levels of depressive symptoms,

negative affect, perceived stress, and intrusive thoughts (Wrosch et al., 2003b; Wrosch, Miller, Scheier, & Brun de Pontet, 2007; Wrosch & Sabiston, 2013) as well as higher levels of purpose in life and positive affect (Wrosch, Amir, & Miller, 2011; Wrosch & Sabiston, 2013). Likewise, individuals who disengage and reengage more easily demonstrate more normative patterns in daily cortisol secretion, increases in sleep efficiency, and decreases in number of physical health problems and levels of systemic inflammation over time (Wrosch et al., 2007; Miller & Wrosch, 2007). Moreover, the protective effect of goal adjustment capacities on physical health appears to be mediated by subjective wellbeing; by reducing psychological distress and fostering purpose in life, goal adjustment capacities may reduce individuals' vulnerability to disease (Wrosch et al., 2007; Wrosch, Scheier, & Miller, 2013).

We propose that the quality of individuals' motivation, as conceptualized by SDT, may have important implications not only for goal engagement, but also goal adjustment processes. In what follows, we develop a theoretical rationale that explains the ways in which autonomous, controlled, and amotivation may be related to goal engagement, disengagement, and reengagement processes and provide indirect empirical evidence for these ideas. Then, we report results of an empirical study that tested our hypotheses over one academic year in a sample of Canadian university students, a particularly appropriate population given that the ability to self-regulate adaptively in the pursuit of goals during the twenties has important implications for success and wellbeing in adulthood (Hill et al., 2011; Howard et al., 2010; Masten et al., 2004; Shulman & Nurmi, 2010b). This work a) extends SDT by assessing to what extent it can account for the adaptive regulation of unattainable goals, b) simultaneously responds to calls from Wrosch and colleagues for research efforts to identify the factors that support the development of goal adjustment capacities (Wrosch, Scheier, & Miller, 2013) and c) contributes to a growing literature on psychological processes that propel averages gains in wellbeing across the transition to adulthood, a literature that until recently has been predominantly descriptive in nature (Shulman & Nurmi, 2010).

Chapter 2: Literature Review

General Causality Orientations

Vallerand's hierarchical model of motivation (Vallerand, 1997, 2007) specifies that autonomous and controlled motivation exist at global, contextual, and situational levels. The global level reflects motivation at a dispositional level, the contextual level reflects motivation in

specific domains (e.g. academics, athletics, relationships), and the situational level reflects motivation for specific behaviors (e.g. study for tomorrow's test, practice the violin this afternoon). Within this framework, motivation has a top-down effect such that dispositional motivational orientation affects motivation in specific domains, which, in turn, affects motivation for specific behaviors (for empirical support for this proposition, see Guay and colleagues (2003), Lavigne and Vallerand (2010), Gillet, Gagne, and colleagues (2013), and Gillet, Vallerand, and colleagues (2013)). Lee, Sheldon, and Turban (2003) have argued that dispositional motivational tendencies should be the starting point for understanding how individuals self-regulate as they strive towards goals because they influence perceptions of self and environment across a broad spectrum of domains.

In SDT, causality orientations reflect different degrees of self-determination at a dispositional level (Deci & Ryan, 1985a). Rather than characterizing "types" of individuals, the three causality orientations are theoretically present to differing degrees in all individuals and have been shown to influence context and situation-specific motivation across a variety of life domains. Reflecting the highest degree of self-determination, the *autonomy orientation* is characterized by a tendency to interpret events as informational; when an event occurs that has the potential to prompt behavior, individuals with a strong autonomy orientation believe they have a choice as to the nature of their response and that their response will be competent (Deci & Ryan, 1985a). Likewise, the autonomy orientation is characterized by a tendency to seek out, or be sensitive to, contexts that support choice and signify competence (Deci & Ryan, 1985a). Last, the autonomy orientation is reflected in behavior that is organized around personal beliefs, values, and interests and that is more likely to be intrinsically motivated.

The autonomy orientation has been linked to a wide variety of positive behavioral, affective, and cognitive outcomes. Higher levels of the autonomy orientation are associated with greater self-esteem, ego-development, integration in personality, interest, creativity, prosocial behavior, and healthy eating habits (Deci & Ryan, 1985a; Koestner, Bernieri, & Zuckerman, 1992; Sheldon, 1995; Frederick & Grow, 1996; Gagne, 2003; Gillet, Gagne, et al., 2013). During the transition to adulthood, higher levels of the autonomy orientation are associated with an informational-identity processing style – the tendency to seek out information and actively explore possibilities before making identity commitments (Soenens et al., 2005). Particularly relevant to questions regarding goal pursuit, higher levels of the autonomy orientation predict

greater work satisfaction, greater commitment to work institutions, more frequent adoption of mastery as opposed to performance learning goals, mastery-oriented responses to failure feedback, and may protect individuals from the undermining effects of rewards on intrinsic motivation (Koestner & Zuckerman, 1994; Lam & Gurland, 2008; Hagger & Chatzisarantis, 2011). Higher levels of the autonomy orientation may predict an increased likelihood of sticking to highly challenging self-regulatory commitments, as evidenced by the greater attendance, weight loss and weight loss maintenance of more autonomously motivated, severely obese individuals involved in a very low calorie weight loss program (Williams et al., 1996). Likewise, higher levels of the autonomy orientation are associated with less defensive coping, impression management, shame, behavioral disengagement, self-handicapping coping strategies, and self-derogation, all of which thwart goal engagement (Deci & Ryan, 1985a; Knee & Zuckerman, 1998; Lewis & Neighbors, 2005).

Reflecting a lesser degree of self-determination in behavior, the *control orientation* reflects a tendency to interpret events as controlling; when an event occurs that has the potential to prompt behavior, individuals with a strong controlled orientation believe that they have little choice as to the nature of their response. Likewise, the control orientation reflects a tendency to seek out, or be sensitive to, events and contexts that curtail choice by imposing external contingencies (e.g. rewards and punishments) that can organize behavior. It should be noted that lack of choice does not necessarily preclude a sense of competence if an individual masters the set of contingencies to which they were sensitive to or sought out in a given context (Deci & Ryan, 1985a). However, while individuals whose motivation is controlled may, if successful, feel effective and competent and be as active and intentional in their pursuit of goals as individuals whose motivation is autonomous, the latter theoretically experience themselves as the initiation and source of their own behavior while the former do not. This distinction has important implications for subjective wellbeing and performance. The control orientation reflects a tendency to experience regulatory events as sources of pressure, to rely on external controls, such as deadlines, to motivate their behavior, and to place importance in factors like pay and status.

Individuals who report higher levels of the control orientation also report higher levels of distress, guilt, defensive coping, impression management, public self-consciousness, contingent self-esteem, the Type-A coronary prone pattern of pressure, tension, and aggressive achievement, and lower levels of ego development (Deci & Ryan, 1985a; Neighbors et al., 2004; Lewis &

Neighbors, 2005). Highly controlled emerging adults are more likely to evince a normative identity-processing style – a tendency to rely on the prescriptions of authority figures when confronted with identity-relevant problems (Soenens et al., 2005). Particularly relevant to goal pursuit, individuals who report higher levels of the control orientation also report higher levels of work satisfaction, but the magnitude of this association is attenuated relative to that observed between the autonomy orientation and work satisfaction (Lam et al., 2008). Such individuals are more likely to adopt performance goals over mastery goals, to enroll in less advanced high school courses regardless of aptitude, and to perceive a university exam as unfair regardless of their final grade (Koestner & Zuckerman, 1994; Wong, 2000; Deci & Ryan, 1985a).

Reflecting a lack of self-determination in behavior, the impersonal orientation is characterized by a tendency to interpret events as signs of personal incompetence; when an event occurs that has the potential to prompt behavior, individuals with high levels of the impersonal orientation believe that they are unable to behave in such a way as to achieve desired outcomes and, consequently, are likely to experience depressive symptoms related to the present and anxious symptoms when entering new situations (Deci & Ryan, 1985).

Higher levels of the impersonal orientation have been linked to lower levels of ego development and self-esteem, higher levels of negative emotions such as shame, fear, hostility, guilt, tension, pressure, and depressive symptoms, and higher levels of self-derogation, public self-consciousness, defensive coping, neuroticism, and general negative affect, which appears to fully mediate the negative relationship between the impersonal orientation and performance on certain cognitive tasks (Deci & Ryan, 1985; Luyckx et al., 2010; Olesen et al., 2010; Gillet et al., 2013). The higher their endorsement of the impersonal orientation, the less likely emerging adults are to have achieved identity commitment, identity integration, or wellbeing that accompanies resolution of identity challenges (Luyckx et al., 2010). Aligned with this finding, more impersonally oriented individuals demonstrate a diffuse-avoidant identity-processing style when facing identity challenges (Soenens et al., 2005). Particularly relevant to goal pursuit, more impersonally oriented individuals are similar to highly controlled individuals in that they tend to adopt performance as opposed to mastery achievement goals, but while the latter are more likely to manage their perceived "performance" by trying to demonstrate competence, the former are more likely to manage their "performance" by attempting to avoid public failure (Koestner & Zuckerman, 1994). Likewise, more impersonally oriented individuals demonstrate the classic

helplessness pattern in achievement settings (i.e. the combination of low self-esteem with attempts to avoid failure) and helpless responses to failure feedback (i.e. quitting; Koestner & Zuckerman, 1994). In line with these findings, highly impersonally oriented individuals more frequently make self-defeating performance attributions and perceive university exams as unfair, regardless of their grade (Koestner, 1996; Deci &Ryan, 1985).

Goal Engagement

Across major theories of developmental regulation, goal engagement refers to individuals' attempts to achieve the goals that, having been chosen, organize behavior and give meaning and purpose to life (Heckhausen, Wrosch, & Schulz, 2010; Haase, Heckhausen, and Wrosch, 2013). Thus, engagement in the pursuit of goals is a primary means through which individuals can actively shape their own development across the life course. Recently, Haase and colleagues (Haase, Heckhausen, & Wrosch, 2013) offered a theoretical and empirical integration of three major theories of developmental regulation: the dual-process model of assimilative and accommodative coping (Brandtstädter & Rothermund, 2002), the motivational theory of lifespan development (MTD; Heckhausen, Wrosch, & Schulz, 2010), and the model of selective optimization with compensation (SOC; Freund & Baltes, 2002). For the purposes of the current study, we summarize the authors' integration of the aspects of each theory that belong to the goal engagement mode in order to present a theoretical background for this construct. Within Haase and colleagues' integrative framework, seven of the eleven regulatory processes highlighted by the three theories belong to an overarching goal engagement mode. These are *assimilation* (dual-process model), *selective primary control*, *compensatory primary control*, and *selective secondary control* (motivational theory of lifespan development), and *selection*, *optimization*, and *compensation* (selective optimization with compensation model). In support of this classification, results of structural equation modelling demonstrate that each of these processes loads positively onto a single second order goal engagement factor (Haase et al., 2013).

According to the model of assimilative and accommodative coping, *assimilation* refers to attempts by individuals to modify situations or their own behavior in an effort to reduce discrepancies between desired and actual developmental outcomes (Brandtstädter & Rothermund, 2002). In this dual-process model, assimilation is both antagonistic and complementary to processes of accommodation, which reduce goal-outcome discrepancies via changes to goals themselves. The cardinal characteristic of assimilation efforts, whether they are aimed at

promotion (e.g. expanding resources and launching future-oriented projects), maintenance of functioning, or prevention of loss, is tenacity, especially in the domains that are most central to an individual's self-concept. The extent to which individuals are tenacious in their goal pursuit, in turn, is influenced by the importance of goals, individuals' sense of self-efficacy and beliefs about the controllability of outcomes, and the functioning of cognitive biases that focus attention on targeted goals and shield pursuers from distraction.

According to the motivational theory of lifespan development (MTD; Heckhausen, Wrosch, & Schulz, 2010), development is adaptive to the extent that individuals achieve control over the environment across domains and across the lifespan. To optimize development, individuals can engage in *primary control striving* (e.g. attempts to modify the environment to achieve goals), supported by *secondary control striving* (e.g. attempts to modify the self to expand, maintain, or minimize losses in the capacity for primary control). Goal engagement, in this theoretical framework, consists of the investment of resources and persistence (*selective primary control*), the mustering of internal, motivational resources, such as imagining the positive consequences of achieving goals (*selective secondary control*), and, when personal resources are insufficient, the marshalling of external or alternative resources, such as seeking advice or being fitted for a hearing aid (*compensatory primary control*; Heckhausen et al., 2010). Critically, MTD specifies that these goal engagement processes are not adaptive per se, but only to the extent that they promote the achievement of goals whose attainment is realistic given available opportunities (e.g. goal-opportunity congruence), whose pursuit does not undermine the achievement of other short- or long-term goals (management of inter-domain and long-term consequences), and whose pursuit does not preclude the maintenance of a minimum diversity of goals, which can protect individuals' sense of self-worth, purpose, and direction when target goals are thwarted. Furthermore, MTD specifies that, to maximize primary control capacity, levels of goal engagement should emerge, grow, and intensify sharply in synchrony with the emergence, peak, and decline of available opportunities for goal achievement (Heckhausen et al., 2010).

