A Self-Determination Theory Perspective on Wellbeing in the Transition from University: Trait Autonomy and Basic Psychological Need Satisfaction through Graduates' Goal Pursuits, Past and Present

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A Thesis
In the Department
of
Psychology

Presented in Partial Fulfillment of the Requirements
For the Degree of
Doctor of Philosophy (Psychology) at
Concordia University
Montréal, Québec, Canada

August 2021

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CONCORDIA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

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Entitled: A Self-Determination Theory Perspective on Wellbeing in the Transition from University: Trait Autonomy and Basic Psychological Need Satisfaction in Graduates' Goal Pursuits, Past and Present

and submitted in partial fulfillment of the requirements for the degree of

Doctor Of Philosophy (Psychology)

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ABSTRACT

A Self-Determination Theory Perspective on Wellbeing in the Transition from University: Trait Autonomy and Basic Psychological Need Satisfaction in Graduates' Goal Pursuits, Past and Present

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This research aims to identify determinants of wellbeing in the transition from university, a challenging lifespan transition with long-term implications for adult development. We applied self-determination theory, a theory of motivation, wellbeing, and optimal development, to propose an integrative model of wellbeing during this transition. This model predicts that trajectories of wellbeing should reflect the extent to which social environments encountered during the transition support vs. thwart graduates' basic psychological needs, the extent to which graduates' dispositional tendencies catalyze processes that facilitate vs. undermine need satisfaction, and the extent to which need-relevant qualities of social environments and graduates' need-relevant dispositional tendencies influence one another across the transition. We tested this model by investigating whether trait autonomy, a dispositional factor associated with need satisfaction and wellbeing within SDT, promotes graduates' wellbeing by facilitating need satisfaction though goal pursuits, past and present. We examined this overarching hypothesis across two analyses of longitudinal data collected from graduates transitioning from a large, public university in Québec. Study 1 investigated whether trait autonomy promotes wellbeing by catalyzing need-satisfying processes of striving for post-graduation goals. Results confirmed that higher levels of trait autonomy predicted more self-concordant striving processes and, through them, increases in graduates' life satisfaction across the transition from university. Study 2 investigated whether trait autonomy might also promote wellbeing by providing graduates with need-satisfying memories of past striving. We tested this hypothesis in relation to a single memory – that of facing an unattainable goal while in university – and two distinct, but conceptually related memory pathways – (i) need satisfaction associated with unconscious activation of episodic memories and (ii) need-satisfying themes of growth in narratives consciously constructed from these memories. The results confirmed our hypothesis, but mainly through the first memory pathway, raising theoretical and methodological issues for future research. Together, findings constitute the first empirical evidence for an integrative, SDT-based model of wellbeing in the transition from university, make theoretical contributions to SDT and other frameworks (i.e., the self-concordance model, the theory of episodic memory need satisfaction, and the theory of narrative identity), raise intriguing questions for future research, and identify promising approaches to intervention to support the wellbeing of graduates during this key transition.

ACKNOWLEDGMENTS

For her years of guidance, expertise in lifespan psychology, and investment of time, energy, and resources in my development as a fledgling researcher (and for taking me on in the first place), I would like to express my sincere gratitude to my supervisor, Dr. Erin Barker.

For scaffolding my learning of M*plus*, latent variable modelling, and different approaches to the study of change over time, I would like to thank Dr. Alexandre J. S. Morin, one of my committee members. I would also like to thank Drs. William Bukowski and Andrew Ryder for their feedback at various stages of the dissertation process.

For innumerable conversations about my projects and theirs, all of which enriched my work and inspired me to do the best research I could, I would like to thank fellow graduate students in Dr. Barker's Lifespan Wellbeing Laboratory, Sarah Newcomb-Anjo, Daria Karbainova, and Kim Desmarais, and the many honors thesis students and research assistants who have worked with and helped us over the years.

Finally, to my mother, father, brother, husband, and beautiful daughters, your own examples of integrity and persistence have helped to sustain my own in ways I struggle to put into words. Thank you!

CONTRIBUTIONS OF AUTHORS

This dissertation is composed of two separate studies, both of which used data collected as part of the Graduation Study, a multi-wave survey of graduates transitioning from a public university in the Canadian province of Québec. In consultation with Dr. Erin Barker, I and another graduate student, Sarah Newcomb-Anjo, designed the Graduation Study, recruited participants, and prepared the master longitudinal data set with help from several research assistants. The Graduation Study was funded by a Fonds de Recherche du Quebéc Santé Chercheurs-Boursiers, Junior 1, career award to Dr. Erin Barker.

For Studies 1 and 2, in consultation with Dr. Barker, I conceptualized study hypotheses, conducted the literature review, conducted all statistical analyses, and wrote up the studies. Dr. Alexandre J. S. Morin provided help trouble-shooting statistical models for Studies 1 and 2.

My doctoral research was supported by a SSHRC Joseph-Armand Bombardier Doctoral Scholarship and the Concordia University Accelerator Award. I am the sole author of the entire dissertation document below.

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CHAPTER 1:
A Self-Determination Theory Perspective on Wellbeing in the Transition from University

The transition from university is a complex, challenging process (Overton-Healy, 2010) encompassing tasks such as completing coursework and capstone projects, establishing an independent living situation (or renegotiating terms of shared residence with peers and parents), carving out the beginnings of a career path, and taking increased responsibility for personal finances (Chickering & Schlossberg, 1998; Gardner, 1999). On the one hand, these tasks present graduates with opportunities to choose channels for development that will maximize their personal growth and wellbeing. On the other hand, they arise amidst formidable challenges, including the abrupt loss of institutional and social structures and supports (Gardner, 1999; Pistilli et al., 2003) and a challenging entry into the workforce. For instance, 53% to 54% of Canadian undergraduate students graduate with accumulated debts (Statistics Canada, 2015) and many are perceived as poorly prepared for the demands of an increasingly automated and rapidly changing economy (Lamb & Doyle, 2017).

Growing recognition of the challenges associated with the transition from university has led to the conceptualization of this period as one of potential risk for the wellbeing of graduates (Lane, 2013, 2016). Previous research suggests that wellbeing in the transition from university is a heterogeneous phenomenon in which a small, but significant minority of prospective and recent graduates experience low or decreasing levels of wellbeing. For example, while qualitative studies have revealed themes such as personal growth (Polach, 2004), intrinsic motivation (Taub et al., 2006), a growing sense of agency and confidence (Robinson, 2019), and optimism (Murphy et al., 2010) among youth transitioning out of university, these and additional qualitative studies have also identified themes of anxiety (Overton-Healy, 2010), uncertainty, dashed expectations, perceptions of a low point in life (Perrone & Vickers, 2003), anxiety, depression, and frustration related to feeling "locked in" and "locked out" of occupational opportunities (Robinson, 2019), lack of direction (Allen & Taylor, 2006), fear of the unknown (Yazedjian et al., 2010), guilt and frustration at work (Polach, 2004), and disappointment (Murphy et al., 2010). Quantitative studies of the transition from university also reveal heterogeneity in graduates' wellbeing trajectories. For example, Buhl (2007) examined changes in psychological and physical wellbeing from a year before to three years after graduation among German undergraduates. Whereas wellbeing generally improved across this four-year span, follow-up cluster analyses revealed that half of participants displayed increasing trajectories, while the other half displayed decreasing trajectories on both indices of wellbeing. More recently, Haase et al. (2012) reported average increases in positive affect and satisfaction with work, decreases in depressive symptoms, and decreases in purpose in life and autonomy that ultimately returned to baseline levels across one year, also among German undergraduates. However, the results also revealed statistically significant inter-individual variability in the linear or quadratic trends for all outcomes in this study, indicating that these average gains are not experienced by all graduates.

What are the implications of this heterogeneity for the future wellbeing and development of university graduates? When considering this question, it is important to remember that the transition from university occurs at the start of the transition to adulthood, a macro-transition that bridges adolescence and adulthood. This transition is "dense" with normative transitions (Shanahan, 2000), encompassing major, overlapping, and interdependent shifts in education, work, relationships, social roles, and identity (Schulenberg & Schoon, 2012). Some have proposed that the increased heterogeneity in wellbeing trajectories observed across this macro-

transition can be attributed to a "Matthew effect." More precisely, individuals already functioning well are equipped with psychosocial resources that help them to successfully navigate its multiple transitions, whereas those already functioning poorly lack requisite resources, struggle in successive transitions, and fall further and further behind (Dannefer, 1987; Schulenberg & Schoon, 2012; Schulenberg & Zarrett, 2006). This effect, in turn, helps to explain why the transition to adulthood witnesses both normative increases in wellbeing (Galambos et al., 2006; Schulenberg et al., 2005; McPhie & Rawana, 2015) accompanied by peak risk for the development of psychiatric disorders and substance abuse (American Psychiatric Association, 2013; Hamdi & Iacono, 2014; Ingram & Gallagher, 2010), and by high rates of suicide (Boeninger & Conger, 2012). Wellbeing is a resource upon which individuals can broaden and build to promote upward spirals of healthy development (Fredrickson, 1998, 2001) and previous research has shown that improvements in wellbeing across the transition to adulthood predict life and career satisfaction in early adulthood (Howard et al., 2010). Thus, high or improving levels of wellbeing in the transition from university can be conceptualized as psychosocial resources that graduates can carry forward into upcoming transitions, improving their likelihood of future wellbeing and healthy development.

Together, the heterogeneity revealed in previous research and the implications of this heterogeneity for future development point to the need for research aimed at identifying determinants of wellbeing in the transition from university and applying this knowledge to support graduates. To our knowledge, the only studies that have attempted to do this are the two empirical studies mentioned above. Buhl (2007) tested demographic and control variables, dispositional tendencies, and aspects of the parent-child relationship as possible predictors of wellbeing trajectory group membership. Conflicts with mothers, lower levels of intimacy with fathers, and tendencies towards conscientiousness and social competence predicted a lower likelihood of improved wellbeing three years after graduation. Haase et al. (2012) found that increases in graduates' occupational goal engagement (e.g., investing time and effort, seeking support vis-a-vis obstacles, using metavolitional strategies) co-varied positively with increases in wellbeing across the transition from university in Germany, highlighting the potential fruitfulness of further research focused on goals during this transition.

While these individual findings are informative, adaptation and development across lifespan transitions reflect influences originating in the individual, influences originating in the environment, and their dynamic transactions across time (Crafter et al., 2019; Lerner et al., 2011). Therefore, understanding the determinants of wellbeing in the transition from university requires the development and systematic testing of theoretical models that integrate all of these influences. Such a model would also facilitate the identification of multiple, inter-related targets for university-led efforts to support graduates. In the present research, we applied self-determination theory (SDT; Deci & Ryan, 2000; Ryan & Deci, 2017), a well-established and richly elaborated theory of human motivation, wellbeing, and optimal lifespan development, to propose such a model.

Self-Determination Theory

Self-determination theory assumes that human beings have an evolved tendency to grow in the direction of increased differentiation, integration, and wellness across the lifespan. However, just as plants require sunlight and water to flourish, SDT specifies that human beings require ongoing psychological nourishment to actualize this tendency and thrive (Ryan, 1995; Vansteenkiste et al., 2010; Vansteenkiste & Ryan, 2013). According to SDT, this psychological nourishment is reflected in the ongoing satisfaction of basic psychological needs, which is not only seen as conducive to, but rather as necessary for wellbeing and optimal development (Chen

et al., 2015; Vansteenkiste et al., 2020). However, when psychological needs are neglected, or, worse, actively frustrated, SDT predicts that the growth tendency will be subverted, putting individuals at risk for ill-being and the development of psychopathology (Bartholomew et al., 2011; Ryan, 2005; Ryan et al., 2006; Vansteenkiste & Ryan, 2013). To date, SDT has identified three basic psychological needs: *autonomy* (self-initiation and self-endorsement of behavior), *competence* (effectiveness), and *relatedness* (mutual responsiveness and caring; Deci & Ryan, 1985, 2000, 2008; Ryan & Deci, 2017; Vansteenkiste et al., 2020). Self-determination theory has demonstrated the benefits that the satisfaction of these three needs entail for wellbeing and healthy development across decades of empirical research (Ryan & Deci, 2017; Vansteenkiste et al., 2020).

Self-determination theory further proposes that experiences of need satisfaction (vs. frustration) depend both on the need-relevant qualities of social environments and the need-relevant dispositional tendencies of individuals themselves (Deci & Ryan, 1985; Deci & Ryan, 2000; Legault et al., 2017; Ryan & Deci, 2017; Vansteenkiste & Ryan, 2013). In other words, while various aspects of social environments support vs. thwart individuals' needs, dispositional tendencies also facilitate (or undermine) need satisfaction by influencing how individuals tend to experience and engage with their environments (Baard et al., 2004). In line with contemporary perspectives on lifespan development (Crafter et al., 2019; Lerner et al., 2011), SDT expects that these forces – those originating in the environment and those originating in the person – also influence one another reciprocally across time. Thus, need-supporting (vs. thwarting) environments should foster the development of need-facilitative dispositional tendencies, which, in turn, should help the individual orient towards more need-supportive environments and perceive and elicit more need-supportive responses across varying environments (Ryan & Deci, 2017; Reeve, 2012). Therefore, according to SDT, wellbeing in the transition from university should be a function of the extent to which: (a) social environments encountered in the course of the transition support vs. thwart graduates' basic psychological needs, (b) graduates' dispositional tendencies promote processes that facilitate vs. undermine need satisfaction, and (c) the extent to which the need-relevant qualities of social environments and the need-relevant dispositional tendencies of graduates influence one another as the transition unfolds.

To our knowledge, no previous research has applied SDT's assumptions concerning basic psychological needs, their antecedents, and their consequences to improve our understanding of wellbeing trajectories across the transition from university, or, indeed, any major developmental transition. Support for our model would strengthen SDT's status as a theory of optimal development, a status for which there is abundant theoretical (e.g., Ryan, 2005; Ryan & Deci, 2017; Ryan et al., 1995), cross-sectional (e.g., Grolnick et al., 1987; Grolnick & Ryan, 1989; Roth et al., 2009), and short-term longitudinal evidence (e.g., Curran et al., 2016; Jang et al., 2012, 2016) within discreet phases of development, but surprisingly little evidence showing that the theory's principles generalize to major developmental transitions. Indeed, we are aware of only two studies that have applied SDT's assumptions concerning needs to a specific transition, both of which focused exclusively on changes in the relative contributions of specific needs to wellbeing in the transition to retirement (Henning et al., 2019; Stenling et al., 2020). Our model could also provide a useful framework for identifying and comparing environmental determinants of graduates' need satisfaction and wellbeing, dispositional determinants of graduates' need satisfaction and wellbeing, and, through the investigation of mediating mechanisms, specific processes through which these effects are manifested. Once identified, these predictors and mechanisms could become the focus of intervention efforts aimed at supporting graduates. At this stage, researchers could draw on the substantial literature supporting SDT-based interventions to

facilitate autonomy and the satisfaction of basic psychological needs (Hagger et al., 2020; Ntoumanis et al., 2020; Su & Reeve, 2011) and adapt existing strategies to meet the needs of graduates in transition.

We initiated this line of research by investigating the effects of need-satisfying dispositional tendencies on trajectories of wellbeing across the transition from university. Prioritizing the investigation of dispositional determinants of need satisfaction and wellbeing in this transition – and the processes through which they manifest their influence – aligns with the perspective that personality (Caspi & Moffit, 1993; Henning et al., 2017; Perren et al., 2010; Shulman et al., 2009; Weiss et al., 2012) is critical for navigating distinct transitions within the increasingly heterogeneous transition to adulthood (Ross et al., 2009; Schulenberg et al., 2003; Schulenberg & Schoon, 2012), in which the loss of social and institutional structures and supports, as well as normative age-graded developmental schedules (Schwartz et al., 2005) go hand-in-hand with increasing levels of freedom to chart individualized courses of development (Arnett, 2014). Thus, in addition to supporting SDT as a theory of optimal lifespan development and identifying targets for future interventions, investigations of whether – and how – need-facilitative dispositional tendencies support wellbeing across the transition from university could also contribute to the research literature on personality and inner resources as determinants of success in the transition to adulthood.

CHAPTER 2
Linking Trait Autonomy, Need Satisfaction in Graduates' Goal Pursuits, and Trajectories of Wellbeing in the Transition from University

Within SDT, the need-facilitative dispositional tendency with the strongest theoretical and empirical links to wellbeing is *trait autonomy* (Weinstein et al., 2012). According to SDT, autonomous behavior is volitional and regulated by the self, as opposed to external or internally imposed pressures and contingencies (Ryan & Deci, 2002). Trait autonomy reflects dispositional tendencies to behave autonomously across time and situations (Weinstein et al., 2012). These tendencies are thought to emerge through ongoing satisfaction of basic psychological needs and exposure to need-supporting socializing agents across an individual's developmental history (Ryan & Deci, 2017). Because autonomous behavior is volitional and self-regulated, more autonomous individuals should experience an internal perceived locus of causality (Ryan & Connell, 1989), meaning that they experience themselves as the initiating source of their own behavior, and their behavior, therefore, as freely chosen and self-endorsed. In addition, because non-defensive self-reflection enhances individuals' conscious awareness of what they need, enjoy, and value, more autonomous individuals are also typically more accepting and integrative vis-à-vis their experiences, both positive and negative (Ryan & Deci, 2006; Ryan & Deci, 2017).

Theoretical and empirical evidence indicate that trait autonomy encompasses three distinct, but interrelated facets (Weinstein et al., 2012). The first is *authorship/self-congruence*, which refers to acting in accordance with one's beliefs, values, and interests and thus experiencing one's actions as freely chosen and self-endorsed (Weinstein et al., 2012). In contrast, trait autonomy's second facet, *susceptibility to control,* reflects sensitivity to external or internally-imposed pressures and tendencies to organize behavior to satisfy these pressures. The third facet of trait autonomy, *interest-taking,* refers to spontaneous, curious, and non-defensive reflection on positive and negative experiences alike (Hodgins & Knee, 2000; Weinstein et al., 2011; Weinstein et al., 2012). Overall, more autonomous individuals should demonstrate higher levels of authorship/self-congruence and interest-taking and lower levels of susceptibility to control (Weinstein et al., 2012).

According to SDT, trait autonomy should facilitate need satisfaction and wellbeing by

catalyzing need-satisfying cognitive and behavioral processes (Ryan, 1995; Weinstein et al., 2012). Consistent with this view, previous research has shown that trait autonomy and its facets are positively associated with need satisfaction (Weinstein et al., 2012) and wellbeing (Weinstein et al., 2012; Yu et al., 2015; Yu et al., 2018). In addition, previous research links trait autonomy (as well as a closely related construct, general autonomy orientation; Deci & Ryan, 1985), with need satisfaction (Baard et al., 2004) and an array of need-satisfying cognitive and behavioral processes originating in the person, such as assisted and asserted modes of getting one's needs met (Legault et al., 2017), healthy interpersonal interactions (Weinstein, Rodriguez, Knee, & Kumashiro, 2016), non-defensive and integrative responses to failure and self-threatening information (Legault & Inzlicht, 2013; Weinstein et al., 2011), adaptive styles of identity development (Soenens et al., 2005), and adaptive goal motivations and striving processes (Lam & Gurland, 2008; Weinstein et al., 2012; Williams et al., 1996).

Any of these need-satisfying processes could be expected to mediate between higher pre-transition levels of trait autonomy and positive trajectories of wellbeing across the transition from university. That said, goals are the reference standards in the control processes that guide most of human behavior (Carver & Scheier, 1982) and thus should have a pervasive influence on functioning at any stage of the life course, including the transition from university. Additionally, motivational theories of lifespan development conceptualize goal pursuits as the main means through which individuals can shape the course of their own development (Brandtstädter, 1999; Heckhausen & Tomasik, 2002; Nurmi, 1993) and thus should have a significant influence on functioning during periods of developmental disequilibrium, like the transition from university. In line with these theories, but focusing on need satisfaction and wellbeing as critical aspects of development, SDT conceptualizes goal pursuits as cardinal means through which individuals can influence their own level of need satisfaction and wellbeing across the life course (Sheldon & Houser-Marko, 2001). Based on these considerations, we investigated trait autonomy as a catalyst for wellbeing in the transition from university by examining the mediating role of experiences of need satisfaction derived from graduates' goal pursuits.

In the next section, we summarize key aspects of SDT's perspective on goals and need satisfaction to provide a conceptual background for our specific hypotheses. Then, we describe three distinct processes linked to goal pursuits through which graduates could derive experiences of need satisfaction and wellbeing as they navigate the transition from university. Broadly speaking, the first process concerns goals graduates have for the future, while the second and third concern goals they have pursued in the past. The examination of each of these specific processes was inspired by a gap in current knowledge and, therefore, has the potential to make additional contributions to theory and knowledge. In the concluding section, we conceptualize each of these processes as a manifestation of trait autonomy, formulate the overarching hypothesis that trait autonomy contributes to positive trajectories of wellbeing in the transition from university by facilitating need satisfaction in graduates' past and present goal pursuits, and introduce the two longitudinal studies we designed to test this hypothesis.

Past and Present Goal Pursuits as Conduits to Need Satisfaction and Wellbeing in the Transition from university

To date, SDT has focused on three major processes through which goal pursuits can produce experiences of need satisfaction and wellbeing: Intrinsic motivation, internalized extrinsic motivation, and intrinsic goals (Deci & Ryan, 2000). *Intrinsic motivation* refers to pursuing a goal because of the interest, challenge, or satisfaction it provides (Deci et al., 1975; Deci & Ryan, 2000). In contrast, *internalized extrinsic motivation* refers to pursuing a goal as a means to an end, but one that reflects the individual's values (identified motivation) or unified

sense of self (integrated motivation; Deci & Ryan, 2000; Ryan, 1995). Together, intrinsic motivation and internalized extrinsic motivation are considered forms of *autonomous motivation* because they reflect an inner perceived locus of causality – a sense of self-organization and self-initiation which, in turn, creates experiences of freedom and volition in the pursuit of goals (Ryan & Connell, 1989). In contrast, poorly internalized extrinsic motivation refers to pressuring oneself to strive for a goal (introjected motivation) or responding to pressure from outside sources, such as parents, professors, or institutions (external motivation; Ryan, 1995). Introjected and external extrinsic motivation are considered forms of *controlled motivation* because they reflect an external locus of causality and create phenomenological experiences of pressure, stress, and inner conflict during goal pursuit (Vansteenkiste et al., 2010). Whereas intrinsic motivation and internalized extrinsic motivation reflect the nature of an individual's reasons for pursuing a goal (the "why" of goal pursuit), *goal content* reflects the nature of the goal itself (the "what" of goal pursuit). Goal contents theory, a mini-theory within SDT (Deci & Ryan, 2000; Ryan & Deci, 2017; Vansteenkiste et al., 2010), defines an *intrinsic goal* functionally as one whose pursuit produces experiences of need satisfaction (and thus, wellbeing). In contrast, an *extrinsic goal* is one whose pursuit produces experiences of need frustration (and thus, ill-being). Commonly studied examples of intrinsic vs. extrinsic goals are personal growth, healthy relationships, and community contribution (intrinsic) vs. financial success, fame, or the maintenance of an attractive public image (extrinsic; Kasser & Ryan, 1996).