According to the model of selective optimization with compensation (Baltes, 1987; Freund & Baltes, 2002), adaptive management of resources across the lifespan consists of three processes. *Selection*, a goal planning process, refers to choosing which goals to pursue and committing resources to their achievement. When goals represent desired end states, selection is *elective*. However, when individuals reorganize their goal structure and choose new goals as a

result of losing the means to pursue a previously prioritized goal, selection is said to be *loss-based,* which can support engagement through freeing resources for active goals, or disengagement, through reorganization. *Optimization*, a set of goal pursuit processes*,* refers to acquiring, applying, and refining the means – the skills and resources - necessary for goal achievement. The SOC model emphasizes that choosing appropriate means depends on an accurate understanding of the goal domain (e.g. musical performance vs. effective parenting) and the opportunities made available within individuals' socio-cultural contexts. Optimization may include straightforward investments of time, effort, and resources, but also persistence in the face of obstacles and increases in the level of goal-related effort when the chances of success are less likely. Last, *compensation* refers to using alternative means – whether external (e.g. a technology such as a prosthesis) or internal (e.g. a memory aid such as a mnemonic device) to maintain or regain functioning when previously employed strategies are no longer available.

Despite differences, which perhaps are owing to diverging fundamental assumptions about the purpose of regulation across the lifespan (Haase et al., 2013), there is a considerable amount of theoretical overlap between the goal engagement processes specified by these three theories. Effort and persistence in the face of obstacles are a common thread, as is the importance of developmental and socio-cultural context (e.g. contextually determined beliefs about controllability in the dual-process model, goal-opportunity congruence in MTL, and appropriate choice of means in the SOC model). Likewise, empirical evidence associated with goal engagement processes from each theory converges on findings suggesting that goal engagement processes confer benefits for successful development and subjective wellbeing across the lifespan. For example, Haase, Heckhausen, and Koller (2008) reported that control striving during the transition to adulthood was associated with securing sought-after training positions among female adolescents and with positive affect among both females and males. Likewise, the components of the SOC model have been shown to be positively associated with each indicator assessed by Ryff's (1989) original inventory of wellbeing (Freund & Baltes, 2002). Finally, tenacity in goal pursuit has been linked with greater life satisfaction, stronger perceived locus of control, and lower levels of depressive symptoms among adults and older adults (Brandtstädter & Renner, 1990; Bailly et al., 2012).

It should be noted that each of these theoretical approaches to developmental regulation includes formulations not only about the goal engagement mode, but also about the goal

disengagement mode and its set of functional and temporal relationships to engagement processes. However, the purpose of the present study is to extend SDT's theoretical framework beyond goal engagement to goal adjustment as conceptualized by Wrosch and colleagues. Hereafter, therefore, we focus our review of goal adjustment capacities (e.g. disengagement and reengagement) to theoretical and empirical evidence associated with this latter framework.

Goal Adjustment

A relatively common phenomenon (Bauer, 2004), unattainable goals are those that individuals cannot achieve due to lack of skill, social, developmental, biological, or genetic constraints, or unresolvable conflicts with other, more important goals (Wrosch et al., 2003a; Wrosch, Scheier, & Miller, 2013). *Goal adjustment capacities* reflect reliable individual differences in the ease with which individuals adjust to unattainable goals and, therefore, their ability to minimize the negative consequences associated with confronting failure and the thwarting of aspirations (Wrosch et al., 2003b, 2007a). *Disengagement capacities* reflect individual differences in the ease with which individuals can withdraw both effort *and* commitment from goals that have been deemed unattainable or prohibitively costly (Wrosch et al., 2003b). Withdrawal of effort is reflected in the scaling back or cessation of behavioral efforts to attain goals, while withdrawal of commitment requires the redefinition of the goal as no longer necessary for satisfaction in life and, hence, less important than it was. Disengagement is considered an essential aspect of self-regulation because all individuals, at one time or another, will face an insurmountable problem – an objective failure or the realization that continued goal pursuit will drain resources and distract from necessary or more important goals. In contrast, *reengagement capacities* reflect individual differences in the ease with which individuals identify, commit to, and begin pursuing meaningful alternative goals following disengagement (Wrosch et al., 2003b). Research in the goal adjustment framework has shown that goal disengagement and reengagement capacities are typically weakly related or unrelated, supporting the hypothesis that they represent independent self-regulation constructs (Wrosch, Scheier, & Miller, 2013). These adaptive capacities appear to increase across the lifespan from adolescence to old age (Wrosch et al., 2003b; Wrosch & Miller, 2009) and to impact quality of life across multiple domains (for a review, see Wrosch, Scheier, & Miller, 2013).

Wrosch and colleagues have developed a theoretical model that specifies the specific primary and secondary functions of goal disengagement and reengagement capacities and their

effects on individuals' health and wellbeing (Wrosch, Scheier, & Miller, 2013). According to this model, the primary function of goal disengagement capacities is to reduce the distress associated with repeated failures (e.g. negative affect and depressive symptoms), which, through effects on the endocrine and immune systems, can improve physiological functioning and reduce vulnerability to disease. In contrast, the primary function of reengagement capacities is to increase individuals' sense of purpose in life and positive affect, which, in turn, translate into benefits for their physiological health. In that disengagement frees individuals' resources, disengagement may also contribute to increases in positive indicators of wellbeing by facilitating reengagement. By promoting purpose in life and positive affect, reengagement, in turn, may make it easier for individuals to come to terms with unattainable goals, disengage, and reduce their distress. Finally, both disengagement and reengagement capacities may exert direct effects on physical health. For example, abandoning a futile goal may result in an immediate decrease in stress and reengagement may result in immediate improvements in conditioning if new goals promote healthy behaviors, such as exercise (Wrosch, Sheier, & Miller, 2013).

Empirical evidence accumulated over the past decade provides strong support for this model (for a review of empirical studies, see Wrosch, Scheier, & Miller, 2013). Research has linked disengagement capacities with lower levels of various negative indicators of wellbeing, including depressive symptoms, negative affect, perceived stress, and intrusive thoughts, as well as a lower number of physical health problems and more normative daily secretion of the stress hormone cortisol (Wrosch et al., 2003b; Wrosch et al., 2007; Wrosch & Sabiston, 2013). Likewise, longitudinal evidence shows that absolute levels or increases in disengagement capacities lead to decreases in depressive symptoms over time (Wrosch & Miller, 2007), playing a protective role among individuals who confront stressors that are particularly likely to constrain their goal pursuits (e.g. older adults experiencing increases in functional disability; Dunne, Wrosch, & Miller, 2011; individuals caring for a family member with a mental illness; Wrosch et al., 2011). Disengagement capacities also predicted fewer physical health problems and improved sleep efficiency in college students across one semester (Wrosch et al., 2007) and declines in levels of C-Reactive Protein, a physiological indicator of systemic inflammation associated with long-term health risks, over one year in a sample of adolescent girls (Miller & Wrosch, 2007).

A more limited body of evidence exists to support the model's hypothesized effects of goal reengagement capacities on positive indicators of subjective wellbeing and physical health.

In line with the hypothesized primary function of goal reengagement capacities, tendencies to identify, commit to, and begin pursuit of new goals have been linked to greater positive affect (Wrosch & Sabiston, 2013) and purpose in life (Wrosch et al., 2011). Likewise, the findings that reengagement capacities are associated with lower levels of perceived stress (Wrosch, et al., 2007) and suicidal thinking (O'Connor & Forgan) and buffer the effects of caregiver burden on depressive symptoms (Wrosch et al., 2011) support their hypothesized secondary function.

Recently, evidence has emerged that reengagement may be a "double-edged sword," adaptive when it renews individuals' sense of purpose but detrimental to wellbeing when it depletes resources that are needed elsewhere (Wrosch et al., 2011; Wrosch, Rueggeberg, & Hoffman, 2013; Wrosch, Scheier, & Miller, 2013). Which side of the sword reengagement represents likely depends on the nature of the new goal an individual selects. In the case of a chronically stressful situation, like caring for a chronically ill family member, the emotional and physiological benefits of disengaging from personal career goals may be undermined if the individual chooses to reinvest in ambitious, resource-intensive social or leisure goals (Wrosch et al., 2011). Given that goal adjustment theorists are just beginning to explore the distinction between more and less adaptive reengagement processes and given the exploratory nature of the present study, we do not distinguish here between more and less adaptive forms of reengagement.

Emerging Adulthood

To date, SDT has not explicitly explored the implications of motivational orientation for goal pursuit during *emerging adulthood* (EA; Arnett, 2000, 2004). A culturally sanctioned period of unprecedented freedom for people aged roughly 18-29 years, EA has evolved over the past five decades due to social and economic changes in industrialized societies internationally, allowing young men and women time to explore different paths and experiences before taking on the responsibilities of traditional adult roles. Characterized by a) exploration in school, work, and intimate relationships, b) instability in these domains as a result of exploration, c) self-focus, d) feeling "in-between" adolescence and adulthood, and e) feeling a sense of possibility and opportunity for the future, EA provides a meaningful context for the investigation of hypotheses concerning motivation and self-regulation of goals. Theories of personality change emphasize that times of role transition, like EA, function as spurs to change in dispositional characteristics (Elder, Modell, & Parke, 1994; Caspi & Roberts, 2001; Roberts & Mroczek, 2008). In support of this view, a meta-analyses of personality trait change in adulthood revealed that more mean-level

change in personality occurs during the twenties than during any other lifespan phase (Roberts, Walton, & Viechtbauer, 2006). Thus, we may be more likely to "catch" individuals in the process of personality change during the decade of the twenties than in earlier or later decades.

Second, we may be more likely to observe the effects of motivational orientations during the twenties than in earlier or later decades. Relative to adolescence, in which institutional and parental authority constrains choice, and adulthood, in which the responsibilities of work and family do likewise, emerging adulthood is a time of relative freedom of action. This freedom may facilitate a clearer expression of individuals' motivational tendencies than earlier or later decades. This hypothesis is supported by the work of Ratelle and colleagues (2007) who observed a naturally occurring "high autonomy" motivational profile among individuals on the threshold of emerging adulthood (mean age = 18.58), but not among individuals just a few years younger, suggesting that high school students' autonomous motivation may be suppressed by a raft of factors - grades, deadlines, lack of choice, and surveillance – that are not as salient in higher education contexts.

Finally, EA is a lifespan phase in which adaptive self-regulation of goals is simultaneously critical for success and wellbeing in later adulthood (Hill et al., 2011; Howard et al., 2010; Masten et al., 2004; Shulman & Nurmi, 2010b) and challenging; overall, young adults report more difficulty disengaging from unattainable goals than older adults (Wrosch et al., 2003b). Emerging adults, particularly those enrolled in university, may experience an abrupt increase in unattainable goals by virtue of tougher standards for achievement in domains such as academics, athletics, and the arts (Rasmussen et al., 2006). Given the importance and challenge associated with goal striving during this lifespan phase, EA provides an appropriate context for a first investigation of the relationships between different degrees of self-determination and adaptive goal engagement and adjustment processes.

Associations between general causality orientations and goal engagement and adjustment capacities in emerging adulthood

Goal engagement. Goal engagement was operationalized in the current study via a measure of persistence in goal striving because persistence appears as a key feature of the engagement mode across major theories of lifespan regulation (Haase et al., 2013). We hypothesized that the autonomy orientation would be positively related to baseline levels and growth in persistence among university-enrolled emerging adults over one academic year. A

strong autonomy orientation is characterized by the tendency to organize behavior according to personal values and interests and to report autonomous reasons for specific behaviors. When a chosen goal reflects an individual's internalized values and intrinsic interests, that individual should experience fewer challenges to the commitment of time, energy, and resources to the pursuit of that goal and, consequently, demonstrate greater persistence. Supporting this hypothesis, several studies of motivation and performance in the academic domain have demonstrated that autonomous motivation leads to better outcomes through sustained effort (Sheldon & Elliot, 1998), study effort (Vansteenkiste et al., 2005), and deep study strategy (Kusurkar et al., 2013). Indeed, for autonomously motivated individuals, the behavioral efforts that are synonymous with persistence may be experienced as pleasurable, as suggested by the finding that positive affect fully mediates the positive association between autonomous motivation for a cognitive task and performance on that task (Gillet et al., 2013). These efforts may even be experienced as flow when the individual's skill level matches the level of challenge inherent in his or her pursuit (Nakamura & Csíkszentmihályi, 2001); experience sampling data indicate that higher levels of the autonomy orientation are indeed associated with a greater percentage of flow experienced while doing school work among high school students (Wong et al., 2000).

Moreover, the autonomy orientation may protect individuals' intrinsic motivation, and thus persistence, for goal pursuits when environmental events threaten to undermine it. Classical SDT studies on the undermining effects of rewards on intrinsic motivation (Deci, 1971, 1972) and subsequent meta-analyses (e.g. Deci, Koestner, & Ryan, 1999) have established that individuals are less likely to persist in intrinsically motivating activities after they have been offered a reward for doing the activity. Follow-up studies identified a host of other environmental events, such as deadlines, surveillance, threats, and negative or controlling positive feedback, that undermine intrinsic motivation and, thus, persistence (for a review, see Deci & Ryan, 2008). Decades after these early studies, Hagger and Chatzisarantis (2011) extended the original findings by demonstrating that the autonomous causality orientation can temper the undermining effects of rewards on intrinsically motivated persistence. In their study, whereas more controlled individuals displayed the classic pattern of persisting less when they had been rewarded than when they had not, more autonomously oriented individuals tended to persist at the same level regardless of reward condition. This finding points to the possibility that high levels of the

autonomy orientation may protect intrinsically motivated persistence not only from rewards, but from some or all of the other factors identified as threats to intrinsic motivation, all of which are likely to be encountered during the course of goal pursuit in the university context.

Likewise, we hypothesized that the control orientation would be positively related to baseline levels and growth in persistence over the academic year. Like autonomy, the control orientation is goal-oriented. For example, experience sampling evidence suggests that the control orientation is related to alertness, activity, and a longer amount of time spent doing schoolwork among high school girls (Wong, 2000). However, we expected that the positive relationship between the control orientation and persistence would be weaker than the relationship between the autonomy orientation and persistence. Although both motivational orientations reflect an orientation toward achieving goals, the control orientation is distinguished by its focus on gaining the approval of authority figures and satisfying social pressures and standards. Lee, Sheldon, and Turner (2003), building on the work of Koestner and Zuckerman (1994), have shown that the control orientation promotes the adoption of one of two types of performance goals – *performance-approach* or *performance-avoidance goals* – depending on an individual's level of self-confidence. Self-confident individuals with high levels of the control orientation seek opportunities to prove their competence and display their abilities to those in a position to grant approval and rewards. Such individuals tend to adopt more difficult goals, again as a function of their self-confidence. These findings constitute indirect evidence that high levels of the control orientation, when paired with self-confidence, should promote persistence in goal striving as conceptualized by Wrosch and colleagues. Individuals with high levels of the control orientation who *lack* self-confidence, however, are more likely to attempt to manage their self-image by avoiding failure and hiding perceived incompetence from evaluators and, to this end, to adopt less difficult goals. These findings suggest that high levels of the control orientation, when paired with a *lack* of self-confidence, should hinder persistence in goal striving. Because we were focused on the main and interactive effects of the general causality orientations themselves in the present study, we did not distinguish between high levels of the control orientation paired with high vs. low self-confidence. Therefore, we expected the observed relationship between the control orientation and persistence to reflect both types of achievement goal patterns – performance-approach and performance-avoidance – and therefore to be weaker than the relationship of autonomy to persistence.

Finally, we expected that impersonal orientation would be negatively related to baseline levels of persistence, as well as declines over the academic year, because the impersonal orientation reflects a fundamental mistrust in the individual's ability to control outcomes in his or her life.

Goal disengagement and autonomy orientation. SDT has demonstrated that autonomous motivation is an asset in promoting cognitions, affects, and behaviors that support goal striving across a wide variety of domains. Thus, it would be tempting to hypothesize that the autonomy orientation also promotes adaptive self-regulation of unattainable goals, on the grounds that autonomy is generally associated with more positive self-regulatory outcomes and the capacity for disengagement, with its theoretical and empirical links to psychological and physical wellbeing, is such an outcome. However, application of the principles of SDT and evaluation of available empirical literature relevant to this question yield two competing hypotheses about the relationship of autonomy to disengagement, one of which is that autonomy, generally considered a panacea for mental health and flourishing, may *hinder* the development of disengagement capacities. Ironically, both arguments rest on the tendency of autonomously oriented individuals to demonstrate deeper, mindful engagement in their actions than controlled or impersonally motivated individuals.

First, we present the argument, in line with SDT's familiar conclusion that autonomy is generally associated with more positive outcomes, that the autonomy orientation *supports* the development of disengagement capacities in emerging adulthood. This argument is based on the work of Legault and Inzlicht (2013), who have proposed that autonomy at the dispositional level should promote adaptive self-regulation in goal pursuit by increasing individuals' attention, receptivity, and emotional reaction to threatening self-relevant information, specifically self-regulatory failures. The greater salience of failure, they argue, and the ability of more autonomously oriented individuals to cope with failure in a non-defensive manner, is a critical adaptation that allows them to "slow down, recalibrate their behavior, and ultimately improve their performance (Legault & Inzlicht, 2013)." Empirical support for their position derives from findings that autonomy is associated with less defensive coping strategies (Knee & Zuckerman, 1998), fewer self-protective attributions after failure (Knee & Zuckerman, 1996), and integration of mistakes and personal faults (Weinstein et al., 2011). Across studies, the autonomy orientation

appears to be associated with less defensiveness than the control orientation (for a review, see Hodgins & Knee, 2002).

Like other researchers who have based models of self-regulation on self-determination theory, Legault and Inzlicht do not make predictions about unattainable goals, specifically. Rather, their research question centers on whether higher levels of the autonomy orientation are associated with increased reactivity to self-regulation failure on a classic inhibition task, the Stroop Task. Moreover, their level of analysis – the error-related negativity (ERN) an event-related potential arising in the anterior cingulate cortex – is a distal antecedent to the behavioral and motivational responses that characterize disengagement. Nevertheless, we propose that their argument can be extended to apply not only to self-regulatory failure in the moment-to-moment course of goal pursuit, but also to self-regulatory failures – i.e. unattainable goals – regarding which further effort would be futile. Autonomous motivation, reflected in "deep, mindful engagement" in goal striving, may, through non-defensive coping and receptivity to self-threatening information, also help individuals to slow down, recalibrate their behavior, *and walk away from* goals whose continued pursuit would expose them to repeated experiences of failure and deplete resources that could be applied to the pursuit of other, or new, goals.

A second line of reasoning supporting an autonomy-disengagement link integrates one proposition from Nesse's (2000) evolutionary perspective on the adaptive function of depressive symptoms and one speculation from self-determination theory. Through the process of natural selection, depressive symptoms (e.g. low mood as distinguished from the clinical syndrome) may have been selected for because they facilitate individuals' disengagement from unattainable goals by signaling that current pursuits are not proceeding as planned. In support of Nesse's thesis, Wrosch and Miller (2007) reported that depressive symptoms predicted increases in goal disengagement capacities over one year in a sample of adolescent girls at high risk for depression. Moreover, although disengagement capacities increased on average in their sample, girls who had the highest baseline levels of depressive symptoms experienced steeper increases in disengagement capacities than those who reported the lowest levels of baseline depression.

From a self-determination perspective, the autonomy orientation may predispose individuals to a greater degree of anguish vis-à-vis goal failure than the control or impersonal orientations because of the relative depth of internalization and self-identification characteristic of autonomously motivated goals (Sheldon & Elliot, 1999). In sum, if the autonomy orientation

differentially predisposes individuals to distress in the face of goal failure, and such symptoms facilitate disengagement, then the autonomy orientation may exert an indirect effect on disengagement through depressive symptoms and low mood when goals are unattainable.

Next, we present the argument, which challenges the consensus within self-determination theory that autonomous motivation is universally adaptive, that the autonomy orientation *thwarts* the development of disengagement capacities. This argument is based on the rationale of Wrosch and colleagues, who speculate that it might be harder for individuals to disengage from more important than from less important goals (Wrosch, Scheier, Carver et al., 2003). These authors define goal importance with reference to Carver and Scheier's well-known hierarchical model of the self-regulation of goals (Carver & Scheier, 1998). In this model, an individual's most abstract goals, ("Be" goals, e.g. "Be a good mother") are tightly linked to, perhaps even direct manifestations of the individual's sense of self. Goals at this level influence goals at the next level down ("Do" goals, e.g. "Spend quality time with my child"), which, in turn, organize goals at increasingly concrete, specific, and ultimately motor levels ("Wake up early to spend the morning with my son; Set my alarm clock for 7:30am; Press the reset button on the alarm clock").

According to this model, a goal is as important as the strength of its vertical connection to goals at higher levels of the hierarchy, and, ultimately, to the individual's sense of self. Further, goals at lower, more concrete levels of the hierarchy may be more important than other goals at the same level if they are more tightly linked to higher-order goals.

What do self-determination and the autonomy orientation have to do with the hierarchical model of self-regulation? We suggest that the very goals that are important in the hierarchical model by virtue of their vertical coherence with an individual's sense of self are likely to be those that are autonomously motivated. Recall that the autonomy orientation reflects a tendency to organize behavior according to the beliefs, values, and interests that have been well-internalized and integrated with the individual's self. If, as Wrosch and colleagues propose, it is generally harder to disengage from a more important vs. a less important goal, and autonomously motivated goals can be viewed as important according to the same criteria, then it should be harder to disengage from a more autonomously motivated than a less autonomously motivated or a controlled goal. Indeed, experience sampling evidence suggests that the autonomy orientation is associated with engagement with academic activities considered important to self, while the

control orientation is associated with engagement in academic activities considered important to others (Wong, 2000).

Goal disengagement and control orientation. We expected that the control orientation would be negatively related to disengagement capacities because of the link between the control orientation and contingent self-esteem, or the dependency of self-worth on success in important domains (Deci & Ryan, 1995; Hodgins et al., 2007). When self-esteem is contingent, the boost to self-worth occasioned by success is transitory, rendering each challenge a new, conclusive test of self-worth. To highly controlled individuals, facing an unattainable goal presumably poses a serious threat to self-esteem. The desire to protect self-esteem may motivate such individuals to persist in futile efforts to achieve goals or, even once behavioral efforts have been abandoned, to remain psychologically committed to goals, exposing them to repeated failure experiences and depleting behavioral and motivational resources that could be fruitfully invested elsewhere.

Goal disengagement and impersonal orientation. We expected that the impersonal orientation would be positively related to disengagement capacities because of the association between the impersonal orientation and depressive symptoms (Deci & Ryan, 1985a). Wrosch and colleagues have argued that depressive symptoms may facilitate adaptive disengagement from unattainable or prohibitively costly goals because low mood may enable individuals to evaluate the costs of continued, futile goal pursuit more objectively. Consistent with their hypotheses, Wrosch and Miller observed that depressive symptoms predicted increases in disengagement and reengagement capacities, which in turn predicted subsequent decreases in overall depressive symptoms in a sample of adolescent girls (Wrosch & Miller, 2009). Findings from this study suggest that the impersonal orientation, though a hindrance to the adaptive self-regulation of personal goals in other respects, may through the tendency to experience low mood facilitate adaptive disengagement when goals are, in fact, unattainable.

Goal reengagement and autonomy orientation. We expected the autonomy orientation to be positively related to baseline levels and yearlong growth in reengagement capacities. Individuals who reengage are likely to choose a new goal that compliments or expresses a core aspect of the self (Wrosch et al., 2003a). Because the autonomy orientation is associated with greater ego development, self-actualization (Deci & Ryan, 1985a), integration in personality (Koestner et al., 1992), and the organization of actions according to self-endorsed beliefs, values,

and interests, individuals with stronger autonomy orientations are likely to have an easier time identifying, committing to, and beginning to pursue alternative goals.

Goal reengagement and control orientation. We expected the control orientation to be unrelated to baseline levels or the yearlong growth trajectory for reengagement because the control orientation is characterized by reliance on external norms and authority figures to organize action. This hypothesis is founded on the insight of Schwartz and colleagues (Schwartz, Cote, & Arnett, 2005), who observed that outcomes associated with controlled motivation can be difficult to predict because controlled individuals rely on the environment for direction. Their argument, we propose, generalizes to reengagement processes. When, following disengagement, clear directives and contingencies vis-à-vis new goals are available, individuals with a strong controlled orientation may reengage in a goal whose pursuit or achievement is likely to result in reward or approval. If, on the other hand, clear directives and contingencies for reengagement following disengagement are absent, individuals with a strong control orientation will lack the environmental cues that typically shape their goal selection and pursuit, resulting in difficulty with reengagement. Since reengagement outcomes for individuals with a strong control orientation are likely to depend more heavily on environmental cues and events than reengagement outcomes for more autonomously oriented individuals, it is difficult to predict a clear relationship in one direction or the other.

Goal reengagement and impersonal orientation. Finally, we expected the impersonal orientation to be negatively related to baseline levels of and declines in reengagement capacities over the academic year. Whereas the impersonal orientation may, through its association with depressive symptoms, support disengagement processes, it is unlikely to help individuals identify, commit to, or begin pursuing alternative goals. Emerging adults who report high levels of the impersonal orientation are less likely to have achieved the identity commitment and integration that could help individuals to select from an array of possible goals. Impersonally oriented individuals are more likely to believe that they cannot control important outcomes in their lives, rendering them less likely to make commitments to new goals, as goal commitment implies a belief that the goal is achievable. Even if an individual manages to identify and commit to a new goal, the negative affectivity associated with the impersonal orientation across studies is likely to interfere with his or her ability to initiate behavioral efforts towards achieving the goal.

Instead, highly impersonally oriented individuals are more likely to focus on unattainable goals as further proofs of their incompetence and ineffectance.

Joint effects of causality orientations in emerging adulthood. Given that each causality orientation is theoretically present to some degree in each individual (Deci & Ryan, 1985a), surprisingly few researchers have investigated interactive effects among the autonomy, control, and impersonal orientations (for exceptions see Knee and Zuckerman, 1998, Wong, 2000. Instead, researchers typically classify individuals into predominantly autonomous, controlled, or impersonal groups on the grounds that the strongest orientation will exert the greatest effects on behavior and subjective experience (e.g. Koestner et al., 1992); Koestner & Zuckerman, 1994), Hagger & Chatzisarantis, 2011) or by classifying individuals into forced (e.g. Knee & Zuckerman, 1996) or naturally occurring (e.g. Ratelle et al., 2007) motivational profiles characterized by high or low levels of each causality orientation.

Although findings from the aforementioned studies have been illustrative, we argue that contemporary research on causality orientations should investigate formal moderation effects between the autonomy, control, and impersonal orientations on self-regulation outcomes. Given that they are theoretically present to differing degrees within each individual, it may be that causality orientations have important joint effects on relevant cognitions, affects, and behaviors. Such research is justified, in part, by the limited but intriguing findings that have been reported. For example, Wong (2000) found that the autonomy and control orientations interacted to predict whether students enrolled in more or less advanced high school courses. High levels of the controlled orientation predicted enrollment in less advanced courses, but this effect disappeared when levels of the autonomous orientation were also high (Wong, 2000), suggesting that the tendency to organize behavior according to well-internalized and integrated beliefs, values, and interests may protect individuals who are simultaneously sensitive to external pressure and control from making self-limiting choices.