Empirical evidence accumulated over close to forty years supports SDT's claim that more autonomous motivation and the pursuit of more intrinsic goals lead to higher levels of need satisfaction and wellbeing (Deci & Ryan, 2000; Ryan & Deci, 2017). Of particular importance to the present research, some of this evidence indicates that autonomous motivation and intrinsic goals promote need satisfaction and wellbeing across substantial periods of time. For example, regarding the "why" of goal pursuit, Sheldon and Schüler (2011) showed that higher levels of autonomous motivation for semester goals predicted higher levels of mid-semester goal progress which, in turn, predicted semester-long increases in need satisfaction among undergraduates. These increases in need satisfaction, in turn, were linked to semester-long increases in wellbeing. Regarding the "what" of goal pursuit, Kasser and colleagues (2014) showed that decreases in materialism (which reflects an orientation towards extrinsic goals) were associated with decreases in mental health problems over 12 years (Study 1) and increases in subjective wellbeing over two years (Study 2). Importantly, these researchers also demonstrated that the effects of changes in materialism on changes in wellbeing were mediated by changes in need satisfaction (Study 2).

Given the evidence that both autonomous motivation and intrinsic goal content predict positive changes in need satisfaction and wellbeing over time, it is surprising that no previous research has investigated whether either process contributes to positive trajectories of wellbeing across a major lifespan transition, like the transition from university. During the transition from university, graduates experiences an abrupt loss of institutional structure and support and can no longer rely on normative, institutionally or socially sanctioned guidelines to direct their own development. As key means through which individuals can influence their own level of need satisfaction and wellbeing, need-satisfying processes of goal striving should therefore be particularly important contributors to positive trajectories of wellbeing during this period. Evidence consistent with this general hypothesis would enrich cognitive evaluation theory, organismic integration theory, and goal contents theory by showing that their predictions concerning goals and need satisfaction generalize to the specific context of a major developmental transition, demonstrate SDT's utility as a theory of optimal lifespan development, and point to the "why" and "what" of goals as important targets for interventions designed to

support university graduates in transition.

Goals for the future. For a first test of our predictions, we drew on Sheldon and Elliot's (1999) self-concordance model (SCM). The SCM specifies that alignment between goals and a person's authentic values, beliefs, and intrinsic interests energizes the entire striving cycle, from initial effort, to sustained effort, to progress, increases in need satisfaction, and finally, increases in wellbeing. The SCM is supported by several multi-wave longitudinal studies (e.g., Blouin-Hudon et al., 2016; Gaudreau et al., 2012; Smith et al., 2011; for a recent review, see Sheldon, 2014). From the perspective of the SCM, university graduates who report higher levels of autonomous motivation and lower levels of controlled motivation for their post-graduation goals should demonstrate higher levels of initial and sustained effort, higher levels of subsequent progress and goal achievement, increases in basic psychological need satisfaction, and increases in wellbeing across the transition from university. Evidence in support of this specific hypothesis would strengthen the generalizability of the SCM by showing that its predictions hold in the context of a major lifespan transition.

Goals from the past. Given the evidence that goal pursuits are critical conduits to need satisfaction and wellbeing, and given SDT's assumption that individuals' histories of need satisfaction are likely to have enduring influences on the course of their development (Ryan & Deci, 2017; Vansteenkiste & Ryan, 2013), it is also surprising that no previous research has investigated whether – in addition to deriving need satisfaction and wellbeing from the goals they are currently pursuing – individuals might also derive need satisfaction and wellbeing from *memories* of goals they have pursued in the past. During the transition from university, graduates are faced with the challenge of restructuring their lives around the pursuit of new goals (Grob et al., 2001; Salmela-Aro et al., 2007). Arguably, the process of responding to this challenge should activate memories of past goal pursuits via both conscious and unconscious processes. If this is the case, then higher levels of need satisfaction associated with graduates' memories of past goal pursuits should also contribute to positive trajectories of wellbeing during this period. Evidence consistent with this hypothesis would elaborate SDT by showing that its predictions concerning goal pursuits as conduits to need satisfaction and wellbeing extend to memories of past striving, would support SDT's contention that individuals' histories of past need satisfaction matter for their developmental trajectories, and point to memories of past goal pursuits as additional targets for interventions designed to support university graduates in transition.

To test this hypothesis, we drew on two distinct literatures that specify mechanisms by which memory can influence wellbeing over time – the literature on need satisfaction as an experiential component of episodic memory (Philippe et al., 2012) and the literature on narrative identity (McAdams, 2001). An episodic memory is a summary record that represents the sensory, perceptual, conceptual, and affective processing that occurred during a past experience (Conway, 2009). Over the past ten years, Philippe and his colleagues have demonstrated that, when activated outside one's conscious awareness by environmental triggers, episodic memories can influence situational changes in wellbeing as a function of the level of need satisfaction the individual experienced at the time of the original event (Lekes et al., 2014; Philippe et al., 2011b; Philippe et al., 2012; Philippe & Bernard-Desrosier, 2017). Moreover, longitudinal studies have indicated that the level of need satisfaction associated with a given memory can predict long-term changes in wellbeing, an effect that has been attributed to frequent activation of the memory and corresponding frequent situational changes in wellbeing over time (Houle & Philippe, 2017; Milyavskaya et al., 2013; Philippe & Bernard-Desrosier, 2017; Philippe & Houle, 2019; Philippe et al., 2012; Philippe et al., 2019).

Since navigating the transition from university involves the wholesale reorganization of

an individual's goal system (Grob et al., 2001; Salmela-Aro, et al., 2007), we reasoned that episodic memories of past goal pursuits should be frequently activated outside of conscious awareness during this period. Furthermore, since this transition is a time of uncertainty, and given evidence that the emotional valence of memory cues likely facilitates access to autobiographical memories of a similar valence (Conway & Pleydell-Pearce, 2000; Simpson & Sheldon, 2020), we reasoned that negative goal-related memories should be activated more frequently than positive goal-related memories during this period. We therefore expected that higher levels of need-satisfaction in graduates' negative goal-related memories should predict more positive trajectories of wellbeing across the transition from university. Evidence consistent with this specific hypothesis would elaborate Philippe and colleagues' model (Philippe et al., 2012) by showing that its predictions concerning episodic memory, need satisfaction, and enduring changes in wellbeing generalize to a new class of memories (i.e., goal memories) and to a new unit of time (i.e., a major developmental transition), elaborate SDT by showing that individuals can derive need satisfaction and wellbeing not only through need-satisfying *processes* of striving, but also through need-satisfying *memories* of striving, and point to negative episodic memories of goal pursuit as additional targets for interventions designed to support graduates in transition.

Narrative identity is the continuously evolving story of an individual's life, a story that organizes the reconstructed past, experienced present, and imagined future into a coherent whole that provides the self with temporal continuity, meaning, and purpose (McAdams, 2001; McAdams & McLean, 2013). Narrative identity researchers have demonstrated that a unified, meaningful, and purpose-filled life story supports psychological wellbeing across the lifespan (Adler, 2012, 2019; Adler et al., 2015, Adler et al., 2016; Mitchell et al., 2020). In addition, recent research indicates that narrative identity may be particularly important for changes in wellbeing when individuals face new, difficult, or destabilizing life experiences (Adler, 2019; Adler et al., 2015, Habermas & Köber, 2015; Mason et al., 2019). If this is the case, then narrative themes associated with unified, meaningful, and purpose-filled life stories should contribute to positive trajectories of wellbeing amidst the novelty and challenge of the transition from university.

Given our focus on negative goal-related memories and need satisfaction, we were particularly interested in the narrative theme of *growth*, which reflects an individual's interpretation that an event (or its consequences) has caused a positive change or development in the self, or led to the realization of positive lessons or insights that enhance the self (McLean et al., 2020). Several previous studies have reported positive associations between growth themes and indices of wellbeing (e.g., Lilgendahl & McAdams, 2011; Mansfield, Pasupathi, & McLean, 2015; Pals, 2006; Whitehead & Bates, 2016). Furthermore, from the perspective of SDT, memories imbued with narrative themes of growth should be inherently need satisfying, as personal growth is a prototypical example of an intrinsic goal (Sheldon, Ryan, Deci, & Kasser, 1996). We thus reasoned that need-satisfying growth themes would be ideal for capturing graduates' attempts to bring unity, meaning, and purpose to memories of negative goal-related experiences and expected that they too would predict positive trajectories of wellbeing across the transition from university. Evidence consistent with this hypothesis would strengthen the claim that narrative identity is particularly important for wellbeing when individuals face new and challenging life experiences, help elaborate SDT's propositions by suggesting that individuals can derive need satisfaction and wellbeing not only through unconsciously activated need-satisfying memories of striving, but also through consciously constructed need-satisfying narratives of past striving, and point to such narratives as additional targets for interventions designed to support graduates.

Trait Autonomy, Need Satisfaction in Past and Present Goal Pursuits, and Trajectories of Wellbeing in the Transition from university

The overarching hypothesis guiding the present research was that trait autonomy should support wellbeing across the transition from university by facilitating each of the need-satisfying goal processes outlined above. Through stronger tendencies to engage in non-defensive self-reflection, to resist self-imposed and external pressures, and to act in accordance with their values and intrinsic interests, more autonomous graduates should select post-graduation goals that better reflect their authentic selves, catalyzing processes of self-concordant striving. Second, through capacities to accept and integrate negative self-relevant information, more autonomous graduates are more likely to have derived need satisfaction in the midst of past negative goal-related experiences and to have encoded representations of need satisfaction with episodic memories of these events. Third (through identical channels), more autonomous graduates are more likely to have learned from their negative goal-related experiences and to have translated their learning into personal growth. In time, non-defensive reflection on these experiences should facilitate the emergence of growth as a prominent, need-satisfying theme inscribed within the narratives more autonomous graduates construct around these kinds of memories. We expand and elaborate on each of these rationales in Chapters 3 and 4.

As a global-level personality construct, trait autonomy is assumed to have a pervasive influence on individuals' functioning (Deci & Ryan, 2000; Ryan & Deci, 2017; Weinstein et al., 2012). Therefore, support for our overarching hypothesis would contribute to the literature on trait autonomy by identifying three specific processes through which this influence manifests itself. In addition, evidence for our distinct mediational hypotheses would contribute to the literatures on self-concordant striving, episodic memory need satisfaction, and narrative identity by identifying a dispositional antecedent of the process with which each is centrally concerned. Finally, evidence for these hypotheses would provide preliminary support for the integrative, SDT-based model of wellbeing in the transition from university we have proposed, identify trait autonomy as a dispositional strength that promotes need satisfaction and wellbeing during the transition from university, identify the development of trait autonomy itself as a potentially fruitful target for university-led efforts to support graduates, and identify measures of trait autonomy as potentially useful screening tools to identify prospective graduates who may be at-risk for low or deteriorating levels of wellbeing.

The Present Research

We tested our hypotheses in two longitudinal studies, each of which analyzed four waves of data drawn from the Graduation Study, an online survey study of emerging adults making the transition from a large public university located in the province of Québec, Canada. Both studies relied on rigorous statistical methods for evaluating longitudinal mediation, including longitudinal confirmatory factor analyses, longitudinal measurement invariance testing, latent curve modeling to depict the trajectories of the wellbeing outcomes, and the estimation of 95% bootstrapped CIs around point estimates of indirect effects. While Study 1 used purely quantitative methods (fully latent longitudinal structural equation modeling), Study 2 took a mixed-methods approach that integrated qualitative coding of narrative data (i.e., graduates' goal narratives) within a path analytic longitudinal mediation model.

Although trait autonomy has been conceptualized as a unitary construct, and although previous research indicates that its facets correlate with relevant constructs in a relatively consistent pattern (i.e., authorship and interest-taking generally relate positively, and susceptibility to control negatively to adaptive outcomes, and vice-versa; Weinstein et al., 2012), we nonetheless adopted a three-factor representation of trait autonomy for Studies 1 and 2.

Whereas authorship/self-congruence, susceptibility to control, and interest-taking correlate with *most* relevant constructs according to the pattern described above, this pattern appears to change in the association between interest-taking and wellbeing. Specifically, previous research has shown that interest-taking is positively associated with positive indicators of wellbeing but unrelated to negative indicators of wellbeing, suggesting – in line with theoretical predictions concerning non-defensive self-reflection – that interest-taking is a complex facet that may not actively inhibit negative emotional experiences (Weinstein et al., 2012). Given the novelty of both studies' hypotheses and the choice of wellbeing as the outcome of interest, we adopted a three-factor model of trait autonomy to allow us to detect distinctive patterns of association between its facets and the mechanisms and outcomes under investigation.

The longitudinal measurement structure for Studies 1 and 2 is presented in Table 1. Study 1 investigated whether trait autonomy contributes to positive trajectories of wellbeing across the transition from university by facilitating self-concordant striving for post-graduation goals (i.e. via higher autonomous and lower controlled motivation for post-graduation goals and subsequent goal progress). In line with previous tests of the SCM (Bahrami & Cranney, 2018; Blouin-Hudon et al., 2016; Koletzko et al., 2014; Sheldon & Elliot, 1999; Sheldon & Kasser, 1995; Sheldon et al., 2004), this study focused on an aspect of subjective wellbeing – life satisfaction – as the wellbeing outcome of interest.

Study 2 complemented Study 1 by investigating whether trait autonomy might also contribute to positive trajectories of wellbeing by facilitating (i) the encoding of need satisfaction in graduates' memories of negative goal-related experiences and (ii) the emergence of need-satisfying growth themes in the narratives they construct from these memories. In line with previous research focusing on both of these adaptive memory pathways (Lekes et al., 2014; Lilgendahl & McAdams, 2011; Mansfield et al., 2015; Pals, 2006; Philippe et al., 2011b; 2012; Whitehead & Bates, 2016), this study examined several indicators of wellbeing (i.e., happiness, purpose in life, and self-esteem).

CHAPTER 3:
Trait Autonomy and Wellbeing in the Transition from University: The Role of Self-Concordant Striving for Post-Graduation Goals

The purpose of Study 1 was to investigate whether trait autonomy contributes to positive trajectories of wellbeing across the transition from university by facilitating self-concordant processes of striving for post-graduation goals. Earlier, we proposed that trait autonomy should catalyze processes of self-concordant striving for post-graduation goals by promoting non-defensive self-reflection, resistance to self-imposed and external pressures, and self-regulation in accordance with values and intrinsic interests among graduates. In what follows, we expand upon these ideas and our approach to testing them before presenting the methods, analytic approach, results, and discussion for Study 1.

In addition to assumptions concerning the effects of self-concordant striving, the SCM also makes assumptions concerning its antecedents. Specifically, the SCM hypothesizes that self-concordance is enhanced by intrapersonal factors that promote insight and personal autonomy (Sheldon, 2014). We propose that the dispositional tendencies reflected in trait autonomy epitomize such factors. While deliberating over what post-graduation goals to pursue, graduates with stronger tendencies towards interest-taking should have a deeper, more accurate awareness of their own values and interests, leading to more self-concordant goal selection. This hypothesis is supported by recent research showing that trait mindfulness, which is conceptually closely related to interest-taking, predicts more self-concordant goal selection (Smyth et al., 2020). Moreover, graduates with stronger tendencies towards authorship/self-congruence should be

more likely to engage in self-regulation efforts that align with this self-knowledge. Graduates higher in these facets of trait autonomy should thus be more likely to select and pursue self-concordant post-graduation goals, launching a process of self-concordant striving that unfolds across the transition from university and culminates in increased levels of need satisfaction and wellbeing. In contrast, graduates who are more susceptible to control should tend to focus more on satisfying external and internally-imposed pressures, leading to less self-concordant goal selection, impaired effort and progress, need frustration, and deteriorating wellbeing.

Consistent with this rationale, previous research links trait autonomy directly or indirectly with several of the successive constructs embedded within in the temporal processes of the SCM. Trait autonomy and two of its facets, authorship/self-congruence and interest-taking, are positively associated with autonomous motivation (AM) and negatively associated with controlled motivation (CM) for daily activities and predict a higher degree of intrinsic aspirations (Weinstein et al., 2012), which reflect and likely foster increases in AM (Hope et al., 2018; Sheldon et al., 2004). In contrast, susceptibility to control is associated with lower levels of AM and higher levels of CM and less intrinsic aspirations. A recent study by Yu et al. (2018) provides additional empirical support for a link between trait autonomy and goal self-concordance; results of this study revealed that trait autonomy predicted more AM than CM for choice of academic major and for coursework among Chinese undergraduates.

To our knowledge, no previous studies have investigated associations between trait autonomy and goal effort, progress, or achievement. However, indirect evidence for these associations comes from a study involving the autonomy causality orientation, a dispositional construct with close theoretical and empirical ties to trait autonomy (Weinstein et al., 2012). In this study, Williams et al. (1996) reported that the autonomy orientation was positively associated with attendance throughout a six-month, very-low-calorie weight loss program, indicating a connection between dispositional autonomy and the level of effort participants invested to achieve their weight loss goals. The researchers also showed that autonomy orientation predicted weight loss maintenance 23 months after the program had ended, indicating an additional connection between dispositional autonomy and goal progress/achievement. These findings indicate that global tendencies towards autonomous functioning are related to goal effort and persistence, even in the case of a highly challenging goal like recovering from obesity.

Third, additional studies link trait autonomy with need satisfaction and wellbeing, the two constructs at the other end of the SCM process. Results of these studies indicate that global trait autonomy, authorship/self-congruence, and interest-taking are all positively associated with need satisfaction (Weinstein et al., 2012) and facilitate both “assisted” and “asserted” modes of getting one’s needs met (Legault et al., 2017). In contrast, susceptibility to control is associated with lower levels of need satisfaction, may actively interfere with individuals’ ability to benefit from assisted modes of need satisfaction, and is unrelated to asserted modes. Regarding wellbeing, trait autonomy and its first facet, authorship/self-congruence, are both positively associated with indicators of wellbeing but negatively associated with indicators of ill-being (Weinstein et al., 2012; Yu, Assor, & Liu, 2015; Yu et al., 2018). Mirroring this pattern in reverse, susceptibility to control has been found to be negatively associated with indicators of wellbeing but positively associated with indicators of ill-being (Weinstein et al., 2012). Finally, interest-taking, which performs identically to authorship/self-congruence in relation to motivation, need satisfaction, and a variety of other psychosocial outcomes, has been found to be positively associated with indicators of wellbeing but generally unrelated to indicators of ill-being (Weinstein et al., 2012). Again, according to Weinstein et al. (2012), this divergence suggests that interest-taking is a complex facet that may not actively inhibit negative emotional experiences.

The Present Study

If trait autonomy facilitates self-concordant processes of striving for post-graduation goals, and if these processes contribute to positive trajectories of need satisfaction and wellbeing across the transition from university, then trait autonomy should exert positive, indirect effects on graduates' wellbeing trajectories via the process described by the SCM. The purpose of Study 1 was to test this mediational hypothesis, and, in so doing, test the dispositional predictions embedded within our integrative, SDT-based model of wellbeing in the transition from university.

To this end, we measured baseline levels of trait autonomy between January and April of graduates' final semester of university. The following October, we invited graduates to describe their most important goal for the next three to five years and to rate their autonomous and controlled motivation for that goal. We also asked graduates to identify (via brainstorming) three to five steps they could take in the next few months to advance towards their goal. The following January, we asked graduates to rate their level of progress on each of these steps. Wellbeing was measured at baseline (final term; T1), Wave 2 (the following October; T2), Wave 3 (the following January; T3), and Wave 4 (the following July; T4).

Based on the theoretical and empirical evidence reviewed above, we expected that higher baseline levels of authorship/self-congruence and interest-taking would predict higher levels of AM and lower levels of CM for graduates' most important post-graduation goal at T2. In contrast, we expected that baseline levels of susceptibility to control would predict lower levels of AM and higher levels of CM for post-graduation goals at T2. In line with the SCM, we expected that AM would predict higher, and CM lower, levels of subsequent goal progress. Meta-analytic evidence suggests that CM alone is unreliably related to goal progress due to its reliance on inconsistent and varying external cues for activation (Koestner et al., 2008). However, individuals who pursue controlled goals across major developmental transitions may lack, at least initially, clear information about contingency structures in new environments and therefore fail to progress. Although self-concordance is often indexed by measuring the extent to which individuals are pursuing idiographic goals for autonomous *relative* to controlled reasons (i.e., using a *relative autonomy index*; Sheldon, 2014), we modeled AM and CM as two distinct factors in order to test this hypothesis. In addition, and also in line with the SCM, we expected that post-graduation goal progress would predict increases in wellbeing across the study, theoretically via increases in need satisfaction. In the key test of our global hypothesis, we expected indirect effects of the facets of trait autonomy on changes in wellbeing via the causal sequence of the SCM. Finally, due to the likelihood that trait autonomy promotes need satisfaction and wellbeing across the transition from university by facilitating additional need-satisfying processes that were not measured in the present study, we also expected direct effects of the facets of trait autonomy on baseline levels and changes in wellbeing.

Method

Participants and Procedures

Participants were recruited as part of a four-wave, longitudinal study designed to follow undergraduate students across the transition from university. Recruitment proceeded via class visits and advertisements in a student newspaper, flyers, and cards placed around campus. In addition, student groups were contacted and invited to "like" a study Facebook page that contained the text of the printed advertisement. All advertisements contained a link to a web page that provided information about the study and sign-up instructions. To participate at T1, students had to indicate that they were currently completing the final semester of their first undergraduate degree at the university where the study took place. Interested students registered for one of

several small in-person orientation sessions at which they learned about the purpose of the study, gave their informed consent, and completed the demographics section of the first online survey. Students then received an ID number and unique link to the remainder of the T1 online survey, which they completed within two weeks. To maximize sample size, orientation sessions and survey completion took place between January and April of the winter semester prior to students' expected graduation. Towards the end of the semester, additional participants were added to the sample in one of two ways. One group of students signed up for the study via the online portal for the Psychology Participant Pool and completed the T1 survey as described above. A second group, who were recruited via class visits, completed the entire T1 survey online. Graduates who participated at T1 were later invited to complete online surveys at Wave 2 (T2; October, 2017), Wave 3 (T3; January, 2018), and Wave 4 (T4; July, 2018). Graduates gave their informed consent and received a small cash honorarium or Participant Pool credit at each wave. The study was approved by the university's institutional review board.

The final sample included 161 participants (69.6% female, *M*age = 23.30, *SD* = 1.86, range 20-30 years) who participated at T1 and who had completed their degree requirements in the spring or summer prior to our first post-graduation survey (T2). At T1, the majority reported that they were born in Canada (64.0%) and spoke English as their maternal language (44.1%; 21.1% French; 34.8% another language). Just over half identified as White (61.5%; 10.1% Chinese; 9.9% Asian; 9.3% Arab; 8.7% Black; 5.0% Latin American; 6.8% Southeast Asian; 3.7% Filipino; 0.6% Aboriginal; 0.6% Korean; 0.6% Japanese; and 5.6% another population group). Most graduates' mothers (85.1%) and fathers (76.4%) had completed high school, college, or a bachelor's degree and 42.9% reported that their parents' annual income fell between $50,000 and $124,999.00 CAD during the last year (range = *less than* $5,000.00 to $200,000.00 CAD *or greater*). Of the eligible sample at T1, 143 (88.8%) completed questionnaires at T2, 128 (79.5%) at T3, and 120 (74.5%) at T4. The sex, ethnicity, and socio-economic status variable distributions of the samples who completed the questionnaires at subsequent waves were consistent with those of the baseline sample (Appendix A).

Measures

Trait autonomy. At T1, trait autonomy was measured with the 15-item *Index of Autonomous Functioning* (IAF; Weinstein et al., 2012). The IAF contains three five-item subscales: authorship/self-congruence (α = .76), susceptibility to control (α = .75), and interest-taking (α = .78). Sample items include: "My decisions represent my most important values and feelings (authorship/self-congruence)," "I do things in order to avoid feeling badly about myself (susceptibility to control)," and "I am deeply curious when I react with fear or anxiety to events in my life (interest-taking)." Using a five-point Likert-type scale ranging from 1 (*not at all true*) to 5 (*completely true*), respondents rate the degree to which each item is true for them.

In this study, we conceptualized trait autonomy as a dispositional asset whose effects were mediated by processes of self-concordant striving. Implicit in this conceptualization is the assumption that trait autonomy is a relatively stable personality disposition. This assumption is supported by previous evidence of very strong test-retest reliability over three measurements taken three months apart (ICC = .86) among university students (Weinstein et al., 2012).

Self-concordance of post-graduation goals. At T2, graduates were asked to "think about and then write down your most important goal for the next three to five years." Next, graduates wrote down steps they could take in the next three months to bring them closer to their goal. Examples of goals and steps described by graduates are available in Appendix B. Finally, graduates were asked to rate their autonomous (α = .63) and controlled (α = .61) motivation for this idiographic goal according to established methods (e.g., Sheldon & Elliot, 1999; Koestner et

al., 2015). Using a seven-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), graduates indicated whether they were pursing their goal for a) external (*because somebody else wants you to, or because you are going to get something from somebody for it*), b) introjected (*because you would feel ashamed, guilty, or anxious if you didn't – you felt that you ought to work on this*), c) identified (*because you really believe that it is an important goal to have – you endorse it freely and value it wholeheartedly*), d) integrated (*because it represents who you are and reflects what you value in life*), and e) intrinsic (*because of the fun and enjoyment this goal will provide you – the primary reason is simply your interest in the experience itself*) reasons.

Progress towards post-graduation goal. At T3, having re-read the steps they had listed at T2, participants rated the degree of progress they had made on the first two steps, respectively, using a Likert-type scale ranging from 1 (*no progress*) to 5 (*a great deal of progress*).

Wellbeing. Most previous research on the SCM (Bahrami & Cranney, 2018; Blouin-Hudon et al., 2016; Koletzko et al., 2015; Sheldon & Elliot, 1999; Sheldon & Kasser, 1995; Sheldon et al., 2004) has investigated the effects of self-concordant striving on one or more of the three facets of subjective wellbeing (SWB) proposed by Diener (1984): Positive affect (PA), negative affect (NA), and life satisfaction (SWL). Recent research indicates that, relative to PA and NA, SWL is heavily influenced by factors that are chronically accessible when individuals evaluate their lives, such as long-term goals and progress towards these goals (Diener et al., 2017; Schimmack & Oishi, 2005). Therefore, using the *Satisfaction with Life Scale* (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), we measured SWL at Times 1, 2, 3, and 4 as the outcome of interest in the present study. The SWLS is a five-item instrument that measures respondents' typical degree of satisfaction with their life using a seven-item (α = .88, .91, .89, .90; *In most ways my life is close to ideal*; *So far I have gotten the important things I want in life*) Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

Analyses

Model Estimation and Evaluation

Models were estimated using M*plus* 8.0's (Muthén & Muthén, 2017) robust weighted least square estimator (WLSMV), which has been shown to perform better than maximum likelihood estimation with ordered-categorical Likert-type items involving five or fewer categories and/or scales involving unequal response thresholds such as those used in the present study (e.g., Finney & DiStephano, 2013). In addition, recent research indicates that WLSMV estimation is well-suited to the structure of motivation measures based on self-determination theory (Litalien et al., 2015; Gillet et al., 2017) or goal theory (Litalien et al., 2017a, 2017b).

Reporting, analysis, and assessment of the implications of missing data were conducted according to best practices outlined by Enders (2010, 2011) for handling missing data in longitudinal designs. Missing data in the forms of attrition, wave nonresponse, variable nonresponse, and item non-response were present across the four waves of the study. One hundred and sixty-one participants completed a total of 644 time-specific questionnaires, with 127 (78.88%) providing responses on at least three out of four measurement points. Of the eligible sample at T1, 143 (88.8%) completed questionnaires at T2, 128 (79.5%) at T3, and 120 (74.5%) at T4. Variable non-response within wave was below 5.0% for all variables except AM and CM for post-graduation goals at T2 (7.0%, respectively) and ratings of progress on steps towards those goals at T3 (8.6%, respectively).

Results from preliminary analyses indicated that missingness was unrelated to any variable included in analyses or participant age, sex, racial identification, or socioeconomic status, with the following exceptions: At T2, males had slightly more missing data than females

on AM and CM for post-graduation goals, χ^2 (1, n = 158) = 4.94, p = .046. Also at T2, participants with higher subjective socioeconomic status were slightly more likely to have missing data on AM and CM for post-graduation goals, t (157) = 2.15, p = .033, as well as SWL, t (157) = 1.99, p = .049). Given these associations, we note that findings may not fully generalize to high SES or male graduates. Although missingness on AM and CM at T2 was related to participant sex and SES, it was unrelated to any variable included in analyses, allowing us to retain the assumption that the data were either missing completely at random or missing at random (Rubin, 1976). To handle missing responses based on these assumptions, we estimated models using algorithms associated with WLSMV estimation that rely on missing at random assumptions (Asparouhov & Muthén, 2010).

Model fit was evaluated with the Chi-square test of exact fit (χ^2), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA) and its 90% confidence interval. Values greater than .90 and .95 for the CFI and TLI indicate adequate and excellent fit, respectively, while values less than .08 or .06 for the RMSEA indicate acceptable and excellent fit (Hu & Bentler, 1999; Yu, 2002). Since WLSMV chi-square values are estimated as the closest integer necessary to obtain a correct p-value, only the p-value for this index should be interpreted. Like the χ^2, MD$\Delta\chi^2$ are sensitive to sample size and minor model misspecification. Thus, comparison of nested models typically focuses on examination of changes in fit indices (Chen, 2007; Cheung & Rensvold, 2002), in which declines in the CFI and TLI of .01 or less and increases in RMSEA of .015 or less indicate that a more constrained (or invariant) model can be retained.

Preliminary Analyses

We first estimated a longitudinal Confirmatory Factor Analytic (CFA) model to verify the a priori factor structure of study variables across the four waves. In total, ten correlated CFA factors were specified. Six factors represented motivational constructs, including the three facets of trait autonomy (T1), AM and CM for participants' most important post-graduation goal (T2), and post-graduation goal progress (T3). The remaining four factors represented SWL measured at each wave of the study. Two items each were used to reflect the latent factors representing CM (T2) and goal progress (T3). As the use of two indicators per construct results in locally unidentified CFA factors, local identification was achieved by placing essentially tau-equivalent constraints on the factor loadings of each construct (i.e., by constraining their respective factor loadings to equality; Little et al., 1999). The model incorporated correlated uniquenesses between matching indicators of the SWL factors across the waves to avoid converging on inflated stability estimates (Marsh, 2007; Mitchison et al., 2015).

The longitudinal CFA model was then used to conduct tests of longitudinal measurement invariance for the wellbeing constructs according to the following sequence (Millsap, 2011; Morin, Arens, & Marsh, 2016): (1) configural (invariance of the specification of fixed and free loadings for each factor at each time point); (2) weak (invariance of the factor loadings); (3) strong (invariance of the factor loadings and item thresholds); (4) strict (invariance of the factor loadings, thresholds, and uniquenesses); (5) invariance of the variance/covariance matrix; and (6) invariance of the latent means. To ensure comparability of constructs over time for predictive tests involving relations among latent constructs, it is only necessary to establish the first two types of invariance (e.g. configural and weak). However, given that latent curve models, such as those used in the present study, are mean-structured by definition, strong invariance is also required to interpret the shape of these trajectories. Finally, it is also useful to establish strong and strict invariance because strictly invariant models estimate fewer parameters, which maximizes statistical power (e.g., Garn et al., 2019).

Main Analyses

First, we estimated unconditional latent curve models (LCMs; Bollen & Curran, 2006) for SWL across Times 1, 2, 3, and 4. In each model, the true passage of time was coded in increments of 0, .7, .9, and 1.4, respectively, to reflect unequal lags of roughly eight, 11, and 17 months between measurement occasions. In these LCMs, two latent growth parameters – the latent intercept (baseline) and latent slope (average rate of change across the measurement occasions) – were used to define the individual trajectories. After contrasting the fit of linear and quadratic (which involved the estimation of an additional slope factor defined by squared time codes) unconditional models (Appendix D), we retained a linear LCM for subsequent analyses.

Next, we estimated a conditional model that incorporated the hypothesized effects of trait autonomy on the process of self-concordant striving and trajectories of SWL across the transition from university. Measurement components (i.e., factor loadings, item thresholds, and item uniquenesses) of the wellbeing constructs were specified as strictly invariant across waves based on results from tests of longitudinal measurement invariance described above.

This model (Figure 1) included direct effects of the three facets of trait autonomy on AM and CM for post-graduation goals, direct effects of AM and CM on post-graduation goal progress, and the direct effect of goal progress on the linear slope of SWL. In addition, reflecting our hypothesis that trait autonomy would influence graduates' wellbeing trajectories via additional need-satisfying processes not measured in the present study, the model included direct effects of its three facets on both the intercept and slope of SWL. To account for multicollinearity among exogenous factors and based on latent correlations observed, covariances between facets of trait autonomy and between AM and CM were included in the model (Cole & Maxwell, 2003), in addition to a covariance between the latent intercept and slope factors of the SWL LCM.

Finally, we requested estimates for all possible indirect effects of each facet of trait autonomy on the slope of SWL via AM and CM (M1a, M1b) and goal progress (M2). Indirect effects were calculated as the products of the path coefficients associated with each component of the mediational chain. We also requested estimates for all possible indirect effects of each facet of trait autonomy on progress via AM and CM (M1a, M1b), for which the product terms combined two weights. The statistical significance of these indirect effects was assessed via bias-corrected bootstrap confidence intervals based on 1000 bootstrap samples (CI; e.g., Cheung & Lau, 2008; MacKinnon et al., 2004), which indicate statistical significance when they exclude the value zero.

Results

Latent factor correlations for Study 1 are reported in Appendix E. Goodness-of-fit results for all Study 1 measurement models are reported in Table 2. The longitudinal CFA model demonstrated excellent fit according to the RMSEA and adequate fit according to the CFI and TLI (Table 2). This model also achieved full longitudinal measurement invariance indicated by decreases in CFI and TLI that were less than or equal to .010, and increases in the RMSEA less than or equal to .015 across increasingly constrained models (Table 2). Based on these results, we retained the model of strict measurement invariance as the basis for the unconditional and conditional LCMs. Standardized parameter estimates from this model are reported in Appendix C. We calculated composite reliability estimates for the factors using McDonald's (1970) ω, using the model standardized factor loadings (λ_i) and uniquenesses (δ_{ii}) as $\omega = (\Sigma|\lambda_i|)^2 / ([\Sigma|\lambda_i|]^2 + \Sigma\delta_{ii})$. Most ω were satisfactory (.686 to .913; M = .833, Appendix C). We note that the coefficient associated with post-graduation goal progress (.598) was lower than typical acceptability guidelines, reinforcing the need to rely on latent variable models corrected for measurement

errors to account for the lower reliability of this factor. It is important to note, however, that ω, just like α, is known to be positively related to the number of items included in a scale (Streiner, 2003). Thus, a coefficient of .598 based on a two-item scale would become .817 if based on six equivalent items.

Building on the model of strict invariance, we next estimated unconditional linear and quadratic growth models for SWL (Appendix D). Because the addition of the quadratic growth factor did not result in a meaningful improvement in fit, did not reveal a statistically significant mean-level quadratic trend, and did not reveal statistically significant variability in quadratic growth, we retained the unconditional linear LCM as the basis for our analyses. This unconditional linear LCM demonstrated excellent fit to the data according to the RMSEA, CFI, and TLI and indicated the presence of statistically significant (or marginally significant for the slopes) inter-individual variability in the intercepts (mean intercept = 4.450, $p \leq .01$; intercept variance = 1.283, $p \leq .01$) and in the linear slopes of SWL (mean slope = -.081, *ns*; slope variance = .418, $p = .057$).

Results of the final conditional LCM are reported in Figure 2. Authorship/self-congruence at T1 predicted higher levels of AM and lower levels of CM for graduates' most important post-graduation goal at T2. Susceptibility to control and, to a lesser degree, interest-taking, both predicted higher levels of CM and were unrelated to levels of AM. Controlled motivation predicted lower levels of post-graduation goal progress at T3. Unexpectedly, the effect of AM on progress was not statistically significant. In line with the SCM, progress towards post-graduation goals predicted increases in SWL across the course of the study.

These results suggested the presence of seven distinct mediated paths, five of which were associated with statistically significant indirect effects (Table 3). Consistent with the hypothesis that trait autonomy would promote positive trajectories of wellbeing in the transition from university via need-satisfying processes of self-concordant striving, authorship/self-congruence predicted long-term increases in graduates' SWL via lower levels of CM for post-graduation goals and higher levels of goal progress. In contrast, susceptibility to control predicted decreases in SWL via higher levels of CM and lower levels of progress. While interest-taking had a positive effect on CM, it did not exert an indirect effect on the slope of SWL via this construct. In other words, the relatively weak, short-term effect of interest-taking on CM for post-graduation goals did not spread or propagate further through the long-term process of striving as graduates navigated the transition from university. Additional indirect effects simply reflected sub-sections of the full mediated pathway that were consistent with those just described (Table 3).

As expected, the results also revealed direct effects of the facets of trait autonomy on both the intercept and slope of SWL, supporting our hypothesis that trait autonomy would influence trajectories of wellbeing in the transition from university via additional need-satisfying processes that were not the focus of the present study. Regarding effects on the intercept, authorship/self-congruence predicted higher, whereas susceptibility to control and interest-taking predicted lower levels of concurrent (baseline) SWL. Regarding effects on the slope, interest-taking directly predicted long-term increases SWL across the transition from university.

The results (R^2) show that the facets of trait autonomy explained 10.8% of the variance in AM and 40.8% of the variance in CM for post-graduation goals. The self-concordance of post-graduation goals (reflected mainly in the negative effect of CM), in turn, explained 36.7% of the variance in post-graduation goal progress. In addition, the direct effects of post-graduation goal progress and interest-taking explained 36% of the variance in the linear slope of SWL. Finally, the direct effects of the facets of trait autonomy explained 35.7% of the variance in initial levels (i.e. intercept) of SWL.

Discussion

Overall, the results of the present study support the hypothesis that trait autonomy should contribute to positive trajectories of wellbeing across the transition from university by catalyzing more self-concordant processes of striving for post-graduation goals. Therefore, the findings also support the general hypothesis guiding the present research, which is that dispositional tendencies that facilitate the satisfaction of basic psychological needs should support wellbeing across this complex and challenging developmental transition. In so doing, the findings provide the first empirical evidence for the integrative, SDT-based model of wellbeing in the transition from university we have proposed and pave the way for future research based on this model. That said, the results also revealed a number of unexpected and intriguing findings, including a lack of association between AM for post-graduation goals and subsequent goal progress, weak associations between interest-taking and the motivational quality of post-graduation goals, and seemingly contradictory effects of interest-taking on baseline levels (negative) vs. long-term changes (positive) in graduates' wellbeing. Here, we discuss the theoretical, developmental, and practical implications of the findings, as well as strengths, limitations, and directions for future research.

Trait Autonomy, Self-Concordant Striving, and Graduates' Wellbeing Trajectories

The key finding of the present study is that higher baseline levels of trait autonomy (e.g., higher baseline levels of authorship/self-congruence and lower baseline levels of susceptibility to control) predicted increases in life satisfaction across the transition from university via lower levels of CM for post-graduation goals and higher levels of subsequent goal progress. Although untested in this study, the mediating role of changes in need satisfaction between goal progress and changes in wellbeing is well-documented by previous empirical research on the SCM (Sheldon, 2014). Thus, by linking trait autonomy with more self-concordant processes of striving for post-graduation goals, results of the present study support the theoretical proposition that need-facilitative dispositional tendencies should promote positive trajectories of wellbeing during the transition from university. The results are also consistent with SDT's broader claim that dispositional autonomy should promote wellbeing by facilitating the satisfaction of basic psychological needs (Ryan, 1995; Weinstein et al., 2012) and identify a potential dispositional antecedent of self-concordant processes of striving towards personal goals. Developmentally, this key finding indicates that trait autonomy may be a dispositional strength that promotes wellbeing across the transition from university and, in so doing, nurtures a psychosocial resource upon which graduates can broaden and build as they face the multiple, overlapping, and interdependent transitions embedded within the larger transition to adulthood. Approaching university graduation with low levels of trait autonomy, however, may be a risk factor for deteriorating levels of wellbeing in the transition from university and beyond, potentially because prospective graduates with low levels of dispositional autonomy are more likely to select post-graduation goals that feel controlled and pressured, to fail to progress, and to experience declines in basic psychological need satisfaction as the transition unfolds.

Recent research indicates that interventions can be effective in enhancing self-concordance both before and after goal selection. For example, Sheldon et al. (2019) demonstrated that individuals who were encouraged to reflect on the self-concordance of an array of potential goals were later more likely to select goals that were intrinsic in content (e.g., related to growth, intimacy, and community) and thus likely to feel congruent to most people (Kasser, 2002). This research suggests that students who are low in trait autonomy, and who are still deliberating vis-à-vis their post-graduation goals, could benefit from the simple exercise of reflecting on the self-concordance of their potential choices. In another study, Unsworth and

Mason (2016) taught individuals to (i) identify self-concordant features of current work, (ii) modify work to incorporate more of these features, and (iii) manage their thoughts to increase the salience of these features. This research suggests that at-risk students who have already made commitments to post-graduation goals could be coached to enhance the self-concordance of these goals prior to graduation. Both approaches to intervention, as well as preliminary screening with the IAF to identify at-risk students, could feasibly be undertaken at the start of the final year of university.

Autonomous Motivation, Controlled Motivation, and Post-Graduation Goal Progress

Overall, the results of the present study were consistent with the hypothesis that trait autonomy should support wellbeing across the transition from university by catalyzing more self-concordant processes of striving for post-graduation goals. However, the effect of self-concordance on subsequent goal progress and changes in wellbeing was driven not, as we expected, by higher levels of AM and lower levels of CM for post-graduation goals, but by lower levels of CM alone. On the one hand, this finding supports our novel hypothesis that CM should reliably lead to impaired goal progress during periods of transition in which contextual contingency structures may not be immediately apparent. If replicated, a negative effect of CM on goal progress during the transition from university (and perhaps during other major developmental transitions) would add additional nuance to our understanding of the ways in which motivational quality impacts goal-related variables and could inform the focus of interventions designed to support the wellbeing of graduates and other individuals in transition.

On the other hand, the results failed to support the hypothesis that AM should reliably lead to enhanced goal progress during the transition from university, a hypothesis we based on empirical support for the SCM (Sheldon, 2014), on empirical support for the positive effect of AM on goal progress in the SDT literature (Koestner et al., 2008), and on SDT's tenet that autonomous forms of motivation should promote adaptive forms of self-regulation (Ryan & Deci, 2017), including vis-à-vis goals (Deci & Ryan, 2000). One possible explanation for this unexpected finding is that a different approach to differentiating motivational quality, such as latent profile analyses (e.g., Wang et al., 2016), response surface analysis (e.g., Brunet et al., 2015), or bifactor models (e.g., Howard et al., 2018), may have been better suited to reveal the expected positive effect of AM on goal progress during the transition from university. Comparing the performance of these approaches in predicting graduates' goal progress and wellbeing trajectories would be an interesting area for future research.

Alternatively, there may be something unique about the transition from university that disrupts – at least, temporarily – the effect of AM on post-graduation goal progress. Previous research has identified several mechanisms by which higher levels of AM may promote goal progress, including increased effort and persistence in the face of obstacles (Sheldon & Elliot, 1998, 1999), task-oriented coping strategies (Gaudreau et al., 2012), spontaneous generation of implementation plans (Carraro & Gaudreau, 2011), and subjective ease of effort (Werner et al., 2016). In addition, previous research has identified several factors that amplify the effect of AM on goal progress and achievement, such as the formation of implementation plans (Chatzisarantis et al., 2010; Koestner et al., 2002, 2008) and higher levels of implicit autonomy and working memory capacity (Gareau & Gaudreau, 2017; Gareau et al., 2019). Recent research also indicates that autonomously motivated emerging adults may perceive, seek out, and elicit higher levels of autonomy support in their relationships and social contexts, which, in turn, enhances their AM for goals and goal progress over time (Levine et al., 2020). Future research is needed to explore whether one or more of the salient features of the transition from university, such as the abrupt loss of social and institutional supports experienced by graduates early in their transitions

(Gardner, 1999; Pistilli et al., 2003) interferes with any of these mediating, moderating, or reciprocal processes and, by extension, with the effect of AM on progress towards post-graduation goals.