How might causality orientations interact to predict goal adjustment outcomes? One possibility is that high levels of the impersonal orientation operating jointly with high levels of either the autonomy or control orientation may, through the tendency to believe in personal incompetence, help individuals to disengage from unattainable goals. Furthermore, causality orientations may interact to predict which individuals display the most adaptive sequence of goal adjustment processes, e.g. disengagement followed by reengagement in alternative goals that

provide purpose in life without spreading individuals' resources "too thin." Given the lack of theoretical or empirical evidence for the effects of interactions among causality orientations on the self-regulation of goals, we do not make specific hypotheses concerning these effects. Rather, we include joint effects of the autonomy, control, and impersonal orientations on each self-regulatory outcome as exploratory analyses that are meant to advance theory and stimulate empirical work.

Current Study: Summary and Hypotheses

To date, SDT has not adequately addressed the phenomenon of unattainable goals nor specific goal adjustment processes (e.g. disengagement and reengagement) that help individuals to self-regulate effectively when, inevitably, they face failure in goal pursuit and the thwarting of aspirations. To fill this gap in the literature, the current study proposes specific hypotheses concerning the ways in which distinct motivational orientations as conceptualized within SDT relate to absolute levels of and change in not only goal engagement, but also goal adjustment capacities. These hypotheses are tested in the developmental context of emerging adulthood, a phase of the lifespan in which the interplay between motivation, striving, and change at the dispositional level may have important implications for later adult outcomes.

Hypothesis 1a:

The autonomy orientation is positively related to both baseline levels and yearlong growth in self-reported persistence in goal striving.

Hypothesis 1b:

The control orientation is positively related to both baseline levels and yearlong growth in persistence. The magnitude of both relationships is attenuated relative to the magnitude of the relationships observed between the autonomy orientation and persistence.

Hypothesis 1c:

The impersonal orientation is negatively related to baseline levels of persistence and predicts declines in persistence over the academic year.

Hypothesis 2a$_1$:

The autonomy orientation is positively related to baseline levels and yearlong growth in disengagement capacities.

Hypothesis 2a$_2$:
The autonomy orientation is negatively related to baseline levels and predicts yearlong declines in disengagement capacities.

Hypothesis 2b:
The control orientation is negatively related to baseline levels and predicts yearlong declines in disengagement capacities.

Hypothesis 2c:
The impersonal orientation is positively related to baseline levels and predicts yearlong increases in disengagement capacities.

Hypothesis 3a:
The autonomy orientation is positively related to baseline levels and the yearlong growth in reengagement capacities.

Hypothesis 3b:
The control orientation is unrelated to baseline levels or yearlong trajectory for reengagement capacities.

Hypothesis 3c:
The impersonal orientation is negatively related to baseline levels and predicts declines in reengagement capacities.

Chapter 3: Methods

Participants and Procedures

Potential participants were recruited by volunteer research assistants at start-of-term fall events and by fliers posted around the university campus where the study took place. Individuals who indicated their interest by providing contact information on sign-up sheets or by contacting the research team directly were sent an email that described the study, offered a gift card to one of three popular retailers in exchange for participation, and provided a link to an online survey. Data collection for the study proceeded over four waves spanning the academic year. At each wave, participants who had at least partially completed one or more previous online surveys were contacted via email and invited to complete a new survey, each of which required participants to indicate that they understood the purpose, potential risks, and potential benefits of the study, indicate their free and informed consent, and indicate that they were between the ages of 18 and 25 years and enrolled in their first university degree program. Reminder emails were sent one and two weeks following the initial contact and data collection closed approximately one month following the initial recruitment email at each wave.

The final sample (N = 298, 78.9% female) for the present study included those who completed at least the demographic characteristics section and first questionnaire of the online survey at Wave 1. Participants in this sample ranged in age from 18 to 25 years (M = 20.88, SD = 1.74), predominantly identified themselves as Caucasian (74.2% Caucasian; 8.7% Asian; 6.7% Black; 8.7% Biracial), and were relatively evenly spread over the first (24.8%), second (31.2%), third (27.5%), and fourth (11.7%) years of university study (3.3% were in their fifth year or beyond). Though a slight majority (53.7%) reported living at home with their parents, a variety of living situations were reported (25% with other students; 7% with non-student roommates; 10% with a spouse; 3.4% with non-parent relatives; 7.4% alone). Participants also reported a range of family incomes, with the greatest proportion (19%) reporting annual family income between $50,000.00 and $75,000.00 CAD (min = 8% at or below $25,000.00, max = 9.7% between $125 and $200,000.00). Approximately 21% of participants reported that they did not know their family income. Seventy-five percent of participants' mothers and 75.6% of participants' fathers had completed two-year (college), four-year (university), or higher education degrees.

Individuals who completed the baseline assessment (start of fall term) were invited via email to participate at three additional data collection points (end of fall term, start of winter term, and end of winter term) over the course of the year. The present study analyzed data from the first, third, and fourth data collection points when data on goal regulation outcomes were

collected. Times of measurement are hereafter referred to as the baseline assessment/Wave 1, Wave 2, and Wave 3.

Measures

General causality orientations. General causality orientations were measured with the 12-vignette version of the *General Causality Orientations Scale* (GCOS; Deci & Ryan, 1985a). This version of the GCOS presents 12 vignettes describing common social or achievement situations, each of which is followed by three possible responses that reflect, respectively, a response consistent with the autonomy, control, and impersonal orientations. Using a 7-point Likert-type scale (anchored at 1 = *very unlikely,* 7 = *very likely*), respondents rate how typical each of the three responses is for them. Responses to items consistent with each orientation are summed across the vignettes to create three independent subscales - the autonomy, control, and impersonal subscales. The GCOS is a well-validated self-report measure of individual differences in relatively enduring motivational tendencies (Deci & Ryan, 1985a). Internal consistency reliability for the subscales of the GCOS were satisfactory in the present sample (α =.74 (Autonomy); α = .69 (Control); α =.77 (Impersonal)).

Goal engagement. Goal engagement was operationalized in the current study via a measure of persistence in goal striving because persistence appears as a key feature of the engagement mode across major theories of lifespan regulation (Haase et al., 2013). Persistence was measured with a 5-item self-report instrument adapted from Wrosch, Heckhausen, and Lachman (2000; e.g. "When I encounter problems, I don't give up until I solve them"). Using a 4-point Likert scale (anchored at 1 = *not at all*, 4 = *a lot*), respondents rate the degree to which each item describes them. Higher scores on a sum total of the items indicate higher levels of the underlying construct. Evidence for the validity of this scale derives from Wrosch and colleagues (2000) study, in which persistence in goal striving was associated with mastery beliefs. Internal consistency reliability for the persistence in goal striving scale was satisfactory across the three waves of the study (α = .82 to .84).

Goal adjustment capacities. Goal adjustment capacities were measured with the 10-item *Goal Adjustment Scale* (GAS; Wrosch et al., 2003b) a well-validated instrument that assesses individual differences in goal adjustment capacities. The GAS contains two independent subscales, the 4-item goal disengagement subscale and the 6-item goal reengagement subscale. The goal disengagement subscale assesses the strength of an individual's tendency to reduce

effort and relinquish commitment towards unattainable or prohibitively costly goals. Two items assess the former (e.g. "It's easy for me to reduce my effort toward the goal") and two the latter (e.g. "If I stay committed to the goal for a long time, I can't let it go" (reverse-scored). Respondents indicate the degree to which these statements describe their tendencies using a 5-point Likert scale (anchored at 1 = *almost always true*, 5 = *almost never true*). The average of ratings across items indicates the strength of individuals' ability to disengage from unattainable or costly goals, such that higher scores indicate more adaptive disengagement capacities. Internal consistency reliability for the disengagement subscale was satisfactory across the three waves of the study (α = .74 to .80).

The goal reengagement subscale assesses the strength of an individual's tendency to identify, commit to, and start pursuing new goals. Two items each assess identification (e.g. "I seek other meaningful goals"), commitment (e.g. "I tell myself that I have a number of other new goals to draw on") and effort (e.g. "I start working on other new goals"), respectively. Participants indicate the degree to which each statement describes them using a 5-point Likert scale (anchored at 1 = *almost always true*, 5 = *almost never true*). The average of ratings across items indicates the strength of individuals' ability to reengage with new, meaningful goals such that higher scores indicate more adaptive reengagement capacities. Internal consistency reliability for the reengagement subscale was satisfactory across the three waves of the study (α = .90 to .92).

Chapter 4: Results

Data Integrity

Prior to statistical analysis, data were screened according to best practices outlined by Kline (2009), Meyers, Gamst, and Guarino (2013), and Tabachnick and Fidell (2007) using IBM SPSS Statistics, version 22. Multiple imputation of missing data was carried out using Mplus, version 6, according to best practices outlined by Múthen and Múthen (1998-2010) and Enders (2010). Main statistical analyses were conducted using HLM version 7.01 (Raudenbush et al., 2011).

Thorough inspection of the data revealed no out-of-range scores or errors. Inspection of standardized scores revealed 18 cases with scores more than three standard deviations beyond the mean on specific variables. None of these cases appeared to belong to a different population than the target population of the study. Therefore, in order to reduce their influence on descriptive

statistics for the data, each outlier was replaced with the next most extreme score within three standard deviations for that variable (Kline, 2009).

Descriptive statistics for all study variables are presented in Table 1. The mean and standard deviation for the three subscales of the GCOS were comparable to those reported for a large (N = 636) sample of undergraduates (Ryan & Deci, 1985a). Similarly, the mean and standard deviation for the persistence in goal striving scale were comparable to those reported for a sample of young adults (25-39yrs) from a large (N = 3,490) national telephone survey conducted in the United States (Wrosch et al., 2000). The mean and standard deviation for goal reengagement was similar to that reported for a sample of undergraduates (N = 115; Wrosch et al., 2003b). However, for goal disengagement, the mean was lower and the standard deviation higher in the sample for the present study than in the sample assessed by Wrosch and colleagues in 2003. One possible cause for this discrepancy is the different proportions of males in each sample. Only 20.5% of the subjects for the current study were male, whereas 69% of the subjects for the Wrosch et al. study were male. Future research may be needed to investigate sex differences in goal adjustment tendencies.

Missing Data. Missing data in the form of attrition, wave nonresponse, and variable nonresponse were present across the three waves of the study. The total sample size of participants with complete data on baseline measures of dispositional motivation and the outcome at each wave declined from baseline (N = 284) to Wave 2 (N = 197) to Wave 3 (N = 169). Reporting, analysis, and assessing the implications of missing data were conducted according to best practices outlined by Enders (2010; 2011) and Jelicic, Phelps, and Lerner (2009; 2010) for handling missing data in longitudinal designs in developmental psychology research.

Rubin (1976) proposed a three-part classification of mechanisms of missing data: data missing completely at random (MCAR), missing at random (MAR), and missing not at random (MNAR). It is critical to attempt to understand the precise mechanism of missing data in an analysis because the mechanism of missing data determines the most appropriate missing data handling technique for that analysis. Data are MCAR when the probability of missing data on a given variable is unrelated to the unobserved data (i.e. the "would-be values" Enders, 2010) and to any other measured variable in the analysis. Data are MAR when the probability of missing data is related to other study variables but not to the missing values themselves. Finally, data are

MNAR when the probability of missing data is related to the values of the missing data themselves, even after controlling for other variables.

Univariate t-tests, which compared participants with and without missing data on a range of variables (e.g. all variables included in statistical analyses, various indicators of wellbeing, and demographic variables) were conducted to assess the mechanism of missing data in the present sample. Results indicated that missingness was unrelated to any variable included in analyses or to indicators of wellbeing, age, or subjective socioeconomic status. However, male participants were more likely to have missing data on all study variables across the three waves of the study. In addition, participants with missing data were more likely to self-identify as Black or North American Indian than as White or Asian, to be in their third year of university study, or to have a mother with a higher level of education. Because missingness was related to observed study variables, the MCAR mechanism was ruled out, leaving MAR and MNAR. It was determined that data were unlikely to be missing MNAR because it seemed unlikely that missingness was related to the values of the missing data themselves. Rather, patterns of attrition, wave nonresponse, and variable nonresponse suggested that participant fatigue was the most likely cause of missing data across waves.

When data are MAR, traditional methods for handling missing data (e.g. listwise deletion) are inappropriate because the data the researcher has do not represent a random sample of the data he or she would have had if all participants had responded fully (Enders, 2010). Instead, a state-of-the-art missing data handling technique is required. To date, multiple imputation (MI) and maximum likelihood estimation (MLE) are the best available methods for handing data that are assumed to be MAR (Enders, 2010). Multiple Imputation and MLE frequently yield very similar results (e.g. parameter estimates and standard errors), because they make the identical assumptions that data are MAR and multivariate normal (Enders, 2011). For the present study, all analyses were carried out once under MI and once under Full Maximum Likelihood Estimation (FIML), the MLE estimation method available in HLM version 7 that also allows comparison of model fit using the likelihood ratio test. With the exception of changes in statistical significance for a small number of fixed effects, results under FIML were very similar to those obtained under MI.[1] Hereafter, we report results obtained under MI because MI, unlike FIML in the context of

[1] Goodness of fit as assessed by the likelihood ratio test and the direction, statistical significance, and patterns of relative magnitude for fixed and random effects were very similar across the four

HLM version 7, allowed us to retain cases with missing data on explanatory variables (Enders, 2010), thereby maximizing sample size and statistical power.

The imputation model included 80 variables – the three causality orientations, persistence, goal disengagement, and goal reengagement at Waves 1, 2, and 3, various indicators of wellbeing, and demographic variables. The selection of these variables capitalized on the richness of our longitudinal dataset, as well as the availability of wellbeing variables whose relations to causality orientation, goal engagement, and goal adjustment tendencies are well established. The imputation model produced a total of 50 imputed datasets, one drawn at every 300th iteration of the imputation process. The variables for whom missing data were imputed included explanatory variables measured at Wave 1 and outcome variables measured at Waves 1, 2, and 3, enabling us to conduct cross-sectional and longitudinal tests of our hypotheses.

Verification of assumptions. Hierarchical linear modeling of change over time assumes that the functional relationship between individual growth trajectories and time is linear (Singer & Willett, 2003). Inspection of individual yearlong trajectories confirmed a linear relationship between time and each regulation outcome. Hierarchical linear modeling also assumes normality

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fitted models for each outcome. With respect to goodness of fit, we observed that the chi-squared statistic for the likelihood ratio test comparing model 4 to model 3 for the persistence outcome was no longer statistically significant under FIML. With respect to random effects, we observed no changes in statistical significance or patterns of relative magnitude across models 1-4 for the persistence or goal disengagement outcomes. However, whereas the within-persons variance was larger than the between-persons variance in intercepts across models for the reengagement outcome under MI, this pattern was reversed under FIML. With respect to fixed effects, the patterns of direction, statistical significance, and relative magnitude were largely unchanged across models for each outcome. We observed that a small number of effects that were statistically significant under MI (N = 298) were significant at a trend level or no longer significant under FIML. These differences are likely attributable to the substantial reduction in sample size for each outcome under FIML. Under MI, which accommodates missing data on explanatory variables, we retained the full sample (N = 297). Under FIML, in order to perform a conservative comparison of results, we restricted the sample to participants with complete outcome data at Wave 1 and Wave 2 for each outcome. This restriction, in addition to FIML's prohibition of cases with missing data on explanatory variables, resulted in a substantial reduction in sample size for each outcome (n (persistence) = 195; n (goal disengagement) = 193; n (goal reengagement) = 195). Finally, we observed that the direction of a small number of effects changed in direction under FIML. However, none of these effects were statistically significant under either missing data handling protocol.

and homoscedasticity of level-1 and level-2 residuals (Singer & Willett, 2003). Visual inspection of Q-Q plots and scatterplots of the relationship between the standardized residuals and fitted values for both intercepts and slopes revealed no serious violations of these assumptions.

Multiple imputation assumes that data are MAR and multivariate normal. The case for the MAR mechanism has been made above. The assumption of multivariate normality requires that all variables and all linear combinations of variables be normally distributed (Tabachnick & Fidell, 2007). Although it is difficult to test this assumption (Sherry & Henson, 2005), multivariate normality is more likely when all variables themselves are normally distributed (Tabachnick & Fidell, 2007). All predictor and outcome variables in the current study were normally distributed, making violations of this assumption less likely.

Statistical Plan

Hierarchical linear models were fitted to the data to assess the differential main and interactive effects of the autonomy, control, and impersonal causality orientations on the initial status and rate of change across one academic year for each of the three continuous outcome variables – persistence in goal striving, goal disengagement capacities, and goal reengagement capacities. A taxonomy of four increasingly complex models was fitted for each outcome according to best practices outlined by Singer and Willett (2003). For each outcome, Model 1 (unconditional means model), which is characterized by the absence of level-1 or level-2 predictors, partitioned the total variance in the outcome into within- and between-person sources and estimated the grand mean for the outcome across the three waves of the study. Model 2 added the variable *Time* (e.g. wave) to the level-1 equation to estimate the average initial status and yearlong rate of change in the outcome, as well as the extent of individual variability around these estimates. Model 3 added the set of three causality orientations to the level-2 equations in an effort to explain individual differences in both initial status and rate of change for each outcome. A final model added product terms for all possible combinations of causality orientations to the level-2 equations to explore possible interactive effects on each outcome (Model 4). Across analyses, level-2 predictors were grand mean-centered to simplify interpretation of results and *Time* was coded so that 0 would represent the baseline assessment (e.g. 0 = Wave 1, 1 = Wave 2, 2 = Wave 3; West et al., 2011). Because we wanted to use the likelihood ratio test, which compares the deviance statistic of a more complex model to that of a

less complex, nested model to assess improvement in model fit, full maximum likelihood estimation was chosen as the estimation method (Singer & Willett, 2003). All analyses were conducted in HLM version 7.01 (Raudenbush et al., 2011) with robust standard errors. As multiple imputation was chosen as the missing data handling technique for the present study, analyses were carried out on a complete data set comprising 298 individuals measured on three occasions, for a total of 888 observations.

Preliminary Analyses

Covariates. Persistence, disengagement, and reengagement baseline scores did not differ by sex, race, or year of study, nor did perceived family socio-economic status predict any of these goal regulation outcomes. Hence, these potential covariates were excluded from subsequent analyses.

Descriptive statistics, autocorrelations, and within-time correlations. Means, standard deviations, and zero-order correlations for all study variables are presented in Table 1. Autocorrelations for the three outcome variables for the full sample across time were all statistically significant ($p < .001$) and ranged from .51 to .72 for persistence (median $r = .66$), from .42 to .61 for disengagement (median $r = .60$), and from .49 to .62 for reengagement (median $r = .50$), suggesting a measure of yearlong stability in each outcome. For all three outcomes, the highest autocorrelations were found between Waves 2 and 3, i.e. January and May of the same academic year. The lowest autocorrelations were found between the initial assessment and Wave 2 for persistence and disengagement. The lowest autocorrelation for reengagement was found between baseline assessment and Wave 3.

Within-time correlations among the outcome measures for the full sample were all statistically significant ($p < .05$) with the exception of the correlation between disengagement and reengagement at the initial assessment and Wave 2. Persistence was positively associated with reengagement (range in r from .30 to .37) and negatively associated with disengagement (range in r from -.28 to -.44).

Correlations between predictor and outcome variables. Correlations between predictor and outcome variables provided preliminary support for proposed hypotheses. The autonomy orientation was positively related to persistence (range in r from .26 to .29), the control orientation was also positively related to persistence, though to a lesser degree (range in r from .07 to .16), and the impersonal orientation was negatively related to persistence (range in r from -

.34 to -.42), respectively at each of the three waves. With respect to disengagement, the autonomy (range in *r* from -.08 to -.16) and control orientations (range in *r* from -.01 to -.12) were both negatively related to the ability to withdraw effort and commitment from unattainable goals, while the impersonal orientation was positively related to this outcome (range in *r* from .09 to .13). The autonomy orientation was positively related to reengagement across the three waves (range in *r* from .23 to .29), the control orientation positively but weakly related to reengagement (range in *r* from .09 to .12), and the impersonal orientation was negatively related to reengagement at waves 1 and 2 (range in *r* from -.16 to .06).

Main Analyses

Goal engagement. Table 2 summarizes results of multilevel models that were fitted to the data to partition and explain yearlong variation in persistence scores. Model 1 (the unconditional means model, not shown) indicated that 61.86% of the total variability in persistence across the academic year was due to variability between persons, while 38.13% was due to variability within persons. A test of the between-persons variability in persistence was statistically significant (χ^2 (297) = 1800.87, $p < .001$), indicating the presence of systematic between-persons variation in this outcome that was worthy of further exploration.

Model 2 (the unconditional growth model, not shown) added the variable *Time* (i.e. wave) to the level-1 equation in order to estimate the average growth trajectory (e.g. average initial status and average rate of change) in persistence across the academic year, as well as the extent of individual differences in growth trajectories, not accounting for the effects of the three causality orientations. Results of this model confirmed a statistically significant intercept ($t = 97.31$, $p < .001$), suggesting that, on average, emerging adults reported non-zero levels of persistence at the start of the academic year. In contrast, the analysis revealed a non-significant slope ($t = 0.06$, $p = .950$), suggesting that, on average, emerging adults' levels of persistence remained stable across the year. Chi-squared tests of the variance components for persistence indicated statistically significant variability in participants' initial status ($\chi^2 = 842.19$, $p < .001$), but not yearlong rate of change ($\chi^2 = 280.50$), $p > .500$), suggesting the presence of reliable individual differences in participants' initial status on this outcome. The association between average initial status and yearlong rate of change in persistence was positive *(r* = .78), indicating that individuals who began the year with higher levels of persistence increased in this adaptive tendency at a faster rate than those who began the year with lower levels of persistence.

Model 3 (the intercepts-and-slopes as outcomes model) added the three causality orientations to the level-2 equations in order to explain individual differences in initial status and yearlong rate of change in persistence. Results of this analysis confirmed statistically significant effects of each causality orientation on participants' initial status in persistence. Consistent with our hypotheses, individuals who reported higher autonomy ($t = 4.56$, $p < .001$) and higher control ($t = 2.28$, $p = .023$), also reported higher baseline persistence, but the magnitude of this effect was smaller for the control orientation. In contrast, individuals who reported higher impersonal orientation demonstrated lower baseline levels of persistence ($t = -8.50$, $p < .001$). In contrast, and contrary to our expectations, none of the causality orientations had a statistically significant effect on participants' yearlong rate of change in persistence. Overall, the likelihood ratio test comparing the lack of fit of Model 3 to the lack of fit of Model 2 indicated that the inclusion of the three causality orientations as a set of time-invariant Level 2 predictors improved the fit of the model to the data to a statistically significant degree (χ^2 (6) = 114.09, $p < .001$).

Finally, in order to explore whether the causality orientations exert interactive effects on yearlong growth trajectories in persistence, we added product terms representing all possible combinations of the autonomy, control, and impersonal orientations to the level-2 equations (Model 4). Results of this analysis confirmed a statistically significant interaction between the autonomy and control orientations ($t = -2.84$, $p = .005$) in predicting participants' yearlong rate of change in persistence. Again, the likelihood ratio test indicated that including the set of three interactions among causality orientations improved the fit of the model to the data to a statistically significant degree (χ^2 (6) = 17.45, $p = .008$).

To probe the nature of the observed interaction, levels of persistence were plotted against time separately using one standard deviation above and below the sample mean for predictors as reference points (see Figure 1). Consistent with our hypotheses, this analysis revealed that high levels of the autonomy orientation reported at baseline were associated with higher absolute levels of persistence across the academic year, regardless of participants' concurrent levels of control. However, the highest levels of persistence were observed among participants who simultaneously reported high levels of the autonomy and control orientations. In addition, high levels of control appeared to exert a protective effect on individuals who reported low autonomy at baseline; individuals in this group declined in persistence if they were low in control ($t = -2.06$, $p = .041$) but increased in persistence if they were high in control ($t = 3.16$, $p = .002$).

The inclusion of the three product terms resulted in one notable change in the structure of the causality orientations' *main* effects; controlling for the other causality orientations and their interactions, the control orientation, which had no observed effect on rate of change in earlier models, had a positive effect on yearlong change in persistence in the final model ($t = 2.62$, $p = .009$).

Goal Disengagement. Model 1 (the unconditional means model) indicated that 51.83% of the total variability in goal disengagement across the academic year was due to variability between persons, while 48.17% was due to variability within persons. A test of the between-persons variability in disengagement was statistically significant (χ^2 (297) = 1332.51, $p < .001$), indicating the presence of systematic between-persons variation in this outcome that was worthy of further exploration.

Model 2 added the variable Time (i.e. wave) to the level-1 equation in order to estimate the average growth trajectory (e.g. average initial status and average rate of change) in disengagement across the academic year, as well as the extent of individual differences in growth trajectories, not accounting for the effects of the three causality orientations. Results of this model confirmed a statistically significant intercept ($t = 61.79$, $p < 0.001$) and slope ($t = 3.66$, $p < .001$), suggesting that, on average, emerging adults reported non-zero levels of disengagement at the start of the academic year and increased in this capacity from September to May. Chi-squared tests of the variance components for disengagement indicated statistically significant variability in participants' initial status ($\chi^2 = 651.68$, $p < .001$), but not yearlong rate of change ($\chi^2 = 276.13$, $p > .500$), suggesting the presence of reliable individual differences in participants' initial status on this outcome. The association between average initial status and yearlong rate of change in disengagement was positive ($r = .88$), indicating that individuals who began the year with higher levels of disengagement increased in this adaptive tendency at a faster rate than those who began the year with lower levels of disengagement.

Model 3 added the three causality orientations to the level-2 equations in order to explain individual differences in initial status and yearlong rate of change in disengagement. Results of this analysis confirmed statistically significant effects of each causality orientation on participants' initial status in disengagement. Supporting the hypothesis that the autonomy orientation *thwarts* the ease with which individuals disengage from unattainable goals, individuals who reported higher baseline levels of autonomy ($t = -2.10$, $p = .037$), also reported

lower baseline disengagement capacities. Consistent with our hypotheses, individuals who reported higher control (t = -1.95, p = .053) reported lower, while individuals who reported higher impersonal orientation reported higher baseline disengagement capacities (t = 2.47, p = .014). Regarding yearlong rate of change, only the control orientation exerted a statistically significant effect on disengagement capacities. Contrary to our expectations, individuals who reported higher control at the start of the academic year demonstrated increases in disengagement capacities across the year. Overall, the likelihood ratio test indicated that the inclusion of the three causality orientations as a set of time-invariant level-2 predictors improved the fit of the model to the data for disengagement to a statistically significant degree (χ^2 (6) = 18.46, p = 0.005).