Interest-Taking and the Self-Concordance of Post-Graduation Goals

Also inconsistent with our expectations, interest-taking was unrelated to AM and positively, though relatively weakly related to CM for post-graduation goals. If our initial hypothesis concerning interest-taking is correct, then the strongest and clearest effect of interest-taking on self-concordance likely occurs during the deliberative phase of striving, in which students weigh alternatives and possibilities vis-à-vis their post-graduation goals (Gollwitzer, 1990; Heckhausen & Gollwitzer, 1987, also see Sheldon et al., 2019). Presumably, most students will engage in this deliberative process before, during, or shortly after they complete their studies. Therefore, by measuring interest-taking in the final semester of university, and AM and CM for post-graduation goals several months after graduates had completed their requirements, we may have missed the ideal window to capture a direct effect of the former on the latter. Future studies could clarify this issue by specifying a shorter lag between the measurement of trait autonomy and self-concordance ratings for post-graduation goals.

Direct Effects of Trait Autonomy on Wellbeing Trajectories

Finally, consistent with our hypothesis that trait autonomy should influence need satisfaction and wellbeing in the transition from university via additional processes, each facet exerted direct effects on wellbeing trajectories in our sample of Canadian graduates. Notably, however, these effects mainly clustered on the trajectory intercepts. One of the assumptions of the SCM is that the effects of self-concordance on changes in wellbeing are fully mediated by sustained effort, progress, and changes in need satisfaction (Sheldon & Elliot, 1999). If the same is true for other processes catalyzed by trait autonomy, then it may be difficult to capture the distal role of the trait without explicitly modelling the process constructs that are proximal to changes in need satisfaction and wellbeing. Nevertheless, these effects on the intercepts indicate that future research on other manifestations of trait autonomy in the transition from university is warranted.

Furthermore, these effects suggest that such research should continue to investigate effects of trait autonomy at the level of the facets to allow for the possibility that they foster increases in wellbeing via different, and possibly quite complex processes. For example, in the present study, authorship/self-congruence and interest-taking both exerted direct effects on baseline levels of wellbeing across the transition from university, but these effects were in different directions; authorship/self-congruence predicted higher, but interest-taking unexpectedly predicted lower levels of baseline life satisfaction among graduates. Despite its negative effect on baseline wellbeing, however, interest-taking also uniquely predicted increases in life satisfaction across the span of the study. At this point, we can only speculate as to the reasons for this seemingly contradictory pattern of findings. Drawing on control theory (Carver & Scheier, 2000), perhaps stronger tendencies towards interest-taking heightened prospective graduates' day-to-day awareness of the discrepancy, or distance between themselves and their most important post-graduation goals, producing experiences of low mood and dissatisfaction as they began the transition from university. These negative affective experiences, however, may have subsequently served as signals that sustained or increased effort was necessary, which, if heeded, could have promoted progress, need satisfaction, and increasing levels of life satisfaction. If this explanation is correct, then we may have captured short-term negative effects of interest-taking on graduates' wellbeing and glimpsed long-term benefits through the conscious modulation of effort. Testing this possibility, as well as other common and specific processes

through which trait autonomy may influence wellbeing across the transition from university, is a promising area for future research that could yield additional intervention targets for universities.

Strengths, Limitations, and Future Directions

The present study examined a novel, SDT-based hypothesis using fully latent, longitudinal structural equation models and four waves of online survey data. Despite these strengths, the sample size was relatively small. However, we note that our recruitment strategy prioritized meeting students in person and explaining the rationale for the study prior to their consent and participation. This autonomy-supportive approach was designed to help students internalize the value of their participation and prevent attrition across a year and a half in which students shed their institutional identity and changed many other aspects of their day-to-day lives. Although this priority created a high bar to entry relative to other online survey studies and potentially limited our sample size, it may have also enhanced the validity of students' self-reports and our retention rates. In addition, although our recruitment efforts achieved a degree of racial and ethnic diversity, the final sample over-represented young women from relatively high SES White or Asian families. These limitations underscore the need for replication studies with larger and more diverse samples of university graduates.

Replication studies could also provide the opportunity to compare the performance of different approaches to differentiating motivational quality in the prediction of goal progress, need satisfaction, and wellbeing in the transition from university. Importantly, despite relying on well-established methodologies, our measures of goals (self-concordance and progress) remain specific to this study, and thus worthy of further investigations of reliability and validity. As noted above, additional avenues for future research include further investigation of the unexpected lack of association observed between AM and post-graduation goal progress in the present study, investigating whether interest-taking's clearest effects on goal self-concordance occur during the deliberative phase of goal engagement, and investigating additional need-satisfying processes by which trait autonomy could support wellbeing in the transition from university.

Conclusions

Overall, results of the present study supported the idea that trait autonomy contributes to positive trajectories of wellbeing across the transition from university by catalyzing more self-concordant processes of striving for post-graduation goals. These results support the overarching hypothesis guiding the present research – that trait autonomy should promote positive trajectories of wellbeing across the transition from university by facilitating experiences of need satisfaction linked to graduates' goal pursuits, both past and present – and provide the first empirical evidence for the integrative, SDT-based model of wellbeing in the transition from university we have proposed. The results highlight trait autonomy as a dispositional asset for graduates navigating the complex, challenging transition from university, highlight trait autonomy as a potential dispositional antecedent of the SCM process, and demonstrate SDT's usefulness for understanding trajectories of wellbeing across a major developmental transition. In addition, results point to a simple, low-cost approach to intervention: Screening prospective graduates with the IAF and coaching those low in trait autonomy to reflect on the self-concordance of the post-graduation goals they are considering or to deliberately enhance the self-concordance of post-graduation goals to which they have already committed.

CHAPTER 4:
BRIDGE

Overall, findings from Study 1 supported the hypothesis that trait autonomy would promote need satisfaction and wellbeing across the transition from university by facilitating self-

concordant processes of striving for post-graduation goals. Study 2 investigated the complementary hypothesis that trait autonomy might also promote wellbeing by furnishing graduates with need-satisfying *memories* of past goal pursuits. To investigate this possibility, Study 2 examined whether trait autonomy exerts indirect effects on graduates' trajectories of wellbeing through two memory pathways identified by previous research – need satisfaction encoded as an experiential component of episodic memory (Philippe et al., 2012) and themes of growth, which should be inherently need-satisfying, in the narratives graduates construct around their memories (McAdams & McLean, 2013; McLean et al., 2020; Pals, 2006). In keeping with our focus on mechanisms linked to goals, we examined these processes as they unfolded with respect to a single memory – that of facing an unattainable goal while in university. As will be explained in further detail below, there are compelling reasons to suspect that memories of this kind of painful, destabilizing experience could have an important role to play in the course of wellbeing across the transition from university.

CHAPTER 5:
Trait Autonomy and Wellbeing in the Transition from University: The Role of Need Satisfaction in Graduates' Memories of Past Striving

Previous research suggests two key pathways through which memories influence wellbeing – (i) representations of need satisfaction encoded as experiential components of episodic memory and (ii) themes that emerge in the narratives individuals construct to make meaning from their experiences (Philippe & Bernard-Desrosiers, 2017). In what follows, we apply theory and research findings from the literatures devoted to trait autonomy (e.g., Ryan & Deci, 2017; Weinstein et al., 2012), need satisfaction in episodic memory (e.g., Philippe et al., 2012), and the theory of narrative identity (e.g., McAdams, 2001; McAdams & McLean, 2013) to develop and test rationales for why these distinct pathways should be particularly important for supporting wellbeing in the transition from university and, further, why trait autonomy should facilitate them both.

Self-determination theory and research indicate that basic psychological needs are fundamental nutriments for wellbeing and optimal development across cultures and across the lifespan (Deci & Ryan, 2000; Ryan & Deci, 2017; Vansteenkiste & Ryan, 2013; Vansteenkiste et al., 2020). Therefore, it has been proposed that one of the basic "experiential" components of episodic memory should be representations of the degree to which needs for autonomy, competence, and relatedness were met during the experiences reflected in memory (Philippe et al., 2011a, 2011b; Philippe et al., 2012).

Drawing on episodic memory theory (e.g., Brewin et al., 2010; Conway & Pleydell-Pearce, 2000), Philippe and his colleagues (Houle & Philippe, 2017; Philippe & Bernard-Desrosiers, 2017; Philippe et al., 2012) have proposed that external and internal cues that match features of an accessible episodic memory can activate that memory and its experiential components outside conscious awareness. Stronger representations of memory need satisfaction are expected to cause increases in situational wellbeing, while weaker representations of memory need satisfaction are expected to cause situational decreases in wellbeing. Over time, frequent activation of a given memory should lead to frequent situational changes in wellbeing, which should accumulate to cause long-term changes in wellbeing. To date, multiple experimental (Houle & Philippe, 2017; Philippe & Bernard-Desrosier, 2017; Philippe et al., 2012; Philippe et al., 2011b) and longitudinal studies (Houle & Philippe, 2017; Milyavskaya et al., 2013; Philippe & Bernard-Desrosier, 2017; Philippe & Houle, 2019; Philippe et al., 2012; Philippe et al., 2019) have supported these predictions.

Accordingly, memories that are frequently activated during the transition from university should influence graduates' wellbeing trajectories as a function of the level of need satisfaction with which they were encoded. Since the transition from university requires graduates to restructure their lives around new goals (Grob et al., 2001; Salmela-Aro et al., 2007), it should include frequent cues for the activation of goal-related memories, in particular. For example, scanning career opportunities online, processing the good news of a job offer or the bad news of a rejection, talking over long-term aspirations with friends and family members, or engaging in private social comparisons between one's early post-graduation successes and those of peers are all experiences that could occur, and occur frequently, in the daily lives of recent graduates, cueing the activation of goal-related memories outside their conscious awareness. Further, since the transition from university is a time of uncertainty, and given evidence that the emotional valence of memory cues should facilitate access to autobiographical memories of a similar valence (Conway & Pleydell-Pearce, 2000; Simpson & Sheldon, 2019), negative goal-related memories are arguably more likely to be frequently activated than positive ones during this period. If so, then the level of NS encoded with negative goal-related memories should influence trajectories of wellbeing in the transition from university.

Let us consider the hypothetical case of a recent graduate, Sam, who did not achieve the required second-year GPA to complete an honours degree in his major, biology. Upon receiving his grades, Sam was devastated; without an honors degree, he will be unable to apply to medical school and pursue his dream of becoming a paediatrician. Despite his disappointment, however, he feels free to choose how to respond to his situation, feels that he could – at least, eventually – respond effectively to the challenges of addressing areas for improvement and identifying a new path, and feels deeply supported by his friends and family members. Two years later, a few months after graduating from university, Sam is filling out an application for a program in genetic counselling. Multiple aspects of this new experience are similar to his experiences leading up to, and including, his rejection from the honours biology track, activating this memory outside of his conscious awareness. Because his basic psychological needs were satisfied during this negative experience, a representation of need satisfaction remains attached to his episodic memory of rejection, which boosts his wellbeing in the here-and-now. As he continues to work on applications throughout the fall, this unconscious process is frequently repeated, supporting a positive trajectory of wellbeing across his transition from university.

Goals, Need-Satisfying Growth Themes in Narrative Identity, and Changes in Wellbeing in the Transition from University

Another pathway through which trait autonomy could facilitate need satisfaction with respect to memories of negative goal-related experiences and contribute to positive trajectories of wellbeing across the transition from university is by facilitating themes of personal growth in the narratives graduates construct to make meaning from these experiences. Narrative identity is the continuously evolving story of an individual's life, a story that organizes the reconstructed past, experienced present, and imagined future into a coherent whole that imbues the self with unity, meaning, and purpose (McAdams, 2001; McAdams & McLean, 2013). Ultimately, the role of a unified, meaningful, and purpose-filled life story is to support psychological wellbeing across the lifespan (Adler, 2012, 2019; Adler et al., 2015). This hypothesis is supported by a recent review of thirty studies that demonstrated the incremental validity of narrative themes, particularly those associated with affect, motivation, and integrative meaning-making, in predicting present and future wellbeing above and beyond the effects of the Big Five personality traits and various situational variables (Adler et al., 2016). Additional evidence consistent with a causal influence of narrative identity on wellbeing comes from a key study in which changes in narrative identity

over a 12-week course of psychotherapy preceded changes in mental health symptoms (Adler, 2012) and from a recent study in which the causal coherence in turning point narratives predicted increases in life satisfaction over one year in a sample of mid-adolescents (Mitchell et al., 2020).

Though little is known concerning *how* narrative identity influences wellbeing over time (Adler, 2015, p. 492), recent research indicates that it may be particularly important *when* individuals face new, difficult, or destabilizing life experiences (Adler, 2019; Adler et al., 2015, Habermas & Köber, 2015; Mason et al., 2019). For example, Adler and colleagues (2015) invited participants from an epidemiologically representative, community-based sample to complete an abbreviated Life Story Interview (McAdams, 2008) and coded narratives from this interview for themes associated with wellbeing in cross-sectional and brief longitudinal studies. Half of participants (Group 1) received a diagnosis of a serious health problem (e.g., cancer) within six months of this baseline assessment, while the other half (Group 2) remained healthy for the duration of the two-year study. Results revealed that narrative themes of redemption, agency, and communion collected prior to diagnosis predicted positive trajectories of mental health in Group 1 but had no effect on mental health trajectories in Group 2. Similar results have been reported in recent studies comparing mothers of children with autism spectrum disorder vs. mothers of typically developing children (Mason et al., 2019) and adults who had experienced a high vs. low frequency of disruptive biographical transitions over the past four years (Habermas & Köber (2015).

If the potential of narrative identity to influence the course of wellbeing in adulthood is activated when individuals face new or difficult experiences, then narrative themes associated with unified, meaningful, and purpose-filled life stories should contribute to positive trajectories of wellbeing amidst the complexity and challenge of the transition from university. Previous research points to many narrative themes that fit this description, from widely studied themes like redemption, contamination, agency, and communion (McLean et al., 2020) to less frequently studied themes such as crystallization of desire vs. discontent (Bauer et al., 2005). In the present study, we focused on the single narrative theme of *growth*, which reflects an individual's interpretation that an event (or its consequences) has caused a positive change or development in the self, or led to the realization of positive lessons or insights that enhance the self in some way (McLean et al., 2020). Several previous studies have reported positive associations between growth themes and wellbeing (e.g., Lilgendahl & McAdams, 2011; Mansfield et al., 2015; Pals, 2006; Whitehead & Bates, 2016). Further, from the perspective of SDT, growth themes are inherently need-satisfying because personal growth is a fundamentally intrinsic goal, whose achievement is its own reward (Ryan et al., 1996). Thus, we reasoned that need-satisfying growth themes would be ideal for capturing graduates' attempts to bring unity, meaning, and purpose to memories of negative goal-related experiences and expected that they would predict positive trajectories of wellbeing across the transition from university.

For example, imagine that Sam, our hypothetical graduate, receives a letter of rejection from his first-choice genetic counselling program in the spring following his graduation from university. Crestfallen, Sam walks around his neighborhood and reflects on his memory of being rejected from the honours biology program while in university. Over the years, Sam has come to understand this painful experience as the catalyst for the development of a more balanced and effective approach to his school work and responsibilities. As a result, he has realized not only that he can overcome challenges, but that challenges can help people develop in positive ways. As other letters arrive, Sam consciously draws on the growth themes he has inscribed on this earlier memory of rejection to help maintain his wellbeing as he navigates this challenging phase of his transition from university.

Trait Autonomy, Need-Satisfying Memories of Negative Goal-Related Experiences, and Wellbeing in the Transition from University

The research literatures related to episodic memory need satisfaction (e.g., Philippe et al., 2012) and narrative identity (e.g., McAdams, 2013; McAdams & McLean, 2013) conceptualize traits and the processes with which they themselves are centrally concerned as distinct aspects of personality – the former relatively stable across time and situations, and the latter highly contextual, dynamic, and reflective of information about the self that is different than that captured by dispositional tendencies, general attitudes, or general self-knowledge. Accordingly, empirical studies associated with both literatures have shown that traits and their processes of interest exert independent effects on wellbeing (Adler et al., 2015; McAdams, 2013; McAdams & Pals, 2006; Philippe & Bernard-Desrosiers, 2017; Philippe et al., 2011a; 2012; Philippe et al., 2013). However, both literatures also contain suggestions that stable aspects of personality could shape or influence memory processes in meaningful ways (Houle & Philippe, 2020; McLean et al., 2020; Pals, 2006; Philippe & Bernard-Desrosiers, 2017).

In the present study, we propose that trait autonomy should facilitate the encoding of higher levels of need satisfaction in graduates' episodic memories of negative goal-related experiences, as well as the emergence of need-satisfying growth themes in the narratives they construct from these experiences. Previous research indicates that more autonomous individuals have stronger tendencies to accept, integrate, and respond non-defensively to negative or threatening information about the self (Knee & Zuckerman, 1996, 1998; Legault & Inzlicht, 2013; Neighbors & Knee, 2003; Weinstein et al., 2011, 2012). Through these tendencies, higher levels of trait autonomy should help individuals experience higher levels of need satisfaction in the midst of negative goal-related experiences, which should subsequently be encoded as experiential components of episodic memories summarizing these experiences. For example, greater acceptance of his original rejection should increase the freedom that Sam, our hypothetical graduate, feels to consider new paths and possibilities (autonomy need satisfaction). Non-defensive integration of this experience with his developing sense of self should include acknowledging areas for self-improvement, a process that promotes felt effectiveness in responding to a challenging situation (competence need satisfaction). Non-defensive responses should also help Sam seek out and be sensitive to supportive responses from others (relatedness need satisfaction) at the time of his rejection.

Likewise, tendencies towards accepting, integrative, and non-defensive responding should also increase the likelihood that individuals like Sam will learn from their negative goal-related experiences. Moreover, learning – about what one could have done differently, or one's own responses to failures and setbacks – is a prerequisite for the lessons, insights, and self-enhancing behavioral changes and positive development that connote growth. Due to their tendencies towards interest-taking, more autonomous individuals are more likely to do the effortful, sophisticated, cognitive work of self-reflection that is needed for the emergence of a clear narrative theme of integrative meaning-making like growth in the days, weeks, months, and even years following an initial negative event (Adler, 2019; McLean & Lilgendahl, 2019).

The Present Study

To test these hypotheses, we collected baseline levels of trait autonomy between January and April during graduates' final semester of university. The following October, graduates were invited to describe a memory of a negative goal-related experience and to rate the degree to which their basic psychological needs had been satisfied during this experience. To ensure that memories were relatively recent and negative in their overall valence, we requested that graduates describe a particular kind of past negative goal-related experience: Facing an

unattainable goal during their university years. Unattainable goals, and with them attendant experiences of failure and stagnation, are negative experiences typically associated with psychological distress (Carver & Scheier, 1990, Wrosch, Scheier, Miller, Schulz, & Carver, 2003) and thus provide a stringent test of the idea that dispositional autonomy can facilitate need satisfaction and growth themes even in the midst and aftermath of difficult experiences. As in Study 1, wellbeing was measured at baseline (final term; T1), Wave 2 (the following October; T2), Wave 3 (the following January; T3), and Wave 4 (the following July; T4).

As in Study 1, we adopted a three-factor representation of trait autonomy including authorship/self-congruence, susceptibility to control, and interest-taking. Given that more autonomous individuals are conceptualized as being higher in authorship and interest-taking, and lower in susceptibility to control, we expected that authorship/self-congruence and interest-taking would predict higher, and susceptibility to control would predict lower, levels of memory need satisfaction. In addition, we expected that authorship/self-congruence and interest-taking would predict higher, and susceptibility to control would predict lower, levels of growth in graduates' memory narratives. In line with previous research, we expected that higher levels of memory need satisfaction and stronger themes of growth would independently predict positive trajectories of wellbeing across the study span. In the key test of our general hypothesis, we expected that the facets of trait autonomy would exert positive, indirect effects on graduates' trajectories of wellbeing via higher levels of memory need satisfaction and growth, respectively.

Methods

Participants and Procedures

As in Study 1, Study 2 participants had to have graduated according to official university records by T2 and be between the ages of 18-30 years. In addition, to be included in Study 2, participants had to have provided a written narrative of a memory of an unattainable university goal at T2. This criterion was imposed to ensure the face validity of participants' self-reported ratings of memory need satisfaction and researcher-coded growth scores.

Of the 153 graduates who met these criteria, additional participants were excluded from Study 2 because their narrative indicated that they had achieved all of their university goals, because they explicitly stated that the memory they described was not important to them, because they indicated "NA" or "rather not say," or because they provided an unclear response (e.g., "it did").

The final sample included 110 participants (73.6% female, *M*age = 23.39, *SD* = 2.01) ranging from 21 – 30 years). The majority reported that they were born in Canada (70.9%) and spoke English (46.4%) or French (21.8%) as their mother tongue. Over half (62.7%) of participants identified as White (9.1% Chinese; 10.0% South Asian; 6.4% Arab; 4.5% Black; 6.4% Latin American; 4.5% Southeast Asian; 0.9% Filipino; 0.9% Aboriginal; 0.9% Korean; 0.9% Japanese; and 6.4% another population group). About half of participants' mothers (47.3%) and fathers (49.1%) had completed a bachelor's, master's, or doctorate/professional degree and 42.7% reported that their parents' annual income fell between $50,000 – $124,999.00 CAD during the last year (range = *less than* $5,000.00 to $200,000.00 CAD *or greater*). Of the eligible sample at T1, all (*N* = 110) participated at T2 by virtue of our additional inclusion criterion, 95 (86.41%) participated at T3, and 92 (83.6%) at T4. As in Study 1, the sex, ethnicity, and socio-economic status variable distributions of the sample were stable across the waves (Appendix E). There were no significant demographic differences (e.g., sex, racial identity, subjective SES, mother tongue, country of origin) or differences on key study variables (e.g., trait autonomy, wellbeing outcomes) between included vs. excluded individuals.

Measures

Trait autonomy. At T1, the authorship/self-congruence (α = .75), susceptibility to control (α = .76), and interest-taking (α = .82) facets of trait autonomy were measured as in Study 1.

Unattainable goal memory. At T2, participants were asked to write about an unattainable goal they had faced in university. First, participants read the following definition of an unattainable goal, adapted from Wrosch, Scheier, Miller, Schulz, & Carver (2003):

An unattainable goal is one that you are not able to achieve, no matter how much effort you put into pursuing the goal. Sometimes, you decide that it's time to let the goal go. Other times, other people or events that are beyond your control decide this for you. Goals can become unattainable for many reasons, such as illness, injury, lack of support, conflicts and competition among goals you are currently pursuing, and lack of resources, time, or the skills you need to achieve the goal.

Next, participants read the following writing prompt, adapted from McAdams (2008):

We would like to know about one goal you let go during your years in university. This goal could come from any area of your life, from relationships, to academics, to work and career, to leisure, to your sense of identity, or any other domain. Maybe you decided to distance yourself from this goal, or maybe someone or some event decided you would not be able to achieve it. Please think about this goal carefully and write at least a paragraph or two about your experience in the space below. Please include all of the following in your description of the experience: When did this experience occur? What were you trying to achieve? Why was the goal unattainable? Who or what decided that the goal was unattainable? Who (else) was involved? What were you thinking, feeling, and wanting in the experience? Why do you think that this is an important event in your life story? What does this event say about who you are?

Most goal descriptions focused on future career or academic pursuits:, 22.7% focused on career or work, 20.9% on an advanced degree, 18.2% on academics. Other unattainable goals involved a variety of personal pursuits: 8.2% on travel, 5.5% on health, physical appearance, or weight loss, 4.5% on athletics, and 3.6% on completing a co-op program, family and relationships, arts, and self-development or understanding, respectively. Three graduates (2.7%) reported unattainable goals related to independence (e.g. financial independence, moving out of parents' home, driver's license), two (1.8%) focused on language acquisition, and one (.9%) focused on volunteering/community contribution.

We note that graduates whose memories did not adhere strictly to the definition of an unattainable goal we provided, but nevertheless described a negative goal-related experience, were retained. For example, this 22-year-old graduate described emotional ambivalence and confusion in the midst of the process of realizing that he or she was no longer passionate about a long-held career goal:

I had a goal of being a genetic counsellor, I realized it wasn't something I wanted once I volunteered at a counselling center and I couldn't deal with taking anymore calls. I was sad that I felt this way but I knew it was a competitive program that was difficult to enter and that I didn't have the adequate requirements. I talked to my boyfriend about it and I understood he felt upset for me but I don't know what else to say. Now, I feel rather lost in my life and I don't have a goal other than to work as a research assistant.

Memory Need Satisfaction. After writing down their memory, participants were asked to rate the level of need satisfaction they recalled having experienced at the time they faced their unattainable goal. As in previous research (e.g., Philippe et al., 2011a, b; Philippe & Bernard-Desrosiers, 2017) two items corresponded to each need [(e.g., "I felt free to do things and think how I wanted" (autonomy), "I felt competent or capable" (competence), and "I felt connected to one or more people" (relatedness)]. Items were rated on a 7-point Likert-type scale from 1

(strongly disagree) to 7 (*strongly agree*). Averaging across needs, the mean need satisfaction rating for unattainable goal memories was 4.23 (range = 1 – 7; *SD* = 1.31). Cronbach's alpha for the full scale was satisfactory (α = .84).[1]

Growth Themes. Narrative coding of growth was based on the procedure outlined by McLean et al. (2020), which was adapted from several previous studies (Bauer et al., 2005; Lilgendahl & McAdams, 2011; McLean & Thorne, 2003, Pals, 2006; Singer et al., 2007). In this approach, growth is defined as "any kind of positive change, development, new insight or lesson, etc., that enhances the person in some way" and could occur as a direct result of the past event itself, from succeeding events, or from the experience of reflecting on the event. A rating of 1 was assigned to narratives that contained no evidence of growth. A rating of 2 was assigned if growth was suggested in the narrative, but was unelaborated, unimportant, or merely implicit/possible. A rating of 3 was assigned if growth was clearly present in the narrative, but was not important, elaborated, and transformative. Finally, a rating of 4 was assigned if growth was a highly important, elaborated, and transformative theme in the narrative. To establish the reliability of the coding scheme, we followed best practice recommendations of Adler et al. (2017) and Syed and Nelson (2015) for the "Master Coder" approach. In a first step, the primary coder, the secondary coder, and an expert in developmental psychology and emerging adulthood met to discuss the coding scheme and practiced coding a randomly selected 10% of the narratives. Next, the primary and secondary coders independently coded an additional 30% of the narratives, exceeding the typical benchmark of 20% due to our relatively small sample (Syed & Nelson, 2015). We then calculated the intraclass correlation coefficient (*ICC*) for these two sets of codes. Specifically, we selected a two-way random effects model for a single rater with absolute agreement. The *ICC* for growth was .76, 95% CI [.419, .895]. Codes assigned by the primary coder were used in all subsequent analyses. The average rating assigned for growth was 2.17 (range = 1 – 4; *SD* = 1.04).

For example, the following memory, from a 21-year-old female graduate, was coded 1 because it contains no evidence of positive change, development, or learning:

My goal was to become a doctor and get admitted into med school. I got rejected from all the med schools in (redacted). I realized maybe this goal could not be achieved when I learned about others who got rejected. These people were better than me in every way (grades, volunteer experience, research experience) and I realized that even if I took a year or two to build and improve my CV, I couldn't catch up. I felt stupid and ignorant for thinking there was a possibility I could get in and for putting all my eggs in one basket. I felt lost because I no longer knew what

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[1] Previous research on the experiential component of episodic memory has typically rated need satisfaction on a scale ranging from -3 (*strongly disagree*) to 3 (*strongly agree*), with the value 0 reflecting the response *do not disagree or agree or not applicable* (e.g., Philippe et al., 2012). In past studies, values below 0 have been referred to interchangeably as indicating either low need satisfaction or need frustration. Recently, however, theoretical and empirical developments in the field of SDT have brought about a consensus that need satisfaction and frustration are distinct constructs with distinct antecedents and consequences, which can be measured using distinct sets of items (Bartholomew et al., 2011; Chen et al., 2015; Vansteenkiste & Ryan, 2013). In order to align our research with these developments, we asked participants to rate need satisfaction items from 0 to 7 to reflect low to high levels of need satisfaction, specifically. Nevertheless, we see need frustration as potentially a very important element of episodic memories of unattainable goals that could be predicted by levels of trait autonomy. We address these issues in our discussion.

I could do with my future. This is an important event in my life story because since I was 17 years old I said I wanted to become a doctor. I told everyone and now everyone knows I failed.

The following memory, from a 28-year-old male graduate, was coded 2 for growth because the narrative outlines a clear discrepancy between the kind of person the graduate believes himself to be vs. the decision he made to abandon his weight gain goal in order to safeguard his health and other goals. Discrepancies between one's sense of self and one's actions and decisions present an opportunity for accommodative processing and integrative meaning-making, from which themes like growth may emerge. Having set up an antithesis, this narrator seems to be on the cusp of synthesis – an articulation of what this experience meant or revealed about life or the narrator that could enhance his or her life in the future. However, this synthesis never comes. Thus, growth in the memory is merely a potential.

[O]ne of my goal was to gain weight and be 170 pounds. In order to achieve my goal, I had to exercise 6 times a week and do heavy weight training. However, I injured myself by lifting weight with an unproper form in which I injured my lower back. After several physiotherapy, arcupuncture, chiropractor, and ostheopath, none of these medical help cured my back pain. I decided myself that I had to let go of that goal since it was not achievable with the back pain and to not further make the injury worst. I was very upset and disappointed since I am kind of person who has a goal and do what ever it takes to achieve it. once I gave my 110% and all the solutions possible, I cannot regret giving up my goal. It is important for me because like I mentioned above, im type of person who sets a long or short term goals and achieve it. Does not matter how long it takes, because I know I will achieve it. In this case, I had to choose between my health and my future. I could not afford to get my lower back pain worst in which it could prevent me to achieve other important goals.

The next memory, recounted by a 24-year-old female graduate, was coded 3 because the theme of growth is clearly present in the narrative. Indeed, this graduate describes realizations concerning her priorities and the quality of her motivation for academic achievement that, when acted upon, enhanced her life. However, the description of change that took place in the graduate is not elaborated, nor does she indicate that it transformed her.

One of my goals throughout university was to make the Dean's list at least once. I always came very close to making it, but never really did. Eventually, I realized the effort I would need to put into achieving that goal would not be worth what I would attain that goal. But mostly, I wouldn't be worth giving up seeing my friends, spending time with my family or boyfriend (who has since become my ex). I wanted it for the recognition, and for my pride. But eventually, when I did decide that making the dean's list was just not for me, I was able to appreciate my high grades for what they were, instead of looking at the very small gap between my final grades and the GPA I needed to be on the Dean's list. I was already spending an incredible amount of time on my studies, and for the sake of my personal well-being decided it would be for the best if I just let go. If it happened, great, but it wasn't a goal I actively pursued after my fourth year, as I become more and more involved in extra-curricular activities.

Finally, this memory, from a 25-year-old female graduate, was coded 4 for growth because it charts a journey from submissive behavior in a selfish and stifling romantic relationship to a deep realization concerning the full potentials of a healthy partnership, one characterized by mutual support and resilience to growth and change as individuals. Much more than a lesson about what to avoid next time, this memory contains a transformative insight about what to seek in future relationships that seems likely to enhance this graduate's wellbeing in enduring ways as she journeys to adulthood.

One of my main goals in university was to study abroad. The thought really excited me and I was ready to do it, had even gone to several meetings about studying abroad. I had gone to a few meetings in my first year, in the second semester. I started dating someone who became my serious boyfriend (we have since broken up but were together for two years). He convinced me not to study abroad, as he thought the distance would affect our relationship detrimentally. I convinced myself that this was fine, and that staying with him was more important. This is one of my greatest regrets to date. I let him hold me back from an experience that I guarantee would have helped me grow as a person and made my university experience even better. I think this experience taught me that another person's jealousy and insecurities should not hold me back from doing something great. If they're really the person for me, then they would encourage me to experience new things even if it's by myself, because if you can still grow while apart but stay together, it'll show how strong your relationship really is.

Wellbeing. As in previous research on episodic memory need satisfaction (Lekes et al., 2014; Philippe et al., 2011a; 2012) and the narrative theme of growth (Lilgendahl & McAdams, 2011; Mansfield et al., 2015; Pals, 2006; Whitehead & Bates, 2016), we examined a variety of indicators of wellbeing. At each wave, participants completed the *Purpose in Life* scale from Ryff's Scales of Psychological Wellbeing (PIL; Ryff, 1989, 2014), the *Center for Epidemiologic Studies Depression Scale* (CES-D; Radloff, 1977), and the *Rosenberg Self-Esteem Inventory* (RSE; Rosenberg, 1965). The 14-item PIL measures respondents' typical degree of purpose in life (e.g., *I have a sense of direction and purpose in life*) using a 6-point Likert-type scale ranging from 1 *(strongly disagree*) to 6 (*strongly agree*). The CES-D is a 20-item instrument that measures respondents' depressive symptoms over the past week using a 4-point Likert-type scale ranging from 0 (*rarely or none (less than one day)*) to 3 (*most of the time (5-7 days)*). Recent work on the factor structure of the CES-D supports a three subscale version that reflects the multidimensionality of depression and includes a 4-item *Negative Affect* subscale (e.g., *I felt sad.*), a six-item *Somatic Symptoms* subscale (e.g., *My sleep was restless.*), and a 4-item *Anhedonia* subscale (e.g., *I enjoyed life (reversed;* Carleton et al., 2013). All items in the updated CES-D Anhedonia subscale are positively worded and are typically reverse scored prior to inclusion in the full scale score. Finally, the RSE is a 10-item instrument that measures general self-esteem (e.g., *I feel that I am a person of worth, at least on an equal plane with others)* using a 4-point Likert-type scale ranging from 0 (*strongly disagree*) to 3 (*strongly agree*).

Given the relatively small sample size for Study 2, we created a global wellbeing outcome variable that included items from each of the scales described above. Five positively worded items of the RSE, the seven positively worded items of the PIL, and all four items of the CES-D *Anhedonia* subscale (e.g., *I felt that I was just as good as other people*; *I felt hopeful about the future*; *I felt happy*; *I enjoyed life*) were combined to create this global variable. Preliminary analyses in SPSS indicated that these items demonstrated excellent internal consistency after scores from each set of items were standardized and averaged (αs = .92, .91, .92, .93 at Times 1, 2, 3, and 4, respectively). We provide additional details concerning the final composite variable, which was derived based on longitudinal confirmatory factor analyses and tests of longitudinal measurement invariance, in the Analyses section.

We note that participants completed self-report ratings for each wellbeing construct prior to the elicitation of unattainable goal memories to ensure that activation of their memories did not influence these ratings, as per recommendations by Philippe et al. (2015).

Covariates. The effects of participant sex (coded 0 = male, 1 = female) on the wellbeing composite were included in predictive analyses to reflect the well-established cross-cultural

effects of sex on self-esteem (Bleidorn et al., 2016) and symptoms of depression (Gater et al., 1998; Seedat et al., 2009).

Analyses

Model Evaluation and Estimation

As in Study 1, measurement models were estimated using M*plus* 8.0's (Muthén & Muthén, 2017) robust weighted least square estimator (WLSMV). Unconditional and conditional LCMs were estimated with M*plus* 8.0's robust maximum likelihood estimator (MLR; Muthén & Muthén, 2017) because these models used factor scores saved from the model of strict measurement invariance. Model fit was evaluated as in Study 1.

As in Study 1, reporting, analysis, and assessment of the implications of missing data were conducted in SPSS according to best practices outlined by Enders (2010, 2011). Missing data in the forms of attrition, wave nonresponse, variable nonresponse, and item non-response were present across the four waves of the study. One hundred and ten participants completed a total of 440 time-specific questionnaires, with 98 (89.1%) providing responses on at least three of four measurement points. Of those eligible at T1 and T2, 95 (86.4%) completed questionnaires at T3 and 92 (83.6%) at T4. Variable non-response within wave was below 5.0% for all variables except the wellbeing composite at T4 (5.4%). Variable non-response across the waves was below 5.0% for all variables except the wellbeing composite at T3 (14.5%) and T4 (20.9%).

Preliminary analyses indicated that missingness on the wellbeing composite was unrelated to participants' demographic characteristics (e.g., age, sex, racial identification, or subjective socioeconomic status) or to study variables, with the following exceptions: graduates with missing data on the wellbeing composite at T3, $t(107) = 2.13$, $p = .036$, and at T4, $t(107) = 2.00$, $p = .049$, had higher baseline scores on susceptibility to control. Given these associations, we note that findings may not fully generalize to graduates with higher levels of this facet of trait autonomy. We had no reason to suspect that missingness on the wellbeing composite was systematically related to the missing values themselves. Therefore, we proceeded under the assumption that the data were missing at random (MAR; Rubin, 1976). To handle missing responses, we estimated measurement models and predictive models using algorithms associated with WLSMV estimation (Asparouhov & Muthén, 2010) and on Full Information Maximum Likelihood procedures for MLR (Enders, 2010), both of which rely on missing at random assumptions.

Preliminary Analyses

First, we estimated longitudinal Confirmatory Factor Analytic (CFA) models to verify the a priori factor structure of study variables across the four waves. As part of this process, we estimated two full longitudinal models, one with a traditional CFA representation for wellbeing at each wave and another with a bifactor-CFA representation for wellbeing at each wave. Bifactor models (Morin, Arens, et al., 2016) partition the covariance among a set of indicators from related subscales into covariance explained by a global factor, which underlies responses to all indicators (G-factor), and covariance explained by a set of specific, orthogonal factors beyond that explained by the G-factor (S-factors). As such, bifactor models test whether there is a single global construct that influences responses to all items and whether meaningful specificity remains located at the subscale level once the global factor is accounted for (Morin, Arens, et al., 2016). In the present study, this approach seemed particularly well-suited to the estimation of a single global indicator of wellbeing while accounting for subscale specificity in the model and is well-aligned with previous research evidence supporting the value of a bifactor representation of psychological wellbeing (Morin, Boudrias et al., 2016, 2017).

The solution that incorporated a bifactor representation of wellbeing demonstrated substantially better fit to the sample data than the alternative CFA solution and was thus retained for subsequent analyses (Table 4). This model included three factors reflecting the three facets of trait autonomy (T1), one factor representing memory need satisfaction (T2), and one factor representing global wellbeing (G-factor) and three orthogonal factors representing purpose, happiness, and self-esteem (S-factors) at each of the four waves, for a total of twenty correlated factors. We note that, as a single-indicator variable, growth (T2) was incorporated into the final predictive model as a manifest variable. Covariances between simultaneously measured predictors (e.g., the three facets of trait autonomy at T1) were also included in the model. To avoid converging on inflated stability estimates (Marsh, 2007; Mitchison et al., 2015), the model incorporated a priori correlated uniquenesses between matching wellbeing indicators at each wave.

Next, we conducted tests of longitudinal measurement invariance for the full longitudinal bifactor CFA model according to the procedure described in Study 1. The model achieved full longitudinal measurement invariance as indicated by decreases in CFI and TLI that were less than or equal to .010, and increases in the RMSEA less than or equal to .015 across models (Table 4). Based on these results, we retained the model of strict invariance as the basis for the unconditional and conditional LCMs. Parameter estimates from this model and estimates of composite reliability (McDonald's (1970) ω, using the model standardized factor loadings (λi) and uniquenesses (δii) as $\omega = (\Sigma|\lambda i|)2 / ([\Sigma|\lambda i|]2 + \Sigma\delta ii)$ are reported in Appendix F. All ω were satisfactory (.756 to .966; $M = .795$).

To maximize power, we saved factor scores, which are estimated in standardized units ($M = 0$, $SD = 1$), from the model of strict measurement invariance for use in our main analyses. Unlike scale scores (i.e., the average or total of subscale items), factor scores incorporate partial control for measurement error by giving more weight to more reliable items and preserve the structure of the measurement model from which they are taken (e.g., bifactor structure, measurement invariance; Devlieger & Rosseel, 2017; Morin, Boudrias, et al., 2016, 2017; Skrondal & Laake, 2001). Of these factor scores, we retained those associated with the facets of trait autonomy (T1), memory need satisfaction (T2), and global wellbeing (G-factor; T1, T2, T3, T4) alone for our main analyses. This strategy brought the total number of repeatedly measured outcome variables from sixteen to four. Bivariate correlations among these factor scores are reported in Appendix H.

Main Analyses

First, we estimated unconditional LCMs for global wellbeing using data from T1, T2, T3, and T4. As in Study 1, the true passage of time was coded in increments of 0, .7, .9, and 1.4, respectively, to reflect unequal lags of roughly eight, 11, and 17 months between measurement occasions. In these LCMs, two latent growth parameters – the latent intercept (baseline) and latent slope (average rate of change across the measurement occasions) – were used to define the individual trajectories. After contrasting the fit of linear and quadratic (involving the estimation of an additional slope factor defined by squared time codes) unconditional LCMs (Appendix G), we retained the quadratic LCM for subsequent analyses.

Building on this model, we estimated a conditional LCM that incorporated our hypothesized predictors (Figure 3). To test our main hypotheses concerning indirect effects of trait autonomy on wellbeing trajectories, the model included (i) direct effects of the three facets of trait autonomy (T1) on memory need satisfaction and growth (T2) and (ii) direct effects of memory need satisfaction and growth on the linear and quadratic slope factors for global wellbeing (T1, T2, T3, and T4). To test our secondary hypothesis concerning direct effects of

trait autonomy on the wellbeing trajectories, the model also included (iii) direct effects of the three facets of trait autonomy and participants' sex on the random intercept, linear slope, and quadratic slope factors of global wellbeing. Covariances between the facets of trait autonomy, between memory need satisfaction and growth, and between the latent growth factors were included in the model (Cole & Maxwell, 2003).

Finally, we requested estimates of all possible indirect effects of each facet of trait autonomy on the linear and quadratic slope of global wellbeing via memory need satisfaction and growth. Indirect effects were calculated as the product of the path coefficients associated with each component of the mediational chain. As in Study 1, the statistical significance of these indirect effects was assessed via bias-corrected bootstrap confidence intervals based on 1000 bootstrap samples (CI; e.g., Cheung & Lau, 2008; MacKinnon et al., 2004).

Results

Figure 4 summarizes results from the final conditional quadratic LCM. Authorship/self-congruence positively predicted memory need satisfaction, while interest-taking positively predicted narrative themes of growth in memories of unattainable university goals. Susceptibility to control was unrelated to either of the proposed mediators. Memory need satisfaction positively predicted the linear slope of global wellbeing and negatively predicted its quadratic slope. Although the effects of memory growth on the linear ($\beta = .241$, $p = .093$) and quadratic ($\beta = -.272$, $p = .076$) slope of wellbeing were in the same direction as those of memory need satisfaction, these effects were not statistically significant.

To interpret the effects of memory need satisfaction on trajectories of wellbeing, we plotted the average trajectory of global wellbeing for individuals whose level of memory need satisfaction corresponded to (i) the sample mean, (ii) one *SD* above the mean, and (iii) one *SD* below the mean for memory need satisfaction. These plots, displayed in Figure 5, demonstrate that individuals with higher levels of memory need satisfaction tended to experience the most favorable wellbeing trajectories across the transition from university. More precisely, whereas all individuals in this sample declined in wellbeing over the course of the study, those high in memory need satisfaction decreased the least and remained the highest over the course of the study. In contrast, those low in memory need satisfaction decreased the most and remained the lowest in wellbeing over the course of the study. However, the benefits associated with high memory need satisfaction and the risks associated with low memory need satisfaction were stronger in the earlier part of the transition from university.

Results also revealed several direct effects of the facets of trait autonomy on trajectories of global wellbeing. First, authorship/self-congruence had a strong positive effect, susceptibility to control a relatively weak negative effect, and interest-taking a negligible effect on the intercept of the global wellbeing trajectories. These findings indicate that graduates with higher levels of authorship/self-congruence started their transition from university with higher levels of global wellbeing, whereas graduates with higher levels of susceptibility to control started their transition with lower levels of global wellbeing. Interest-taking did not have a direct effect of the level of global wellbeing graduates reported during their final semester.

Furthermore, authorship/self-congruence negatively predicted the linear slope factor and positively predicted the quadratic slope factor of the global wellbeing trajectories. To interpret this second set of effects, we again plotted the average global wellbeing trajectory for individuals whose level of authorship/self-congruence corresponded to (i) the sample mean, (ii) one *SD* above the mean, and (iii) one *SD* below the mean for authorship/self-congruence. These plots, presented in Figure 6, demonstrate that graduates with higher levels of authorship/self-congruence in their final semester experienced the most favorable global wellbeing trajectory

across the transition from university. More precisely, whereas all individuals in this sample declined in global wellbeing, those high in authorship/self-congruence started higher and remained higher in wellbeing over the course of the study. Furthermore, the (already mitigated) declines experienced by those higher in authorship/self-congruence started to slow down around December/January of the year following graduation. In contrast, those average in authorship/self-congruence continued to decline at a steady rate and those low in authorship/self-congruence experienced an acceleration in their rate of decline around the New Year.