Finally, in order to explore whether the causality orientations exert interactive effects on yearlong growth trajectories in disengagement, we added product terms representing all possible combinations of the autonomy, control, and impersonal orientations to the level-2 equations (Model 4). Results of this analysis confirmed a statistically significant interaction between the autonomy and impersonal orientations (t = 2.31, p = .021) in predicting participants' yearlong rate of change in disengagement. However, the likelihood ratio test indicated that including the set of three interactions among causality orientations did not improve the fit of the model to the data to a statistically significant degree (χ^2 (6) = 8.34, p = .214).

To probe the nature of the observed interaction, levels of disengagement were plotted against time using one standard deviation above and below the sample mean for predictors as reference points (see Figure 2). This analysis revealed that, among individuals who reported high baseline levels of the autonomy orientation, high levels of the impersonal orientation were associated with a greater capacity to disengage from unattainable goals, an advantage that was maintained across the academic year. Among participants who reported low baseline levels of autonomy, high levels of the impersonal orientation were associated with a higher baseline capacity for goal disengagement, but not with change in these capacities over the course of the year (t = -0.06, p = .949). In contrast, among participants low in autonomy, low levels of the impersonal orientation were associated with increases in levels of goal disengagement that ultimately reached and surpassed those observed among more highly impersonally oriented individuals (t = 4.03, p < .001).

Goal Reengagement. Model 1 indicated that 52.06% of the total variability in goal reengagement capacities across the academic year was due to variability between persons, while 47.94% was due to variability within persons. A test of the between-persons variability in reengagement was statistically significant ($\chi^2 = 1268.79$, $p < .001$), indicating the presence of systematic between-persons variation in this outcome that was worthy of further exploration.

Model 2 added the variable *Time* (i.e. wave) to the level-1 equation in order to estimate the average growth trajectory (e.g. average initial status and average rate of change) in persistence across the academic year, as well as the extent of individual differences in growth trajectories, not accounting for the effects of the three causality orientations. Results of this model confirmed a statistically significant intercept ($t = 77.41$, $p = .000$), suggesting that, on average, emerging adults reported non-zero levels of reengagement at the start of the academic year. In contrast, the analysis revealed a non-significant slope ($t = 1.18$, $p = .239$), suggesting that, on average, emerging adults' levels of reengagement remained stable across the year. Chi-squared tests of the variance components for reengagement indicated statistically significant variability in participants' initial status ($\chi^2 = 873.04$, $p < .001$), and yearlong rate of change ($\chi^2 = 398.99$, $p < .001$), indicating the presence of reliable individual differences in both these aspects of participants' yearlong growth trajectories for reengagement. The association between average initial status and yearlong rate of change in persistence was negative ($r = -0.428$), indicating that individuals who began the year with higher levels of reengagement increased in this adaptive tendency at a slower rate than those who began the year with lower levels of reengagement capacities.

Model 3 added the three causality orientations to the level-2 equations in order to explain individual differences in initial status and yearlong rate of change in disengagement. Consistent with our hypotheses, the autonomy orientation was positively related ($t = 3.21$, $p = .001$), the control orientation was unrelated ($t = 1.08$, $p = .281$), and the impersonal orientation was negatively related ($t = -1.74$, $p = .083$) to baseline levels of reengagement capacities. In contrast, none of the causality orientations had a statistically significant effect on participants' yearlong rate of change in reengagement, and their inclusion in the model resulted in a negligible decrease in individual variability in slopes. Overall, however, the likelihood ratio test indicated that the inclusion of the three causality orientations as a set of time-invariant Level 2 predictors improved the fit of the model to the data to a statistically significant degree (χ^2 (6) = 35.96, $p < .001$).

Finally, in order to explore whether the causality orientations exert interactive effects on yearlong growth trajectories in reengagement, we added product terms representing all possible combinations of the autonomy, control, and impersonal orientations to the level-2 equations (Model 4). Results of this analysis confirmed no statistically significant interactions between causality orientations in predicting average intercept or slope for reengagement capacities. Examination of the estimated variance components for the model with interactions indicated that the set of interactions collectively explained only an additional .11% of the variance in intercepts on reappraisals and an additional 3% of the variance in slopes. Overall, the likelihood ratio test indicated that including the set of three interactions in the level-2 model did not improve the fit of the model to the data for reengagement to a statistically significant degree (χ^2 (6) = 2.57, p >.500).

Chapter 5: Discussion

The current study provides empirical support for the proposition that the quality of individuals' motivation has important implications for both goal engagement and adjustment processes in emerging adulthood.

Regarding ***goal engagement***, emerging adults who reported higher levels of ***autonomy*** at the dispositional level (e.g. of the autonomy orientation) reported greater behavioral efforts to achieve goals at the baseline assessment. This finding is consistent with accumulated evidence indicating that concordance between reasons for goals and individuals' internalized values and beliefs and intrinsic interests promotes effort and perseverance across a wide variety of domains (Deci & Ryan, 2000). As expected, higher levels of the ***control orientation***, which, like the autonomy orientation, reflects a tendency to be goal-directed in behavior, were also associated with higher levels of persistence at baseline. Given that the control orientation can manifest in the adoption of performance-approach or performance-avoidance goals (Koestner & Zuckerman, 1994) and, in contrast to autonomous motivation, has been shown to promote initial but not sustained effort (Sheldon & Elliot, 1998), we expected the strength of this association to be attenuated relative to that observed for the autonomy orientation, an hypothesis that was likewise supported by the data. In contrast, higher levels of the ***impersonal orientation*** were associated with lower levels of baseline persistence, confirming the well-replicated finding that a sense of personal ineffectance and a belief in the uncontrollability of important outcomes undermines behavioral persistence (e.g. Pelletier et al., 2001; Calvo et al., 2010). In sum, these results suggest

that the organization of goal pursuit according to values, beliefs, and intrinsic interests characterized by the autonomy orientation is an asset for emerging adults in the midst of active striving.

Regarding ***goal disengagement,*** participants who reported higher levels of the ***autonomy orientation*** reported lower levels of disengagement capacities at the baseline assessment, which suggests that emerging adults whose motivation for goal pursuits typically reflects deeply self-endorsed values and intrinsic interests may experience greater difficulty disengaging from these goals when withdrawal of effort and commitment is the most adaptive response. This finding supports the second of two competing hypotheses we advanced concerning the implications of the autonomy orientation for the adaptive regulation of unattainable goals. Highly autonomously oriented individuals may, by virtue of the deep connection between their values, interests, and aspirations and the consequent importance of their goals, find it relatively more difficult to let go of unattainable goals despite the realities of insufficient skills, missed developmental deadlines, or competing demands for resources.

This finding represents a paradox for today's emerging adults, who are often encouraged to pursue dreams and identify passions as the surest route to success, fulfillment, and wellbeing in adulthood. Although social scientists have not, to date, launched a systematic investigation of this message – e.g. its pervasiveness, influence, and veracity – its utility has been debated in the popular press for a decade (for a recent example, see http://www.huffingtonpost.com/andrew-andestic/should-we-encourage-our-k_b_6037148.html). Exhorted to find and pursue a passion, emerging adults who are highly autonomously oriented may, ironically, be ill-equipped to respond adaptively to the inevitable failures inherent in making the transition to competitive, demanding environments such as the university or market contexts.

Consistent with our hypotheses, higher levels of the ***control orientation*** were also associated with lower self-reported disengagement capacities at baseline, suggesting that individuals who demonstrate a strong tendency to organize behavior according to environmental cues and contingencies may also experience difficulty disengaging from unattainable goals. A possible explanation for this finding is that high levels of the control orientation reflect contingent self-esteem, or self-worth that is dependent on success in important domains (Deci & Ryan, 1995; Hodgins et al., 2007). When success is a prerequisite for self-esteem, unattainable goals present a serious threat to an individual's sense of self-worth, a threat that highly controlled

individuals may attempt to allay by persisting in futile efforts or remaining psychologically committed to goals.

Also consistent with our hypotheses, higher levels of the ***impersonal orientation*** were associated with higher levels of disengagement capacities at the baseline assessment, suggesting that the tendency to focus on personal ineffectance and the uncontrollability of life outcomes may support individuals in circumstances where withdrawal of effort and commitment is the most adaptive response. This finding provides support for our hypothesis that individuals who more readily accept that important life outcomes may be, at least at times, beyond their control should have an easier time disengaging from unattainable goals. One possible mechanism for this effect may be the experience of depressive symptoms and low mood, which both theoretical (e.g. Nesse, 2000) and empirical evidence (e.g. Wrosch & Miller, 2009) suggest promote adaptive disengagement.

Regarding ***goal reengagement***, higher levels of the ***autonomy orientation*** were associated with greater reengagement capacities at baseline, suggesting that individuals who typically organize goal pursuit around internalized and intrinsic motivation may find it easier to identify, commit to, and commence pursuit of new goals. This relative facility with reengagement, we argue, may have its roots in the greater integration in personality (Koestner et al., 1992) and tendency to seek out information and actively explore possibilities before making identity commitments (Soenens et al., 2005) observed among more autonomously oriented emerging adults. As we have noted, although typically related to benefits for health and wellbeing, reengagement may represent a double-edged sword depending on a) whether or not an individual has disengaged and b) the nature of the alternative goal he or she selects, given life circumstances (Wrosch, Scheier, & Miller, 2013). Thus, it remains to be seen whether a strong autonomy orientation promotes adaptive reengagement tendencies or poses risks for overcommitment and depletion. Indeed, this relationship may depend on factors independent from causality orientation and situation-specific motivation.

Also consistent with our hypotheses, higher levels of the ***control orientation*** were weakly related to reengagement capacities at baseline. The fact that the control orientation was positively associated with persistence but weakly associated with reengagement points to an important distinction; while control may support the engagement of individuals who have already selected and committed to a goal, it may thwart attempts to identify and commit to an alternative goal

following disengagement. Given that the control orientation is characterized by reliance on external cues, individuals with high levels of this orientation may be at a loss following disengagement if the environment does not provide clear directives with clear contingencies for reinvestment. This explanation is consistent with the insight, which is beginning to appear more frequently in the SDT literature, that the effects of controlled motivation may be difficult to predict due to the reliance of controlled individuals on environmental directives (Schwartz et al., 2005).

Finally, again consistent with our hypotheses, higher levels of the ***impersonal orientation*** were negatively related to reengagement capacities at baseline. This finding is aligned with Deci & Ryan's (1985a) contention that impersonally oriented individuals seek out and are sensitive to signs of incompetence and uncontrollability in regulatory events. When these events are, indeed, objective failures, we argue that individuals with a strong impersonal orientation will tend to focus on failure at the expense of moving forward with new goals.

In sum, results of the current study provide empirical support for all of our hypotheses concerning the differential main effects of causality orientations on participants' absolute levels of goal engagement and adjustment capacities, suggesting that SDT is a relevant and useful framework for understanding not only adaptive striving, but also adaptive responses to failure and frustration. Of particular interest was our finding that the autonomy orientation appears to be associated with lower levels of disengagement capacities among emerging adults, a finding that challenges the accepted wisdom that autonomy is an unqualified asset in the context of goal pursuit.

Only one causality orientation exerted a statistically significant effect on yearlong rate of change in a goal regulation outcome. Contrary to our hypotheses and to results concerning participants' baseline status, the control orientation predicted increases in disengagement capacities over the course of the academic year. It is possible that individuals with higher levels of the control orientation mature in their capacity to disengage from unattainable goals because their goals reflect internal and external pressure rather than self-endorsement. The opportunity to cast off goals that are experienced as sources of pressure may outweigh the threat to contingent self-esteem that, we propose, is inherent in admitting failure for such individuals. Which aspect of unattainable goals is more salient in a given context may depend on unmeasured factors such

as goal importance, a priori investment of resources, and level of peer, family, and societal pressure to achieve the goal.

Finally, although the data did not support hypotheses concerning the main effects of causality orientations on yearlong changes in goal regulation tendencies, results of exploratory analyses did confirm the presence of statistically significant interactive effects among causality orientations on yearlong rate of change in two out of three goal regulation outcomes. The specific nature of these interactions suggests that balance among, or the capacity to draw flexibly upon the different qualities of motivation that can exist within individuals may be an asset in terms of both goal engagement and adjustment.

Regarding the joint effect of the autonomy and control orientations on yearlong changes in persistence, simple slopes analysis (Preacher, Curran, & Bauer, 2006) indicated that, relative to low levels of autonomy, high levels of the autonomy orientation were, as expected, an asset supporting higher overall levels of persistence across the year. However, the control orientation appeared to exert adaptive effects as well, boosting the overall level of persistence among emerging adults who are already high in autonomy and supporting growth in persistence among those who are typically less self-determined in their goal pursuit. These results suggest that individuals who can balance goal pursuits organized around deeply internalized values and intrinsic interests with sensitivity and responsiveness to the external academic and social demands of the university context may be best equipped to self-regulate effectively while striving during this phase of their lives.