Taken together, results from the final conditional quadratic LCM suggested the presence of two distinct mediated paths, both of which were associated with statistically significant indirect effects. First, the association between authorship/self-congruence and the linear slope of global wellbeing was mediated by graduates' levels of memory need satisfaction (indirect effect = .126; CI = .010 to .353). Second, the association between authorship/self-congruence and the quadratic slope of wellbeing was also mediated by memory need satisfaction (indirect effect = -.074; CI = -.235 to -.001).

The results (R^2) show that the facets of trait autonomy explained 28.1% of the variance in memory need satisfaction but only .50% of the variance in growth themes. In addition, the facets of trait autonomy and memory need satisfaction and growth, taken together, were able to explain 18.1% of the variance in linear changes in global wellbeing and 64.4% of the variance in quadratic changes in global wellbeing. Finally, direct effects of the facets of trait autonomy were able to explain 74.0% of the variance in initial levels of global wellbeing.

Discussion

Overall, the results of Study 2 supported the hypothesis that trait autonomy contributes to positive trajectories of wellbeing in the transition from university via mechanisms involving need satisfaction, past goal pursuits, and memory. In addition, Study 2 revealed direct effects of trait autonomy on wellbeing that were not mediated by memory processes, suggesting the presence of additional pathways by which trait autonomy may support need satisfaction and wellbeing in this transition. However, while results offered strong support for the first mediated pathway we proposed (i.e., via representations of need satisfaction in episodic memories of unattainable goals), support for the second was weaker. More autonomous graduates subsequently narrated their experiences of facing unattainable university goals with stronger themes of growth, but the effects of growth themes on trajectories of wellbeing were not statistically significant. In addition, results revealed unexpected facet-specific effects on the proposed mediating processes as well as on our global wellbeing outcome variable. Here, we discuss developmental, theoretical, and practical implications of the findings from Study 2, as well as strengths, limitations, and directions for future research.

Trait Autonomy, Need Satisfaction in Memories of Unattainable University Goals, and Wellbeing in the Transition from University

The key finding of Study 2 is that graduates who reported higher levels of trait autonomy (specifically, authorship/self-congruence) in their final semester of university subsequently reported stronger representations of need satisfaction in their memories of unattainable university goals, which, in turn, protected them from the normative declines in global wellbeing observed in the sample as a whole. These findings align with our hypothesis that the accepting, integrative, and non-defensive tendencies stemming from trait autonomy facilitate need satisfaction in the midst of negative goal-related experiences, which, having been encoded as experiential components of episodic memories, contribute to positive trajectories of wellbeing through repeated unconscious activation during the transition from university.

From a developmental perspective, these findings are important because they suggest that more autonomous graduates approach their transition with an advantage: need-satisfying memories that support their wellbeing via processes occurring outside of their conscious awareness. This possibility is reminiscent of archetypes of the quest in myth and literature, in which the hero or heroine packs a few supplies in a bag before taking to the road. In this case, however, in addition to water, food, a cloak, and a dagger, the more autonomous quester's satchel also contains a memory that, although it was not brought on purpose, nevertheless plays a pivotal part in the success of the journey.

Though not the focus of our study, it is also worth noting that most graduates were able to describe facing an unattainable goal during their years in university, a finding that provides additional support for the idea that unattainable goals are a relatively common phenomenon (Bauer, 2004). A handful of graduates wrote about destabilizing experiences in which their goals shifted after they learned about the realities of chosen paths from peers or personal experience. Because these memories belong within the larger class of negative goal-related memories we wanted to study, we retained them for analysis. From a developmental perspective, the fact that a few graduates responded to our writing prompt in this way is consistent with the idea that change and instability – in relationships, work, and worldview – are normative aspects of the transition to adulthood (Arnett, 2004) and with the complementary idea that lifespan capacities to change the environment in which one develops (i.e., capacities for primary control) likely peak during the twenties (Heckhausen et al., 2010).

From a theoretical perspective, these findings are important because they identify a possible dispositional antecedent for the process by which stronger representations of need satisfaction are encoded with episodic memories, a possibility that has been suggested, but never before demonstrated in this literature (Philippe & Bernard-Desrosiers, 2017). The findings also provide new empirical evidence that elaborates upon Philippe and his colleagues' (Houle & Philippe, 2017; Philippe & Bernard-Desrosiers, 2017; Philippe et al., 2012) theory of memory need satisfaction and changes in wellbeing. Historically, longitudinal tests of this model have revealed *promotive* effects of memory need satisfaction (e.g., prospective associations between memory need satisfaction and increases in wellbeing). To our knowledge, this study is the first to show that memory need satisfaction can also have *protective* effects on changes in wellbeing, as well. Interestingly, the protective effect we observed was stronger in the earlier months of the study than in its later months. If, as we assume, the overall effect of memory need satisfaction on changes in wellbeing across the transition from university is driven by the frequent activation of negative goal-related memories outside of conscious awareness, then the fading of this effect likely indicates that these memories are activated with less and less frequency as the transition unfolds, an interpretation that awaits confirmation in future research.

In combination with the results obtained in Study 1, these findings provide additional evidence that dispositional factors facilitative of need satisfaction may promote positive trajectories of wellbeing across the transition from university. Indeed, these findings offer promising preliminary support for an integrative, SDT-based model of wellbeing in the transition from university, in which environmental supports for need satisfaction, dispositional tendencies facilitative of need satisfaction, and reciprocal effects of these person and environment factors work together to support wellbeing.

Critically, low levels of memory need satisfaction were associated with the least favorable wellbeing trajectories in our sample. Graduates who reported low levels of memory need satisfaction experienced the steepest declines in wellbeing in the early months of the study and maintained the lowest levels of wellbeing throughout the study relative to those who reported

average or high levels of memory need satisfaction. These findings indicate that targeting the negative effects of episodic memories associated with low levels of need satisfaction could be a fruitful aim for interventions designed to support wellbeing among university graduates. In a recent experiment, Philippe et al. (2018) demonstrated the effectiveness of a brief, low-cost resilience intervention in increasing the overall level of need satisfaction in networks of memories associated with undergraduates' negative self-defining memories. This finding is important because high overall levels of need satisfaction across networked memories have been found to buffer the negative emotional impact of single episodic memories whose level of need satisfaction is low (Philippe et al., 2011b). Results of this experiment suggest that graduates whose negative goal-related memories are characterized by low levels of need satisfaction could benefit from the simple exercise of consciously recalling their memory and listening to a brief audio track that emphasizes vitality, self-efficacy, and the capacity to grow through difficult experiences. This approach, with preliminary IAF screening to identify at-risk students, could easily be implemented at various points during throughout graduates' final semester and the following year, perhaps via a mobile app.

Trait Autonomy, Need-Satisfying Growth Themes in Narratives of Unattainable University Goals, and Wellbeing in the Transition from University

As expected, more autonomous graduates not only subsequently reported higher levels of need satisfaction associated with episodic memories of unattainable goals, but also subsequently narrated these experiences with stronger themes of growth, a small effect driven by trait autonomy's interest-taking facet. This finding contributes to the narrative identity literature by providing evidence that trait-level dispositional tendencies may contribute to processes that shape the construction (and likely ongoing revision and reconstruction) of narrative identity, thereby adding to our knowledge regarding structural relationships among these different levels of personality (McLean et al., 2020).

Results were less consistent, however, with our hypothesis that growth themes would, in turn, contribute to positive trajectories of wellbeing during the transition from university. Specifically, although the size and direction of the effects of growth themes on the linear and quadratic slopes of global wellbeing were similar to those of memory need satisfaction, these effects were not statistically significant. Given the strength of the theoretical rationales underlying these hypotheses, we suspect that this lack of statistically significant association may reflect analytic choices specific to the present study, such as our decisions to code growth from a single narrative and to combine indices of happiness, purpose, and self-esteem into a global wellbeing outcome.

First, across previous studies, single narrative codes are less predictive of wellbeing trajectories than codes aggregated across multiple scenes taken from an individual's life story (Adler et al., 2015). An interesting avenue for future research would be to administer the full Life Story Interview to graduates during their final semester of university, code multiple narratives for growth, and investigate whether growth themes aggregated across the whole life story might be more strongly associated with wellbeing trajectories across the transition from university. This approach would also enable future researchers to examine whether interest-taking could explain a higher proportion in variation in overall Life Story growth, as opposed to growth coded from a single narrative.

Second, in a recent synthesis of theory and research on the association between narrative identity and wellbeing, Adler (2019) proposed that integrative meaning-making in life stories may promote wellbeing through two distinct pathways. The first "assimilative" pathway involves the integration of experiences that are more-or-less consistent with an individual's developing

sense of self, resulting in "hedonic" experiences of wellbeing. The second "accommodative" pathway involves the integration of experiences that challenge or disrupt the unity, purpose, or meaning of the life story and developing self, resulting in ego development and "eudaimonic" experiences of wellbeing (Adler et al., 2016, Adler, 2019). Although growth themes could conceivably emerge in both assimilative and accommodative efforts at integrative meaning-making, growth themes in narratives of unattainable goals better reflect the idea of making sense of disruptions to the developing sense of self. If this is the case, then growth themes in narratives of unattainable goals are likely to exert their strongest effects on "eudaimonic" indicators of wellbeing, effects that could have been obscured by our use of a global wellbeing composite. Future studies could address this issue by elaborating our proposed model to include disaggregated, distinct aspects of wellbeing using larger samples of graduates[2].

Direct Effects of Trait Autonomy on Graduates' Wellbeing Trajectories

As expected, trait autonomy also had a direct, positive effect on trajectories of global wellbeing. Individuals who reported higher levels of authorship/self-congruence in their final semester of university started their transitions with higher levels of wellbeing, maintained this favorable position throughout the course of the study, and demonstrated a decelerating rate of decline starting around the middle of the study. In contrast, those average in authorship/self-congruence demonstrated a steady rate of decline across the course of the study and those low in authorship/self-congruence demonstrated an accelerating rate of decline around the middle of the study. These findings indicate that trait autonomy likely supports need satisfaction and wellbeing in the transition from university through processes that we did not test in the present study. For example, previous research has linked trait autonomy and similar dispositional constructs with need-satisfying interpersonal interactions (Weinstein et al., 2016) and tendencies to seek out and evaluate information before making identity-relevant commitments in emerging adulthood (Soenens et al., 2005). Testing these and other candidate processes linked to need satisfaction as mediators of the effect of trait autonomy on wellbeing trajectories in the transition from university is an important direction for future research, both in terms of increasing our understanding of pathways through which trait autonomy contributes to wellbeing and in terms of identifying specific targets for interventions designed to support graduates.

Facet-Specific Effects of Trait Autonomy on Mediators and Outcomes

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[2] In distinguishing between "hedonic" and "eudaimonic" experiences of wellbeing, Adler (2019) reflects a growing trend towards conceptualizing eudaimonia as a psychological state like subjective wellbeing (Martela & Sheldon, 2019). Self-determination theory, however, maintains that wellbeing is a sign, or symptom, of need satisfaction and organismic growth that can take many forms, including subjective happiness and satisfaction with life, energy/vitality, self-esteem and self-acceptance, and a sense of meaning and purpose in life (Ryan & Deci, 2017, p. 241). In other words, hewing to the Aristotelian perspective (Nichomachean Ethics 1095b13-23; 1097b1-5; 1098a1-10; 1099a6-25), SDT views eudaimonia as a particular *way of living* – i.e., the investment of time and energy towards the actualization of one's highest developmental potentials – and views wellbeing as a positive product of this way of living (Ryan & Deci, 2017; Ryan et al., 2008; Ryan & Huta, 2009). Reformulated from the perspective of SDT, then, the assimilative process that Adler (2019) proposes likely results in experiences of subjective wellbeing, while the accommodative process likely results in different manifestations of wellness, such as purpose, meaning, and ego development.

Based on previous research, we expected that the facets of trait autonomy (i.e., higher levels of authorship/self-congruence and interest-taking and lower levels of susceptibility to control) would work together to facilitate memory need satisfaction, need-satisfying growth themes, and positive trajectories of wellbeing overall (e.g., Weinstein et al., 2012). However, given that Study 1 revealed facet-specific effects of trait autonomy on baseline levels of life satisfaction, we remained open to the possibility that Study 2 would reveal similar complexities. Results indicated that this was indeed the case. Specifically, memory need satisfaction was only predicted by authorship/self-congruence, growth was only predicted by interest-taking, the intercept and slopes of wellbeing were only predicted (directly and indirectly) by authorship/self-congruence, and susceptibility to control was unrelated to any endogenous variables.

According to SDT, trait autonomy reflects general tendencies to experience one's behavior as self-organized or self-initiated, as opposed to controlled by forces external to the self (Weinstein et al., 2012). These general tendencies, in turn, arise from specific tendencies towards acting in accordance with values, beliefs, and intrinsic interests, which are themselves supported by tendencies to reflect with non-defensive curiosity on internal and external experiences and undermined by sensitivities to external pressures and controls (Weinstein et al., 2012). Within this conceptualization of dispositional autonomy, interest-taking plays a fundamentally facilitative role. Based on this consideration, we interpret the lack of direct association we observed between interest-taking and (i) memory need satisfaction and (ii) trajectories of wellbeing, respectively, as a reflection of its typical role in processes stemming from dispositional autonomy, a facilitative role that may have been difficult to detect without a larger sample of graduates. Conversely, we interpret the statistically significant positive effect of interest-taking on growth themes as an indication that, in a departure from its usual facilitative function, interest-taking may be a key driver of the effects of trait autonomy on this particular process. This interpretation is consistent with developmental accounts of the emergence of narrative identity across the lifespan, in which narrative identity does not emerge until capacities for sophisticated cognitive tasks, such as self-reflection, have matured in late adolescence (Adler, 2019; McLean & Lilgendahl, 2019).

In addition, we interpret the lack of association we observed between susceptibility to control and (i) memory need satisfaction, (ii) memory growth, and (iii) trajectories of wellbeing as evidence that the primary effects of this facet may be on the negative counterparts of these constructs: Need frustration, need-frustrating narrative themes, and purely negative indicators of wellbeing. Conceptually and empirically distinct from low levels of need satisfaction (Bartholomew et al., 2011), need frustration refers to experiences of feeling actively coerced or controlled (autonomy need frustration), feeling ineffective and like a failure (competence need frustration), and feeling excluded and rejected (relatedness need frustration; Chen et al., 2015; Vansteenkiste & Ryan, 2013). By need-frustrating narrative themes, we refer to themes that reflect the narrator's interpretation that he or she was being controlled, incompetent, or rejected in the experience that forms the frame for the story. For example, one widely studied narrative theme that could encompass any of these aspects of need-frustration is *contamination*, in which a story has an affectively positive beginning that gives way to an affectively negative conclusion (McAdams, Reynolds, Lewis, Patten, & Bowman, 2001). By purely negative indicators of wellbeing, we are referring to indicators like negative affect, rumination, and depressive symptoms (as opposed to low positive affect, etc.). To our knowledge, no previous theoretical or empirical work has addressed the possibility that susceptibility to control exerts primary positive effects on need frustration and ill-being and secondary negative effects on need satisfaction and wellbeing (though see Weinstein et al., 2012, Study 4, for preliminary data showing stronger

effects of susceptibility to control on indicators of ill-being than indicators of wellbeing). However, preliminary evidence to this effect emerges from our own research. In Study 1, susceptibility to control was unrelated to AM for post-graduation goals, which should produce experiences of need satisfaction, but strongly related to CM for post-graduation goals and, hence, presumably, to experiences of need frustration. If future studies support this idea, it could explain why we failed to detect negative effects of susceptibility to control on memory need satisfaction, memory growth, and trajectories of wellbeing in our relatively small sample.

Strengths, Limitations and Future Directions

The present study examined novel hypotheses using a mixed methods approach that included the coding of narrative data and the estimation of latent curves for global wellbeing over four waves of data. Despite these strengths, findings need to be interpreted with caution due to some limitations of the study design, particularly as pertains to our analysis of trait autonomy, memory need satisfaction, and trajectories of global wellbeing. First, our theoretical rationale for this process includes the untested assumption that the levels of trait autonomy we modelled as predictors of memory need satisfaction were the same as those that existed at the time the memories were originally encoded. Although this assumption is justifiable given the conceptualization of trait autonomy as a relatively stable trait-level variable with evidence of high test-retest reliability (Weinstein et al., 2012), stronger support for our hypotheses would come from studies in which trait autonomy was measured prior to the formation of the memories that form the heart of the analysis. In addition, our rationale assumes that (ii) memories of goal-related experiences are activated frequently outside conscious awareness during the transition from university and that (iii) negative goal-related memories are activated with greater frequency than positive ones during this period. While our findings concerning memory need satisfaction and trajectories of global wellbeing are consistent with these assumptions, they by no means verify them. Stronger evidence for our theoretical rationales would come from studies that include explicit tests of each of these assumptions.

The sample size for this study was relatively small given the complexity of our statistical models and the final sample over-represented young women from relatively high SES White or Asian families. These limitations to generalizability underscore the need for replication studies among larger and more diverse samples of university graduates. Such studies could also improve our ability to detect smaller, secondary effects of the facets of trait autonomy on memory need satisfaction, growth, and trajectories of wellbeing and explain why these effects did not emerge in the present study (e.g., effect of interest-taking on memory need satisfaction, effect of susceptibility to control on trajectories of global wellbeing). In addition, such studies could provide opportunities to incorporate multiple narratives, need frustration, need-frustrating narrative themes, and disaggregated positive and negative indicators of wellbeing.

Conclusions

Overall, the results of Study 2 suggest that trait autonomy may contribute to positive trajectories of wellbeing in the transition from university not only by catalyzing need-satisfying processes of striving for post-graduation goals, but also by furnishing graduates with need-satisfying memories of past striving. While evidence for this effect was clearer in the first memory pathway we investigated than in the second, the results nevertheless support the overarching hypothesis guiding the present research – that trait autonomy should promote positive trajectories of wellbeing in the transition from university by facilitating experiences of need satisfaction linked to graduates' goal pursuits, both past and present. Furthermore, the results provide empirical evidence supportive an integrative, SDT-based model of wellbeing in the transition from university we proposed in the introduction. Our results highlight trait

autonomy as a dispositional asset for graduates navigating the complex, challenging transition from university and as a potential dispositional antecedent of the processes specified by the theories of episodic memory need satisfaction and narrative identity, respectively. Finally, the results point to additional avenues for intervention, particularly screening prospective graduates for low authorship/self-congruence using the IAF, identifying memories of unattainable university goals with low levels of need satisfaction in this group, and coaching individuals to listen to messages of resilience after calling these potentially harmful memories to mind.

CHAPTER 6:
GENERAL DISCUSSION

The present research was motivated by the need to understand determinants of wellbeing across the transition from university and, ultimately, to use this knowledge to support graduates who experience low or deteriorating wellbeing during this period. To this end, we drew on SDT, a well-established theory of human motivation, wellbeing, and development (Ryan & Deci, 2017), to propose a developmentally-informed, integrative model of wellbeing applied to this transition. This model specifies that, during the transition from university, wellbeing should be a function of the extent to which social environments encountered in the course of the transition support vs. thwart graduates' basic psychological needs, the extent to which graduates' dispositional tendencies promote processes that facilitate vs. undermine need satisfaction, and the extent to which the need-relevant qualities of social environments and the need-relevant dispositional tendencies of graduates influence one another as the transition unfolds. In the present research, we performed the first empirical tests of this model by investigating whether trait autonomy, a dispositional factor with strong theoretical and empirical links to need satisfaction, contributes to positive trajectories of wellbeing in the transition from university by facilitating need satisfaction in graduates' goal pursuits, both past and present.

Summary of Research Findings

Study 1 revealed that higher levels of trait autonomy predicted more self-concordant processes of striving for post-graduation goals, processes which have been shown to promote the satisfaction of basic psychological needs and wellbeing in previous research. Specifically, the authorship facet of trait autonomy predicted lower levels of CM for post-graduation goals, which in turn predicted higher levels of subsequent goal progress and increases in life satisfaction over the course of the study. Likewise, lower levels of susceptibility to control, which reflect lower levels of trait autonomy, predicted increases in life satisfaction via an identical mediated pathway. These two findings suggest that trait autonomy may promote need satisfaction and wellbeing across the transition from university by helping graduates to access sources of sustained energy that further their most important goals for the future.

Study 2 revealed that higher levels of trait autonomy also contributed to positive trajectories of wellbeing across the transition from university via processes linked with need satisfaction, goals, and memory. Specifically, the authorship/self-congruence facet of trait autonomy predicted stronger representations of need satisfaction in graduates' episodic memories of unattainable university goals, which, in turn, buffered them against the mean-level declines in global wellbeing observed in this study. Notably, higher levels of the interest-taking facet of trait autonomy were also associated with stronger themes of growth in the narratives graduates constructed around these memories, which, in turn, had effects on trajectories of global wellbeing that were similar to those of memory need satisfaction. While these effects did not reach statistical significance, we argued that they may yet emerge as determinants of graduates' wellbeing in future studies with larger, more diverse samples, more diverse indices of wellbeing, and multiple narratives from which to code growth. Together, findings from Studies 1 and 2

indicate that trait autonomy may contribute to positive trajectories of wellbeing in the transition from university by simultaneously catalyzing need-satisfying processes of striving for post-graduation goals and furnishing graduates with need-satisfying memories that protect them as they navigate a complex, challenging life transition (Overton-Healy, 2010).

Finally, Studies 1 and 2 each revealed a handful of unexpected findings that raised interesting questions for future research. For example, interest-taking was associated with lower levels of baseline life satisfaction and increases in life satisfaction over the course of Study 1. Our interpretation of this seemingly contradictory pair of findings centered on the idea that non-defensive self-reflection could have initially increased graduates' awareness of the distance between themselves and their future goals (leading to dissatisfaction), but subsequently helped them to take action and make progress towards their goals (leading to increases in satisfaction). Similarly, susceptibility to control was unrelated to the mediators (e.g., memory need satisfaction and growth) and outcomes (e.g., intercepts and slopes for global wellbeing) in Study 2. We interpreted this lack of association as evidence that Study 2 may have foregrounded the *secondary effects* of susceptibility to control (e.g., its effects on need satisfaction and wellbeing), which may have been difficult to detect given the relatively small sample size for this study. These and additional unexpected findings from Studies 1 and 2 require further investigation in future research.

Developmental Contributions, Theoretical Contributions, and Implications for Intervention

Unexpected findings notwithstanding, Studies 1 and 2 suggest that trait autonomy is a dispositional strength that protects and promotes wellbeing during the transition from university and, in so doing, cultivates a resource upon which graduates can broaden and build as they navigate the multiple, overlapping, and interdependent transitions embedded within the larger transition to adulthood (Schulenberg & Schoon, 2015). An interesting area for future research would be to investigate whether experiences of need satisfaction and wellbeing in the transition from university foster the development of resources that graduates carry forward into some of these subsequent transitions, such as normative transitions into the workforce, parenthood, and committed romantic relationships (Salmela-Aro et al., 2007), or even into non-normative transitions that may accompany the transition to adulthood (e.g., unexpected diagnoses of serious physical or mental health problems, unplanned exits from work or educational pathways). If this is the case, then higher levels of trait autonomy in the final semester of university could contribute by many paths and processes to upwards spirals of adaptive functioning across the transition to adulthood.

In addition to their implications for development across the transition from university and broader transition to adulthood, our findings contribute to the research literature devoted to the SCM (Sheldon & Elliot, 1999), to need satisfaction as an experiential component of episodic memory (Philippe et al., 2012), and to narrative identity (e.g., McAdams & McLean, 2013) by identifying trait autonomy as a potential dispositional antecedent of the processes with which each framework is centrally concerned. In addition, the findings extend the SDT literature by showing that its assumptions concerning dispositional antecedents of need satisfaction generalize to a major developmental transition. More broadly still, they align with the ideas that personality exerts direct (temperamental) and indirect (instrumental) effects on wellbeing (DeNeve and Cooper, 1998; Diener et al., 1999; McCrae & Costa, 1991) and can be a resource, or psychological strength, that individuals bring into stressful situations (e.g. Lazarus & Folkman, 1984; Zarrett & Eccles, 2006), including life transitions (e.g. Caspi & Moffit, 1993; Henning et al., 2017; Perren et al., 2010; Shulman et al., 2009; Weiss et al., 2012). Finally, our findings complement models of personality trait change in emerging adulthood, which emphasize

increases in conscientiousness, agreeableness, and emotional stability in response to role transitions (social role investment theory; Roberts et al., 2005), by showing that pre-transition variation in trait-level tendencies may also influence functioning during role transitions via effects on processes related to motivation, behavior, and memory.

Ultimately, however, the most important implications of these findings are those they have for interventions designed to support graduates. For example, Study 1's finding that higher levels of CM for post-graduation goals predicted impaired goal progress and decreases in SWL indicates that increasing the self-concordance of post-graduation goals may be a key target for efforts to support graduates. Likewise, Study 2's finding that episodic memories with low levels of need satisfaction were associated with accelerating declines in global wellbeing indicate that inoculating graduates against the effects of such memories could be another promising target. Luckily, in both cases, interventions already exist that could be adapted for these purposes, such as interventions (i) to increase the likelihood that individuals will select goals that are intrinsic in content, and thus more likely to be self-concordant (Sheldon et al., 2019), (ii) to help individuals increase the self-concordance of goals they are already pursuing (Unsworth & Mason, 2016), and (iii) to integrate single episodic memories with low levels of need satisfaction within need-satisfying memory networks (Philippe et al., 2018). Following replication of our findings in larger, more diverse samples, initial screening with the IAF to identify at-risk individuals followed by these brief, low-cost adapted interventions could be viable applications of the present research.

Notably, growth themes in narratives of unattainable university goals, which were prospectively predicted by pre-transition levels of trait autonomy's interest-taking facet in Study 2, had a pattern of effects on the trajectories of global wellbeing that was similar to that of memory need satisfaction, but fell short of the conventional threshold for statistical significance. In the discussion for Study 2, we proposed that future studies could improve the likelihood of detecting effects of growth on trajectories of wellbeing in the transition from university by coding this theme across multiple life story narratives (Adler et al., 2015) and/or investigating growth as a predictor of change in indicators of eudaimonic indicators of wellbeing, in particular. If future studies can address these issues and detect a replicable, positive effect of growth on graduates' trajectories of wellbeing, then strengthening this theme, either in single memories of graduates' unattainable goals or across their life story narratives, might be another useful target for intervention. While we are not aware of any existing interventions that have demonstrated the capacity to increase levels of growth (or other themes of integrative meaning) in life story narratives, there is some evidence that narrative themes can change in response to intervention, and that these changes may be causally related to changes in indicators of wellbeing (Adler, 2012). In this regard, promising starting points could be the exploration of the experimental clinical literature on the effectiveness of cognitive behavioral writing therapy (Roos et al., 2017; Van der Oord et al., 2010; Van Emmerik et al., 2008) for strategies that could be adapted to help graduates articulate strong, clear, themes of growth in their life story prior to graduation.

Finally, the finding that facets of trait autonomy predicted positive trajectories of wellbeing via the processes examined in Studies 1 and 2 (and likely through additional processes as indicated by direct effects on wellbeing in both studies) marks the development of trait autonomy itself as an important target for efforts to support graduates. Building on earlier theoretical and empirical work (e.g., Deci & Ryan, 1985; Grolnick, Deci, & Ryan, 1997), Ryan and Deci (2017) have proposed that dispositional autonomy develops via the "substantial, persistent" (p. 221) satisfaction of basic psychological needs across development, primarily as a result of the autonomy-supportive, controlling, or amotivating qualities of social environments. If

future research supports this assumption, then efforts to support the development of graduates' dispositional autonomy can – and should – start as early as childhood and emphasize increasing levels of autonomy support across contexts of development. Autonomy support refers to the provision of choices, meaningful rationales for requested behaviors, and perspective taking by persons in power (Deci & Ryan, 1985). Fortunately, a wealth of evidence indicates that autonomy support does increase in response to intervention, and further, that changes in autonomy support predict changes in need satisfaction, wellbeing, and other indicators of adaptive development (Chatzisarantis & Hagger, 2009; Cheon et al., 2012, 2014, 2016; Joussemet et al., 2014; Moe et al., 2018; Reynders et al., 2019).

Strengths, Limitations, and Future Directions

Strengths of the present research include the analysis of four waves of longitudinal survey data using state-of-the-art approaches to handling missing data and modeling change over time (LCM; Little, 2013), the use of longitudinal confirmatory factor analysis and tests of longitudinal measurement invariance to verify the latent structure of the constructs of interest and its stability over time, and reliance on fully latent models (Study 1) or models using factor scores (Study 2) to control for measurement error. In addition, the research adopted a mixed methods approach that combined the statistical rigor of latent curve modeling (Studies 1 and 2) with the coding of narrative data (Study 2), which allowed us to weave the authentic voices and experiences of graduates into the study. By providing several examples of graduates' narratives in the main text of Study 2, we hope to increase awareness of and interest in these experiences that will inspire future research on the currently understudied transition from university.

Furthermore, instead of "reinventing the wheel," we applied a well-established theory of human motivation, wellbeing, and development to the problem of understanding wellbeing in the transition from university. As noted in the General Introduction, because adaptation and development across developmental transitions are the product of multiple environmental, dispositional, and transacting person-environment influences (Crafter et al., 2019; Lerner et al., 2011), a useful theory of wellbeing in the transition from university needs to be able to integrate each of these factors. Self-determination theory, which has from its inception emphasized both environmental and person-driven determinants of wellbeing in ongoing dialectic (Deci & Ryan, 1985), provided an ideal pre-existing framework for the model we proposed, illuminated what its key proximal determinant of wellbeing ought to be – the satisfaction of basic psychological needs – and inspired the specific research questions on need satisfaction and goals we chose as first tests of this model. This approach allowed us to simultaneously ground our hypotheses in decades of sound theoretical and empirical work and to contribute something relatively new to the SDT research literature, which, despite its emphasis on human development, contains few studies of specific developmental transitions.

These strengths notwithstanding, findings from Studies 1 and 2 should be interpreted with caution due to limitations arising from sample size and certain elements of the studies' designs. First, the sample size was relatively low in Study 1 and further reduced in Study 2 due to an additional inclusion criterion, which, in concert with overrepresentation of White and Asian higher SES female graduates, limits the generalizability of the findings and may have interfered with our ability to detect smaller, ancillary or secondary effects. Additionally, though useful as a strategy to maximize statistical power, the aggregation of wellbeing outcomes in Study 2 may have masked construct-specific effects of growth on trajectories of wellbeing. To address these limitations, future studies should focus on replicating the current findings in larger, more diverse samples and taking advantage of the opportunities offered by greater statistical power to test theoretically justified, but smaller effects, as well as effects on specific aspects of wellbeing.

Second, the theoretical model proposed in each study included assumptions, which, although justified by theory and previous research, were not tested directly in our analyses. These include the assumption that changes in need satisfaction acted as a mediator of the association between goal progress and increases in SWL in Study 1 and the assumption that goal-related memories are particularly likely to be frequently activated during the transition from university in Study 2. Vis-à-vis Study 1, future studies could address this limitation by adding additional measurement points and asking graduates about their level of need satisfaction several times while pursuing their most important post-graduation goals. Vis-à-vis Study 2, future studies could rely on ecological momentary assessments (EMA; Shiffman et al., 2008) to track whether goal-related memories are, as we assume, frequently activated as graduates navigate the transition from university.

Finally, in addition to addressing the new research questions, limitations, and future directions associated with Studies 1 and 2, future research is also needed to begin the process of systematically elaborating the integrative, SDT-based model of wellbeing across the transition from university within which they are embedded. First, future research could build on Studies 1 and 2 by investigating the role of trait autonomy in promoting additional goal processes known to influence need satisfaction, namely, the intrinsic vs. extrinsic contents of goals themselves (Deci & Ryan, 2000; Kasser & Ryan, 1996; Ryan et al., 1996; Unanue et al., 2014). Further elaboration of the mediated pathways linking trait autonomy to trajectories of wellbeing during this transition could include other person-driven processes with known influences on need satisfaction, such as "informational" styles of identity development in emerging adulthood (Soenens et al., 2005). In addition, all future research grounded in the proposed model should include experiences of both need satisfaction and frustration as endogenous mediators. This elaboration will accomplish the inextricably linked goals of (i) improving the ability of future investigations to detect primary effects of susceptibility to control on experiences of need frustration and (ii) improving the ability of future studies to detect primary effects of experiences of need frustration, themselves, on changes in negative indicators of wellbeing.

Future research could also build on Studies 1 and 2 by investigating multiple indices of positive and negative, hedonic and eudaimonic wellbeing as separate outcomes. This elaboration would enable the exploration of some of the new research questions raised in Studies 1 and 2 and has to potential to yield additional new questions that will ultimately strengthen our understanding of the distal effects of trait autonomy.

Finally, while elaborations of the proposed model at the level of mediating mechanisms and outcomes are important directions for future research, elaboration at the level of its exogenous predictors is also critical, both in terms of understanding trajectories of wellbeing in the transition from university and in pinpointing targets for future interventions. In particular, incorporating the need-supporting vs. thwarting qualities of the social environments graduates move from, into, and through during the course of their transitions would enable researchers to investigate the effects of these key influences on experiences of motivation, need satisfaction and frustration, and wellbeing in the transition from university, explore the extent to which they interact with dispositional tendencies to influence change in outcomes, and even to trace reciprocal effects of person and environment on one another as transitions unfold. The exciting challenge inherent in incorporating need-relevant effects of social environments in the transition from university will be generating hypotheses that account for diversity and instability in these environments as fundamental features of the transition period, theoretical terrain that, to our knowledge, has yet to be explored in the SDT literature.

Conclusions

Overall, the results of the present research indicate that trait autonomy contributes to positive trajectories of wellbeing in the transition from university by facilitating experiences of need satisfaction in processes linked to goal pursuits, both past and present. In so doing, Studies 1 and 2 lay theoretical and empirical groundwork for an SDT-based model of wellbeing during the transition from university, a model whose value lies in potentials to illuminate causes of heterogeneity in trajectories of wellbeing across this transition and into the larger transition to adulthood, to inspire effective interventions in support of graduates whose wellbeing is at risk for deterioration, and possibly even to generate new theory grounded in SDT concerning stability and change in need satisfaction itself, as well as need-relevant environment and dispositional factors. Ideally, the findings will justify the continuation of this work on behalf of university graduates in transition and spur applications to other lifespan transitions.

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Table 1

Longitudinal Measurement Structure for Studies 1 and 2

Wave	Wave 1: Pre-Graduation	Wave 2: Post-Graduation Fall	Wave 3: Post-Graduation Winter	Wave 4: Post-Graduation June
Study 1				
Predictor/ Mediators	Trait Autonomy	AM & CM for Most Important Post-Graduation Goal	Post-Graduation Goal Progress	
Wellbeing	SWL1	SWL2	SWL3	SWL4
Study 2				
Predictor/ Mediators	Trait Autonomy	BPNS for Unattainable University Goal Memory & Growth Theme in Memory Narrative		
Wellbeing	WB1	WB2	WB3	WB4

Note. AM = autonomous motivation; CM = controlled motivation; SWL1-SWL4 = *Satisfaction with Life Scale* (Diener, Emmons, Larsen, & Griffin, 1985) measured at Waves 1, 2, 3, and 4; BPNS = basic psychological need satisfaction; WB1-WB4 = global wellbeing composite variable reflecting items from the *Purpose in Life* scale (PIL; Ryff, 1989, 2014), *Centers for Epidemiologic Studies Depression Scale* (CES-D; Radloff, 1977), and the *Rosenberg Self-Esteem Scale* (RSE; Rosenberg, 1965).

Table 2

Goodness-of-Fit for Study 1 Measurement Models

	χ^2	*df*	RMSEA [90% CI]	CFI	TLI
Longitudinal CFA Model					
1. Longitudinal CFA Model	822.817*	746	.025 [.010-.036]	.944	.935
Longitudinal Measurement Invariance Models					
2. Configural invariance across time points	822.817*	746	.025 [.010-.036]	.944	.935
3. Weak invariance across time points	816.841*	758	.022 [.000-.033]	.957	.951
4. Strong invariance across time points	830.261*	770	.022 [.000-.033]	.956	.951
5. Strict invariance across time points	843.685*	785	.022 [.000-.033]	.957	.953
6. Variances/Covariances invariance across time points	844.397*	788	.021 [.000-.032]	.959	.955
7. Latent means invariance across time points	846.823*	791	.021 [.000-.032]	.959	.956

Note. df = degrees of freedom; RMSEA = root mean square error of approximation; CI = confidence interval; CFI = comparative fit index; TLI = Tucker-Lewis index. All χ^2 values are statistically significant at $*p < .01$.

Table 3

Unstandardized Point Estimates and Standard Errors and 95% Bootstrapped Confidence Intervals for Study 1 Indirect Effects

	Satisfaction with Life Slope		Post-Graduation Goal Progress	
	Point Estimate (*SE*)	95% BC CI	Point Estimate (*SE*)	95% BC CI
AUTH → CM → PROG	0.097 (0.080)	[0.005, 0.957]		
SUSC → CM → PROG	-0.130 (0.088)	[-0.991, -0.010]		
INTR → CM → PROG	-0.079 (0.069)	[-1.211, 0.001]		
CM → PROG	-0.217 (0.142)	[-1.015, -0.006]		
AUTH → CM			0.264 (0.180)	[0.026, 1.769]
SUSC → CM			-0.354 (0.209)	[-2.000, -0.048]
INTR → CM			-0.214 (0.152)	[-1.838, 0.013]

Note. BC CI = Bias-corrected bootstrapped confidence interval; AUTH = authorship/self-congruence at T1; CM = controlled motivation for post-graduation goal at T2; PROG = progress towards post-graduation goal at T3; SUSC = susceptibility to control at T1; INTR = Interest-taking at T1.

Table 4

Goodness-of-Fit for Study 2 Measurement Models

	χ^2	df	RMSEA (90% CI)	CFI	TLI
Longitudinal CFA Models					
1. Longitudinal CFA Model	4092.467*	3361	.044 (.039-.049)	.930	.925
2. Longitudinal bifactor CFA Model	3502.831*	3159	.031 (.024-.038)	.967	.963
Longitudinal Measurement Invariance Models for the bifactor CFA Model					
3. Configural Invariance Model	3491.640*	3159	.031 (.024-.037)	.966	.961
4. Weak Invariance Model	3586.236*	3243	.031 (.024-.037)	.965	.961
5. Strong Invariance Model	3694.750*	3354	.030 (.023-.037)	.965	.963
6. Strict Invariance Model	3705.786*	3402	.028 (.021-.035)	.969	.967
7. Variance/Covariance Invariance Model	3717.286*	3414	.028 (.021-.035)	.969	.967
8. Latent Means Invariance Model	3728.197*	3426	.028 (.021-.035)	.969	.968

Note. df = degrees of freedom; RMSEA = root mean square error of approximation; CI = confidence interval; CFI = comparative fit index; TLI = Tucker-Lewis index.
All χ^2 values are statistically significant at *$p < .01$.

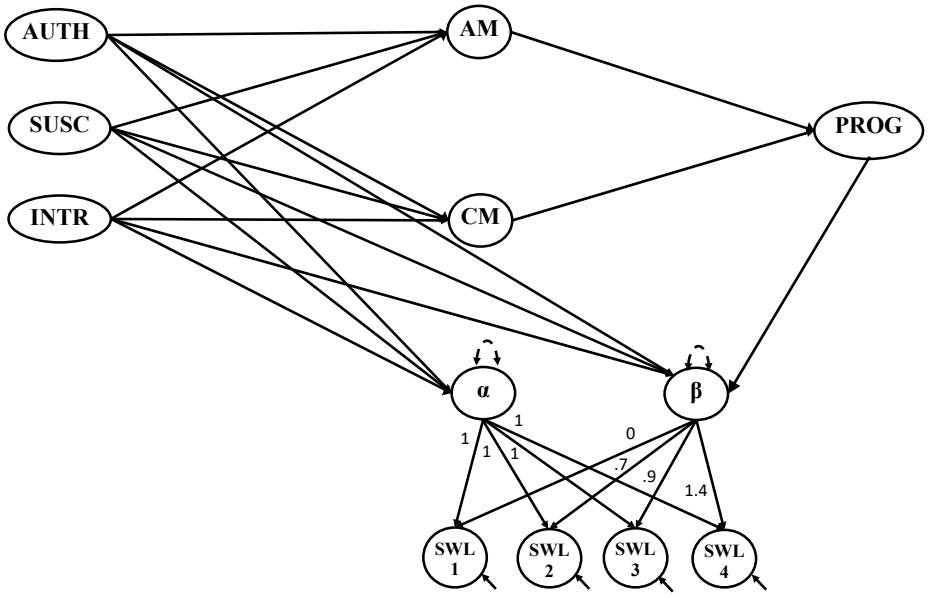

Figure 1. Proposed Model for Study 1. AUTH = authorship/self-congruence at T1; SUSC = susceptibility to control at T1; INTR = interest-taking at T1; AM = autonomous motivation for post-graduation goal at Time 2; CM = controlled motivation for post-graduation goal at Time 2; PROG = progress towards post-graduation goal at Time 3; SWL1-SWL4 = Satisfaction with Life from T1-T4; α = latent intercept factor for SWL; β = latent slope factor for SWL. For ease of interpretation, all aspects of the measurement model except those pertaining to the latent intercept and slope factors for SWL, as well as covariances between the three facets of trait autonomy and between AM and CM, are not shown.

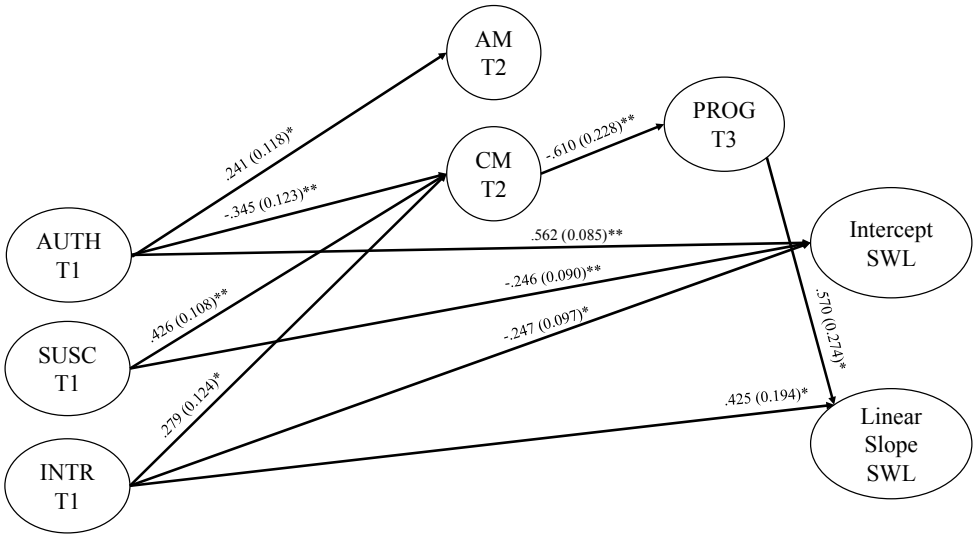

Figure 2. Effects of trait autonomy on life satisfaction trajectories via self-concordant striving. This figure reports standardized path coefficients and standard errors in parentheses. AUTH = authorship/self-congruence at T1; SUSC = susceptibility to control at T1; INTR = interest-taking at T1; AM = autonomous motivation for post-graduation goal at T2; CM = controlled motivation for post-graduation goal at T2; PROG = self-reported progress towards post-graduation goal at T3; Intercept SWL = baseline level of satisfaction with life; Linear Slope SWL = linear slope of satisfaction with life including Times 1, 2, 3, and 4. For ease of interpretation, all aspects of the measurement model, covariances between the three facets of trait autonomy and between AM and CM, and non-significant paths are not shown.