Regarding the joint effect of the autonomy and impersonal orientations on yearlong changes in goal disengagement capacities, simple slopes analysis indicated that, among highly autonomously oriented individuals, high levels of the impersonal orientation were associated with greater, and low levels of the impersonal orientation with lower absolute levels of disengagement capacities across the academic year. This interaction effect, like that of the autonomy and control orientations on persistence, again suggests that a degree of balance among motivational styles may be an asset for self-regulation in goal pursuit among emerging adults. Even the impersonal orientation, though generally shown to be deleterious for striving, may play an adaptive role when it helps emerging adults to withdraw effort and commitment at the appropriate time. The results of the current study indicate that the stronger an individual's autonomy orientation, the more difficult it may be for that individual to respond adaptively to unattainable goals. However,

when such individuals also have the capacity to accept that they may lack skill and competence in certain areas and understand that certain outcomes may be beyond their control (e.g. draw on the impersonal orientation), they may be more likely to disengage, sparing them from exposure to repeated failure and freeing their resources, potentially, for meaningful reengagement in alternative goals.

Among less autonomously oriented individuals, high levels of the impersonal orientation were again associated with higher baseline disengagement capacities, which supports our hypothesis that the impersonal orientation supports disengagement processes in general. However, within this group, it was low levels of the impersonal orientation that were associated with yearlong increases in goal disengagement capacities. At first glance, this finding is difficult to interpret because low levels of the impersonal orientation are theoretically less supportive of disengagement. One possible interpretation is that low levels of the autonomy orientation may function similarly to high levels of the impersonal orientation and support growth in disengagement even when the impersonal orientation is less dominant. While the impersonal orientation may help individuals to disengage through beliefs about uncontrollability and personal ineffectance, low levels of the autonomy orientation may support increases in disengagement capacities through low levels of internalization and consequently low importance of personal goals. Simply put, less self-determined individuals may have an easier time with disengagement because they tend to care less about the goals they are pursuing. These intriguing findings justify the further development of theory and empirical questions around the joint effects of causality orientations on the development of goal regulation capacities in emerging adulthood.

Strengths and Limitations

Although all study hypotheses vis-à-vis participants' *initial status* in goal engagement, disengagement, and reengagement capacities were supported by the data, we did not observe the expected differential effects of causality orientations on yearlong *changes* in goal regulation outcomes. Three aspects of our study design may have limited our ability to observe longitudinal effects of causality orientations on goal regulation outcomes. First, a single academic year may have been insufficient to capture the effects of causality orientations on the development of these outcomes. Given the gradual nature of personality change (MacAdams & Olsen, 2010), a longer period – for example, three or four years of university study – may be more appropriate for the study of these putative effects. Second, while hierarchical linear modeling allowed us to estimate

effects of causality orientations on the linear rate of change for each outcome across the entire academic year, alternative statistical modeling approaches to the analysis of change over time may have revealed effects on more nuanced patterns of change. For example, a cross-lagged panel design within the structural equation modeling framework would have allowed us to test whether causality orientations exerted main or interactive effects on a constant vs. time-varying rate of change in goal regulation capacities from Wave 1 to Wave 2 (e.g. first semester and winter holiday), or from Wave 2 to Wave 3 (e.g. within the second academic semester only). Third, the relatively equal distribution of students across four years of university study limited our ability to test hypotheses in subsamples of students whose experiences vis-à-vis striving and the experience of unattainable goals may be qualitatively different given their context. Students enrolled in their first year of university study, for example, likely experience a greater transition in terms of roles and the experience of unattainable goals than students in any other year. Likewise, students enrolled in their final year may need to face the fact that long-term goals, such as admission to graduate and professional schools or positioning oneself effectively to work in competitive industries, have not been achieved. Future research on the effects of causality orientations on the development of goal engagement and adjustment capacities should test hypotheses over developmentally meaningful expanses of time, such as a three or four year degree, and among subsamples in which change in goal regulation at the personality level is most likely to occur, such as individuals transitioning into or out of university or into the workforce.

The current study has several limitations. First, we did not sample emerging adults who are not enrolled in university. Thus, results and conclusions may not generalize to individuals who are working, traveling, volunteering, or spending time deciding upon their future paths.

Second, we operationalized goal engagement via a measure of persistence in goal striving, which, while a central aspect of engagement across major theories of developmental regulation, is by no means synonymous with the construct. Indeed, a recent effort to integrate approaches to the regulation of goals across the life course identified seven distinct and overlapping goal engagement processes (Haase et al., 2013). It is therefore possible that the differential associations between the autonomy, control, and impersonal orientations with goal engagement persistence reported here may not be invariant across the full spectrum of goal engagement processes.

Third, the current study does not address the issue of different profiles in goal adjustment capacities. Goal adjustment theory suggests that different profiles, or sequences, of disengagement and reengagement are more or less adaptive depending on individuals' life circumstances (Wrosch, Scheier, & Miller, 2013). In general, individuals who disengage from unattainable goals and then reengage in meaningful alternatives are hypothesized to demonstrate the most adaptive outcomes, so long as new goals do not spread resources too thin. Specifically, among younger adults, reengagement is considered particularly important when disengagement capacities are low; because younger adults have relatively greater opportunities for alternative goal pursuit and relatively few obligations, reengagement may buffer the negative consequences of difficulty with disengagement. On the other hand, it may be more beneficial to remain committed to an unfeasible goal in contexts with relatively small alternative opportunities, such as older adulthood, in order to protect an individual's sense of meaning and purpose in life. As it is not disengagement and reengagement in isolation, but in different combinations made more or less adaptive by different circumstances, that determine health and wellbeing in the wake of experiencing an unattainable goal, a more rigorous test of the relevance of self-determination theory for explaining differences in goal adjustment capacities would include predictions not only about disengagement and reengagement per se, but in relevant combinations. For example, while the impersonal orientation may be more important for ease of disengagement, the autonomy orientation may be more important for ease of reengagement, suggesting again that individuals who are able to draw flexibly on different motivational orientations may show the most adaptive responses to unattainable goals.

The current study has several notable strengths. To our knowledge, it represents the first attempt to apply SDT's theoretical framework of motivation at the dispositional level to the phenomenon of unattainable goals and adaptive responses (e.g. goal disengagement and reengagement) to failure and frustrated aspirations. Second, it advances knowledge of goal adjustment processes by identifying factors that may support the development of disengagement and reengagement capacities. Third, the current study advances research on motivational processes that may contribute to normative growth in wellbeing during emerging adulthood. In the fifteen years since Arnett coined the term EA to describe this new period of development in Western, industrialized societies, descriptive research on its demographic features and the subjective experiences of emerging adults in varied cultural contexts has proliferated. The current

study responds to the need to advance research on EA beyond questions of "what" to questions of "how" (Shulman & Nurmi, 2010a) – questions about the factors that support growth and maturation during an exploratory and often unstable phase (Arnett, 2004).

Implications for future research

To address the limitations and build on the strengths cited above, future research applying SDT's theoretical framework to the phenomenon of unattainable goals should a) test hypotheses in competing samples of university-enrolled vs. non-university enrolled emerging adults to explore whether contextual differences within emerging adulthood contribute to different patterns of motivation and goal regulation, b) develop and test hypotheses concerning the impact of dispositional motivational orientation on more or less adaptive profiles of goal disengagement and reengagement, c) test hypotheses concerning change in dispositional characteristics over a longer period of time in order to maximize the likelihood of observing putative longitudinal effects and d) test hypotheses among individuals who are most likely to be experiencing or anticipating role transition, e.g. emerging adults making the transition to or out of university or to the job market.

Results of the current study, which investigated hypotheses at the dispositional level for both motivational predictors and goal regulation outcomes, point to the need for research efforts aimed at identifying the mechanisms through which causality orientations may exert distal effects on the development of goal engagement and adjustment capacities. Wrosch and colleagues have suggested that the repeated regulation of specific goals, e.g. learning the benefits of disengagement and reengagement through experience over time, may be a proximal influence on the development of goal adjustment capacities (Mens, Wrosch, & Scheier, 2014). Likewise, SDT researchers have shown that causality orientations predict the quality of motivation for specific goals. Therefore, the next step in understanding the relation of motivation to the full spectrum of goal regulation processes is the development of longitudinal models that specify links between motivational orientation, motivation for specific goals, regulation of specific goals, and finally, changes in goal regulation capacities. Such models should also test potential moderators of these effects. For example, research in the SDT framework has demonstrated that *autonomy support* – the experience of being offered choice, a clear rationale for directives, and indications that one's perspective is understood and valued by authority figures and institutions – and motivation at the

dispositional level (e.g. causality orientation) exert additive effects on motivation in specific situations (Gillet et al., 2013). Likewise, Wrosch and colleagues have proposed various factors that may facilitate or hinder goal disengagement and reengagement, including depressive symptoms and aspects of personality such as optimism and the experience of positive affective states (Wrosch, Scheier, & Miller, 2013) and biographical or environment factors, such as the amount of investment one has already made in a goal (e.g. "sunk cost") and the amount of peer, family, and societal pressure one experiences vis-à-vis goal achievement (Wrosch et al., 2003a).

Self-determination theory is a theory of human motivation that emphasizes intrinsic human tendencies to behave in healthy, effective ways (Deci & Ryan, 2000). Results from the current study indicate that SDT's theoretical framework can be usefully extended to predict healthy, effective behavior among emerging adults not only in the midst of their active goal pursuit, but also in the face of the failures, frustrations, and thwarted aspirations that are inevitable aspects of the human experience.

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Table 1.

Means, standard deviations, and zero-order correlations between study variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. GE (T1)												
2. GE (T2)	.509**											
3. GE (T3)	.659**	.723**										
4. GD (T1)	-.370**	-.310**	-.374**									
5. GD (T2)	-.178**	-.279**	-.286**	.421**								
6. GD (T3)	-.375**	-.234**	-.442**	.598**	.607**							
7. GR (T1)	.303**	.225**	.324**	.067	.058	-.025						
8. GR (T2)	.356**	.376**	.454**	-.099	.079	-.023	.501**					
9. GR (T3)	.238**	.314**	.322**	-.013	.038	.111	.486**	.624**				
10. AUT (T1)	.292**	.260**	.260**	-.158**	-.086	-.078	.232**	.250**	.291**			
11. CON (T1)	.068	.074	.160**	-.118*	-.029	-.007	.095	.091	.120*	.214**		
12. IMP (T1)	-.397**	-.420**	-.340**	.128*	.099	.092	-.082	-.156	.058	-.098	.257**	
M (*SD*)	3.10 (.60)	3.04 (.57)	3.10 (.59)	2.54 (.79)	2.63 (.75)	2.70 (.81)	3.49 (.85)	3.67 (.73)	3.54 (.78)	5.82 (.60)	4.62 (.71)	3.96 (.88)

Note. GE = Goal engagement; GD = Goal disengagement subscale of the Goal Adjustment Scale (GAS); GR = Goal reengagement subscale of the GAS; AUT = Autonomy subscale of the General Causality Orientations Scale (GCOS); CON = Control subscale of the GCOS; IMP = Impersonal subscale of the GCOS; T1 = Time 1; T2 = Time 2; T3 = Time 3;
* $p < .05$. ** $p < .00$

Table 2.

Multilevel modeling analyses predicting initial status and rate of change in persistence from causality orientations

			Model 3		Model 4	
Fixed Effects		Parameter	Coefficient	*SE*	Coefficient	*SE*
Initial Status, π_{0i}	Intercept	γ_{00}	3.08 **	0.03	3.06 **	0.03
	Aut	γ_{01}	0.22 **	0.05	0.23**	0.05
	Con	γ_{02}	0.10 **	0.04	0.08 *	0.04
	Imp	γ_{03}	-0.28 *	0.03	-0.28 **	0.03
	AutxCon	γ_{04}			0.12	0.08
	AutxImp	γ_{05}			-0.01	0.06
	ConxImp	γ_{06}			0.04	0.04
Rate of change, π_{2i}	Intercept	γ_{10}	0.00	0.01	0.02	0.01
	Aut	γ_{11}	-0.03	0.03	-0.04	0.03
	Con	γ_{12}	0.04 $^{+}$	0.02	0.06 **	0.02
	Imp	γ_{13}	0.01	0.02	0.01	0.02
	AutxCon	γ_{14}			-0.11 **	0.04
	AutxImp	γ_{15}			-0.03	0.03
	ConxImp	γ_{16}			-0.04	0.03
Variance Components						
				SD		
Level 1	Within-person	σ^2	0.13	0.35	0.12	0.35
Level 2	In initial status	τ_{00}	0.12**	0.34	0.12**	0.34
	In rate of change	τ_{10}	0.00	0.03	0.00	0.03
	Covariance[a]		0.92		0.94	
Goodness of Fit						
	- 2 log likelihood (FIML) [b]		1116.12**		1098.67**	

Note. Aut = Autonomy Subscale of the General Causality Orientations Scale (GCOS); Con = Control Subscale of the GCOS; Imp = Impersonal Subscale of the GCOS.

[a] Covariance of τ_{00} and $\tau_{10,}$ expressed as a correlation.

[b] "Deviance" statistic; summarizes lack of fit of model to data.