*$p < .05$. **$p \leq .01$

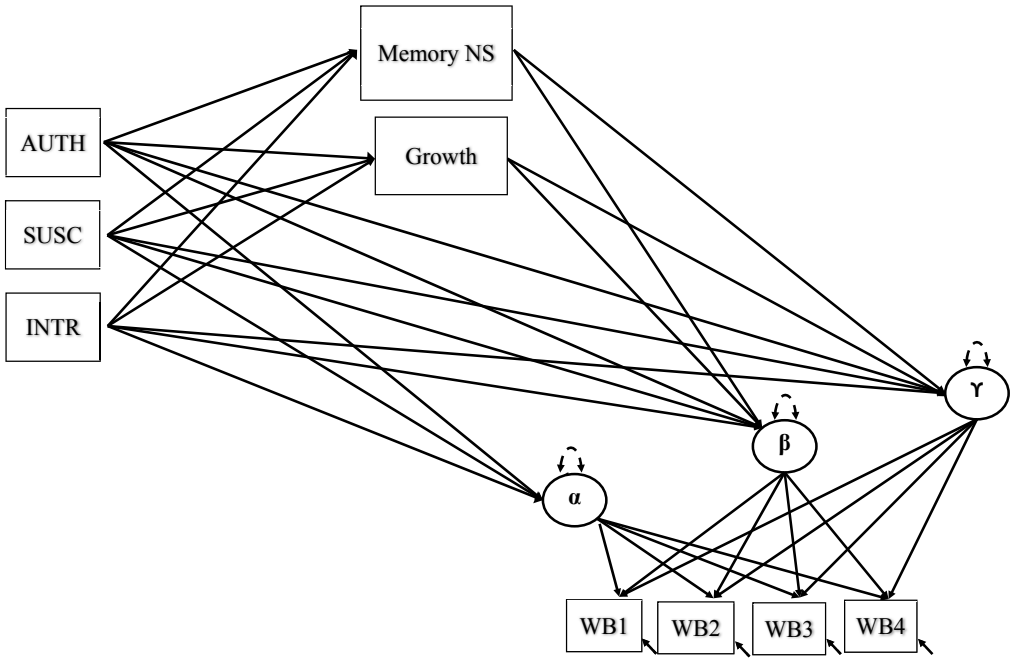

Figure 3. Proposed model for Study 2. AUTH = authorship/self-congruence at T1; SUSC = susceptibility to control at T1; INTR = interest-taking at T1; Memory NS = Need satisfaction associated with memories of unattainable university goals at T2; Growth = theme of growth in narratives of these memories at T2; α = intercept of global wellbeing; β = linear slope of global wellbeing; Υ = quadratic slope of global wellbeing; WB1 – 4 = Time 1 – 4 measurements of global wellbeing, respectively. For ease of interpretation, covariances between (i) the three facets of trait autonomy (ii) covariances between the Memory NS and Growth, (iii) covariances between the growth factors, (iv) the effect of sex on the growth factors, and (v) and time codes identifying the growth factors are not shown.

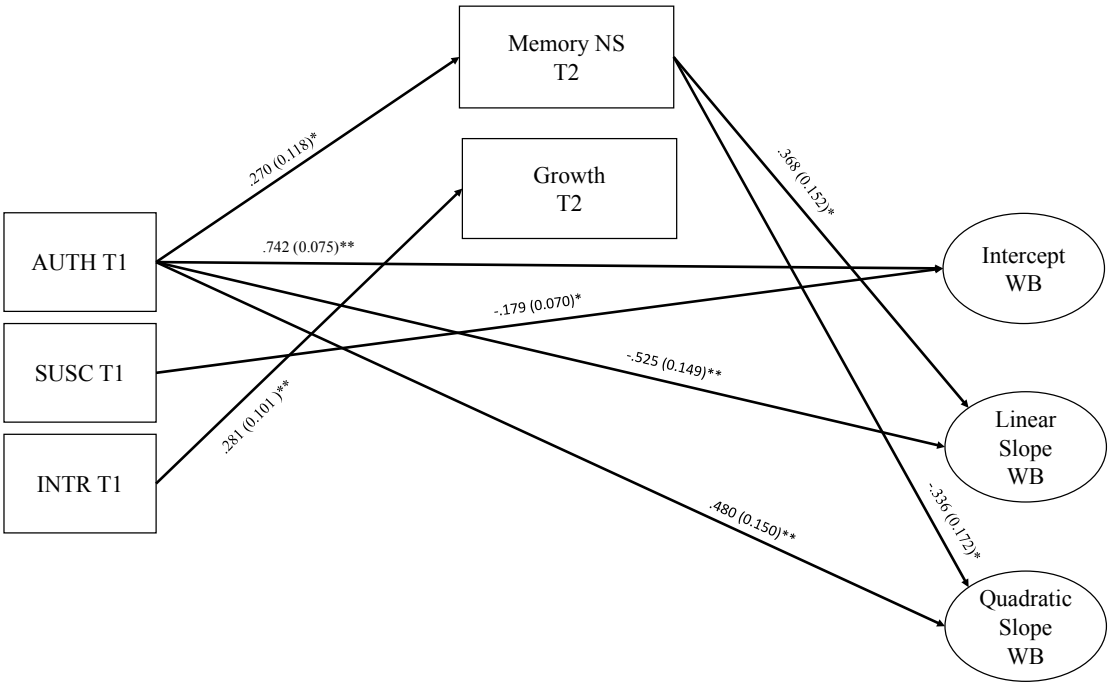

Figure 4. Effects of trait autonomy on global wellbeing trajectories via need-satisfying memory processes. This figure reports standardized path coefficients and standard errors in parentheses. AUTH = authorship/self-congruence at T1; SUSC = susceptibility to control at T1; INTR = interest-taking at T1; Memory NS = representation of basic psychological need satisfaction encoded as an experiential component of graduates' unattainable university goal memories at T2; Growth = presence of growth themes in narratives graduates wrote about these experiences at T2; Intercept WB = baseline levels of global wellbeing; Linear Slope WB = linear slope of global wellbeing; Quadratic Slope WB = quadratic slope of global wellbeing, both using Times 1, 2, 3, and 4. The measurement model for the latent intercept, linear slope, and quadratic slope of SWL, as well as covariances among factors and non-significant paths are omitted for ease of interpretation.

*$p < .05$. **$p \leq .01$

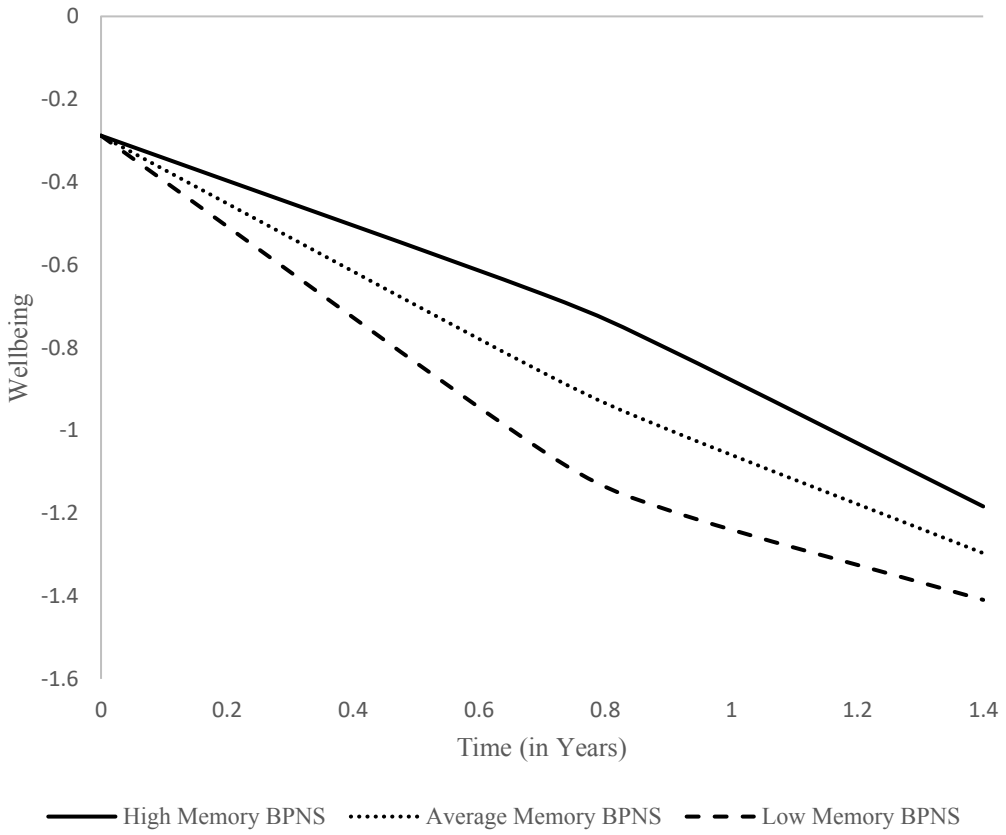

Figure 5. Trajectories of Global Wellbeing at High, Average, and Low Levels of Memory Need Satisfaction

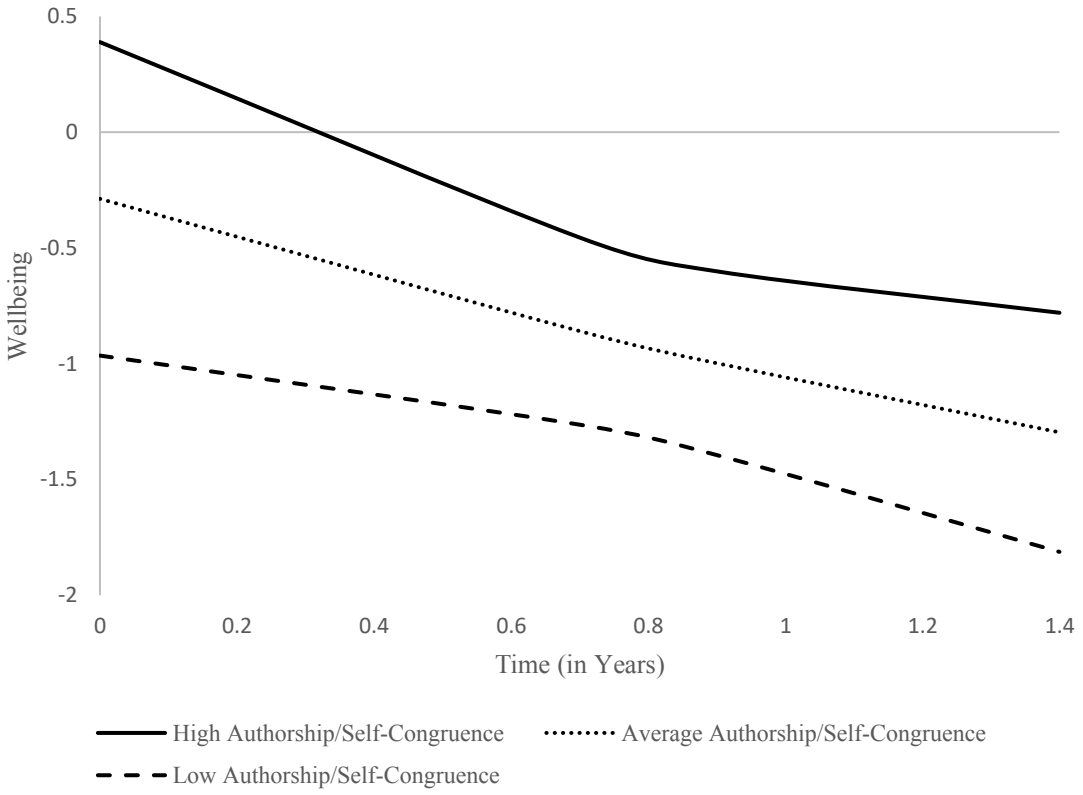

Figure 6. Trajectories of Global Wellbeing at High, Average, and Low Levels of Authorship/Self-Congruence

Appendix A:

Demographic Characteristics of the Study 1 Sample at each Wave

	Wave 1	Wave 2	Wave 3	Wave 4
% Female	69.6%	71.3%	71.9%	72.5%
% Born in Canada	64.0%	67.8%	67.2%	67.5%
% Mother Tongue English or French	65.2%	68.5%	68.0%	68.3%
% Identify as Caucasian	61.5%	62.9%	61.7%	63.3%
% Identify as Heterosexual	85.1%	85.3%	84.4%	85.8%
% Mother's education is BA or higher	45.4%	42.7%	43.7%	45.0%
% Father's education is BA or higher	51%	49%	50%	50.9%
% Household annual income falls between $50,000.00 - $124,999.000 CAD	42.9	42.7%	43.8%	42.5%

Appendix B:

Examples of Post-Graduation Goals and Steps Elicited from Study 1 Participants at Wave 2

Goal: "Pass the CFA exam and obtain my CPA certification"
- **Steps**: "study on my way to work (train); try to focus on the task rather than worry…; follow to-do lists…don't delay!"

Goal: "To get a job as a teacher in the public school system"
- **Steps**: "do the French exam; call school boards; sub as a teacher"

Goal: "Work in the graphic arts industry"
- **Steps**: "register for classes; obtain the right software; adjust my work schedule"

Goal: "Preparing and learning how to live self-sustainably"
- **Steps**: "finish the medicinal herb program that I am currently enrolled in; do some internet research; search for a partner who would share this dream"

Appendix C:

Standardized Parameter Estimates and Composite Reliability Estimates from the Study 1 Longitudinal CFA Model

	λ										δ
Item	AUT	SUSC	INTR	AM	CM	PROG	SWL1	SWL2	SWL3	SWL4	
IAF1	.701										.509
IAF4	.778										.395
IAF12	.766										.413
IAF9	.474										.775
IAF15	.708										.498
IAF3		.644									.586
IAF6		.947									.103
IAF13		.612									.625
IAF8		.397									.842
IAF10		.493									.757
IAF7			.753								.434
IAF2			.416								.827
IAF5			.810								.343
IAF11			.917								.159
IAF14			.725								.475
AM1				.499							.751
AM2				.735							.460
AM3				.948							.101
CM4					.722						.478
CM5					.722						.478
PROG1						.702					.507
PROG2						.602					.637
SWL1							.822				.325
SWL2							.638				.593
SWL3							.899				.191
SWL4							.817				.333
SWL5							.706				.501
SWL1_w2								.861			.259
SWL2_w2								.698			.513
SWL3_w2								.924			.147
SWL4_w2								.857			.266
SWL5_w2								.760			.422
SWL1_w3									.835		.303
SWL2_w3									.657		.568
SWL3_w3									.908		.176
SWL4_w3									.830		.310
SWL5_w3									.724		.476
SWL1_w4										.846	.284
SWL2_w4										.675	.545
SWL3_w4										.915	.163
SWL4_w4										.842	.291
SWL5_w4										.740	.453
ω	**.819**	**.767**	**.854**	**.784**	**.686**	**.598**	**.886**	**.913**	**.890**	**.902**	

Appendix D:

Goodness-of-Fit and Unstandardized Growth Parameter Estimates for Study 1 Unconditional Linear and Quadratic LCMs

Goodness-of-Fit						Fixed Effects			Random Effects		
	χ^2	*df*	RMSEA (90% CI)	CFI	TLI	Intercept	Linear Slope	Quadratic Slope	Intercept	Linear Slope	Quadratic Slope
Linear LCM											
1.	274.632	178	.058 [.044 - .072]	.956	.953	4.450**	-0.081		1.283**	0.418 (*p* = .057)	
Quadratic LCM											
2.	264.773	174	.057 [.043 - .071]	.959	.955	4.483**	-0.339	0.199	1.629**	3.959*	1.340

Note. LCMs = Latent Curve Models; *df* = degrees of freedom; RMSEA = root mean square error of approximation; CI = confidence interval; CFI = comparative fit index; TLI = Tucker-Lewis index.

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

Appendix E:

Study 1 Latent Factor Correlations

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1.AUTH										
2.SUSC	.027									
3.INTR	.366**	.358**								
4.AM	.305**	-.080	.201*							
5.CM	-.057	.442**	.281*	-.351**						
6.PROG	.137	-.259*	-.106	.209	-.157					
7.SWL1	.399**	-.265**	-.121	.120	-.370**	.271*				
8.SWL2	.474**	-.281**	.064	.144	-.388**	.232	.685**			
9.SWL3	.324**	-.263**	-.035	.220*	-.477**	.287*	.666**	.806**		
10.SWL4	.390**	-.327**	.066	.145	-.374**	.358**	.593**	.707**	.773**	--

Note. AUTH = authorship/self-congruence at T1; SUSC = susceptibility to control at T1; INTR = interest-taking at T1; AM = autonomous motivation for post-graduation goal at T2; CM = controlled motivation for post-graduation goal at T2; PROG = self-rated progress towards post-graduation goal at T3; SWL1-SWL4 = satisfaction with life at T1, 2, 3, and 4.

*$p < .05$. **$p \leq .01$.

Appendix F:

Demographic Characteristics of the Study 2 Sample at each Wave

	Wave 1	Wave 2	Wave 3	Wave 4
% Female	73.6%	73.6%	72.6%	73.9%
% Born in Canada	70.9%	70.9%	71.6%	70.7%
% Mother Tongue English or French	68.2%	68.2%	68.4%	68.4%
% Identify as Caucasian	62.7%	62.7%	62.1%	62.0%
% Mother's education is BA or higher	47.3%	47.3%	47.3%	47.8%
% Father's education is BA or higher	49.1%	49.1%	50.6%	52.1%
% Household annual income falls between $50,000.00 - $124,999.000 CAD	42.7%	42.7%	45.2%	42.4%

Note. $N = 110$. Values for Waves 1 and 2 are identical because the baseline sample was limited to those who provided unattainable goal memory narratives at Wave 2, all of whom had participated at Wave 1.

Appendix G:

Standardized Parameter Estimates and Composite Reliability Estimates from the Study 2 Bifactor CFA Measurement Model

	λ																		δ
	Trait Autonomy			NS	G-Factors for Wellbeing				S-Factors for Wellbeing										
Item	AUT	SUS	INT	NS	WB 1	WB 2	WB 3	WB 4	PIL1	PIL2	PIL3	PIL4	RSE1	RSE2	RSE3	RSE4	HAP 1	HAP 2	HAP 3	HAP 4	
Wave 1																					
IAF1	.654																				
IAF4	.856																				
IAF9	.403																				
IAF12	.768																				
IAF15	.668																				
IAF3		.696																			
IAF6		.685																			
IAF8		.498																			
IAF10		.336																			
IAF13		.645																			
IAF2			.504																		
IAF5			.880																		
IAF7			.720																		
IAF11			.908																		
IAF14			.758																		
PIL1					.743				.372												.310
PIL4					.669				.496												.306
PIL8					.626				.561												.294
PIL9					.601				.605												.273
PIL10					.505				.594												.392
PIL12					.625				.208												.567
PIL13					.738				.278												.567
CES4					.631												.262				.533
CES8					.659												.302				.475

CES12		.684			.729	.000
CES16		.707			.508	.241
RSE1		.790		.329		.268
RSE3		.808		.103		.337
RSE4		.818		.246		.270
RSE7		.755		.375		.289
RSE10		.857		.042		.264
Wave 2						
ANS1	.783					
rANS2	.366					
CNS1	.903					
CNS2	.965					
RNS1	.852					
RNS2	.861					
PIL1		.743	.372			.310
PIL4		.669	.496			.306
PIL8		.626	.561			.294
PIL9		.601	.605			.273
PIL10		.505	.594			.392
PIL12		.625	.208			.567
PIL13		.738	.278			.379
CES4		.631			.262	.533
CES8		.659			.302	.475
CES12		.684			.729	.000
CES16		.707			.508	.241
RSE1		.790		.329		.268
RSE3		.808		.103		.337
RSE4		.818		.246		.270
RSE7		.755		.375		.289
RSE10		.857		.042		.264
Wave 3						
PIL1		.743	.372			.310

PIL4				.669				.496			.306
PIL8				.626				.561			.294
PIL9				.601				.605			.273
PIL10				.505				.594			.392
PIL12				.625				.208			.567
PIL13				.738				.278			.379
CES4				.631						.262	.533
CES8				.659						.302	.475
CES12				.684						.729	.000
CES16				.707						.508	.241
RSE1				.790					.329		.268
RSE3				.808					.103		.337
RSE4				.818					.246		.270
RSE7				.755					.375		.289
RSE10				.857					.042		.264
Wave 4											
PIL1				.743				.372			.310
PIL4				.669				.496			.306
PIL8				.626				.561			.294
PIL9				.601				.605			.273
PIL10				.505				.594			.392
PIL12				.625				.208			.567
PIL13				.738				.278			.379
CES4				.631						.262	.533
CES8				.659						.302	.475
CES12				.684						.729	.000
CES16				.707						.508	.241
RSE1				.790					.329		.268
RSE3				.808					.103		.337
RSE4				.818					.246		.270
RSE7				.755					.375		.289
RSE10				.857					.042		.264
ω	**.809**	**.756**	**.873**	**.917**	**.962**	**.958**	**.916**	**.966**			

Note. λ = standardized factor loadings; δ = standardized item uniquenesses; AUT = authorship/self-congruence; SUS = susceptibility to control; INT = interest-taking; NS = memory basic psychological need satisfaction; WB1-WB4 = global wellbeing factor at each wave; PIL1-PIL4 = specific purpose in life factor at each wave; RSE1-RSE4 = specific self-esteem factor at each wave; HAP1-HAP4 = specific happiness factor at each wave; ω = McDonald's (1970) estimate of composite reliability. Here, ω is reported for factors measured at Waves 1 (AUT, SUS, INT) and Wave 2 (NS) and the G-factors for wellbeing at each Wave. Because ω assumes scale unidimensionality, a conservative approach dictates that it should only be interpreted for the G-factor in a bifactor model (Salavei & Reise, 2018).

Appendix H:

Study 2 Factor Scores Correlations

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. AUTH									
2. SUSC	-.122								
3. INTR	.395**	.313**							
4. Memory BPNS	.337**	-.103	.190*						
5. Memory Growth	.124	-.045	.245**	.215*					
6. WB1	.650**	-.274**	.140	.308**	.158				
7. WB2	.505**	-.246**	.178	.371**	.306**	.699**			
8. WB3	.513**	-.230*	.133	.410**	.168	.657**	.785**		
9. WB4	.543**	-.289**	.142	.296**	.184	.813**	.755**	.745**	
10. Sex	-.001	.002	.016	-.190*	.144	.056	.119	.231**	.259**

Note. AUT = authorship/self-congruence; SUS = susceptibility to control; INT = interest-taking, all at T1; memory BPNS = basic psychological need satisfaction associated with graduates' memories of unattainable university goals at Wave 2; memory growth = qualitative code assigned for the level of growth present in the memory description; WB – WB4 = G-factors for Global Wellbeing at Waves 1, 2, 3, and 4. All variables except memory growth are based on factor scores saved from the model of strict measurement invariance.

*$p < .05$. **$p \leq .01$.

Appendix I:

Goodness-of-Fit and Unstandardized Growth Parameter Estimates for Study 2 Unconditional Linear and Quadratic LCMs

Goodness-of-Fit						Fixed Effects			Random Effects		
	χ^2	*df*	RMSEA (90% CI)	CFI	TLI	Intercept	Linear Slope	Quadratic Slope	Intercept	Linear Slope	Quadratic Slope
Linear LCM											
1.	12.360*	5	.116 (.033-.199)	.971	.965	.018	-.112**		.531**	.000**	
Quadratic LCM											
2.	1.166*	1	.039 (.000-.260)	.999	.996	-.012	.074	-.130	.803**	1.740**	.603

Note. LCMs = Latent Curve Models; *df* = degrees of freedom; RMSEA = root mean square error of approximation; CI = confidence interval; CFI = comparative fit index; TLI = Tucker-Lewis index.

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