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

Table 3.
Multilevel modeling analyses predicting initial status and rate of change in goal disengagement capacities from causality orientations

			Model 3		Model 4	
Fixed Effects		Parameter	Coefficient	*SE*	Coefficient	*SE*
Initial Status, π_{0i}	Intercept	γ_{00}	2.55**	0.04	2.54**	0.04
	Aut	γ_{01}	-0.14*	0.07	-0.13^{+}	0.06
	Con	γ_{02}	-0.13^{+}	0.07	-0.14*	0.04
	Imp	γ_{03}	0.13*	0.05	0.13*	0.05
	AutxCon	γ_{04}			0.07	0.11
	AutxImp	γ_{05}			0.04	0.08
	ConxImp	γ_{06}			0.01	0.05
Rate of change, π_{2i}	Intercept	γ_{10}	0.08**	0.02	0.09**	0.02
	Aut	γ_{11}	0.03	0.03	0.03	0.03
	Con	γ_{12}	0.06*	0.03	0.07*	0.03
	Imp	γ_{13}	-0.03	0.03	-0.03	0.03
	AutxCon	γ_{14}			-0.07	0.05
	AutxImp	γ_{15}			0.10*	0.04
	ConxImp	γ_{16}			-0.04	0.03
Variance Components						
				SD		
Level 1	Within-person	σ^2	0.2737	0.52	0.2713	0.52
Level 2	In initial status	τ_{00}	0.2649**	0.51	0.2668**	0.52
	In rate of change	τ_{10}	0.0028	0.05	0.0024	0.05
	Covariance[a]		0.929		0.923	
Goodness of Fit						
	- 2 log likelihood (FIML) [b]		1828.75**		1820.42	

Note. Aut = Autonomy Subscale of the General Causality Orientations Scale (GCOS); Con = Control Subscale of the GCOS; Imp = Impersonal Subscale of the GCOS.
[a] Covariance of τ_{00} and $\tau_{10,}$ expressed as a correlation.
[b] "Deviance" statistic; summarizes lack of fit of model to data.

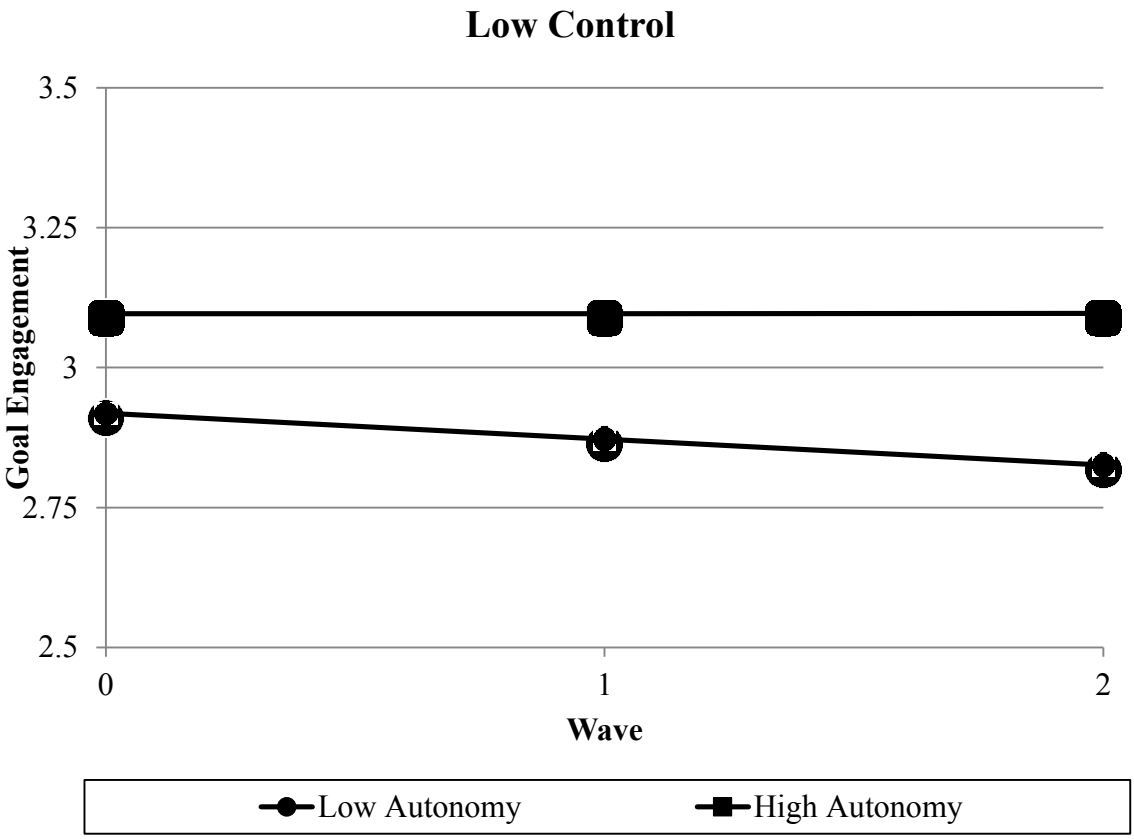
*p <.05. **p < .01.

Table 4.
Multilevel modeling analyses predicting initial status and rate of change in goal reengagement capacities from causality orientations

			Model 3		Model 4	
Fixed Effects		Parameter	Coefficient	*SE*	Coefficient	*SE*
Initial Status, π_{0i}	Intercept	γ_{00}	3.54**	0.04	3.52**	0.05
	Aut	γ_{01}	0.28**	0.09	0.28**	0.09
	Con	γ_{02}	0.09	0.08	0.08	0.08
	Imp	γ_{03}	-0.10^{+}	0.06	-0.09	0.03
	AutxCon	γ_{04}			0.07	0.14
	AutxImp	γ_{05}			-0.11	0.10
	ConxImp	γ_{06}			0.04	0.09
Rate of change, π_{2i}	Intercept	γ_{10}	0.03	0.02	0.04^{+}	0.02
	Aut	γ_{11}	0.03	0.04	0.02	0.05
	Con	γ_{12}	-0.00	0.04	0.01	0.04
	Imp	γ_{13}	0.02	0.03	0.01	0.03
	AutxCon	γ_{14}			-0.06	0.08
	AutxImp	γ_{15}			0.04	0.06
	ConxImp	γ_{16}			-0.03	0.04
Variance Components						
				SD		
Level 1	Within-person	σ^2	0.25	0.50	0.25	0.50
Level 2	In initial status	τ_{00}	0.367**	0.61	0.364**	0.60
	In rate of change	τ_{10}	0.0428**	0.21	0.0417 **	0.20
	Covariance[a]		0.92		0.94	
Goodness of Fit						
	- 2 log likelihood (FIML) [b]		1844.53**		1841.96	

Note. Aut = Autonomy Subscale of the General Causality Orientations Scale (GCOS); Con = Control Subscale of the GCOS; Imp = Impersonal Subscale of the GCOS.
[a] Covariance of τ_{00} and $\tau_{10,}$ expressed as a correlation.
[b] "Deviance" statistic; summarizes lack of fit of model to data.

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


Low Control
3.5
3.25
3
2.75
2.5
Goal Engagement
0
1
2
Wave
Low Autonomy
High Autonomy

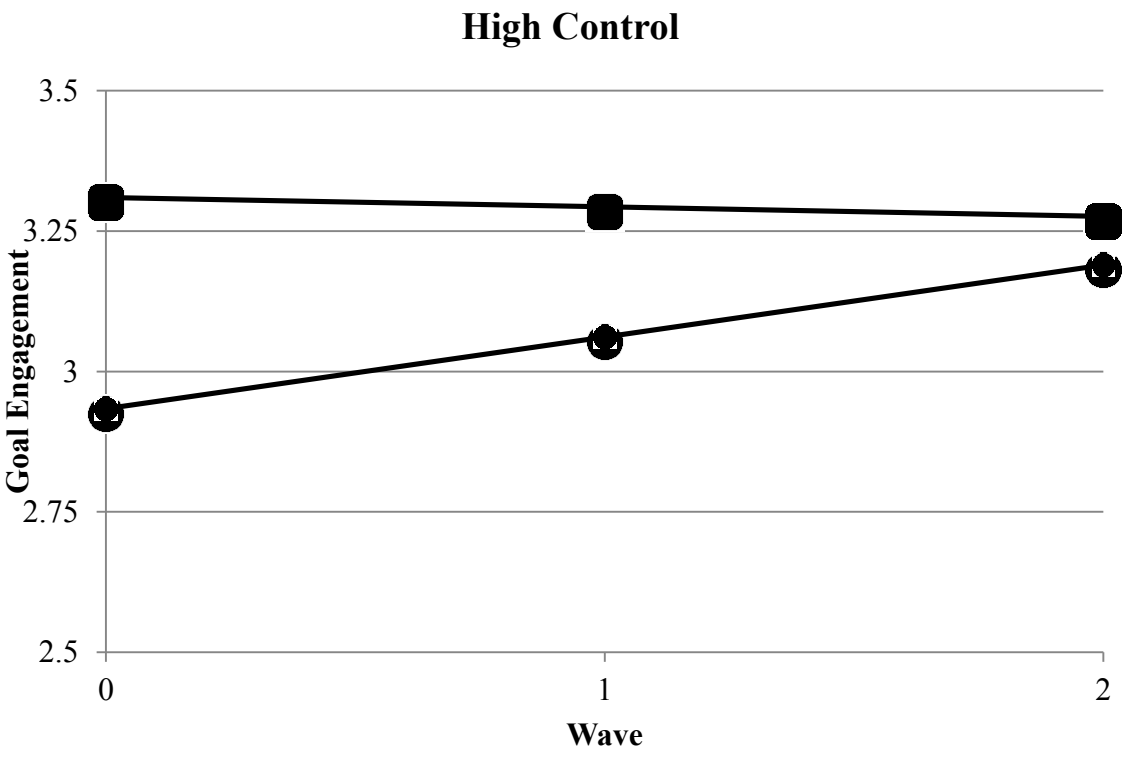

High Control
3.5
3.25
3
2.75
2.5
Goal Engagement
0
1
2
Wave

Figure 1: Associations between time and persistence at low (-1 *SD*) and high (+1 *SD*) levels of the autonomy orientation separately for participants who reported low (-1 *SD*) vs. high (+1 *SD*) levels of the control orientation

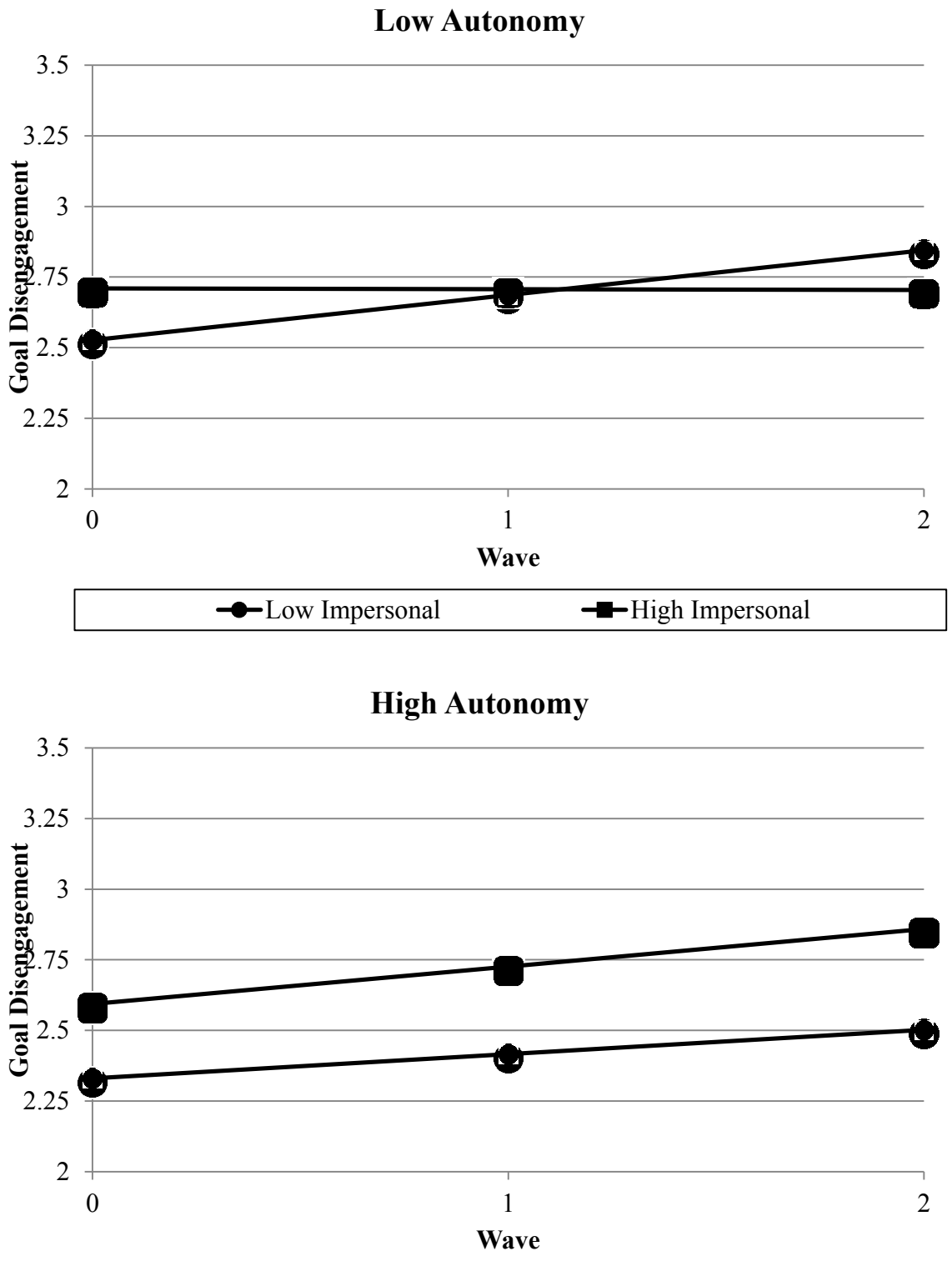


Figure 2: Associations between time and goal disengagement capacities at low (-1 *SD*) and high (+1 *SD*) levels of the impersonal orientation separately for participants who reported low (-1 *SD*) vs. high (+1 *SD*) levels of the autonomy orientation