A Longitudinal Study of Subjective Age in University Students: Money Matters

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ABSTRACT

This longitudinal study explored intraindividual change across four years in 190 Canadian university students' (*M* age = 18.36; 60% female) subjective maturity, as indicated by their comparative subjective age (CSA; how old one feels relative to his or her chronological age). Students completed paper-and-pencil or web-based questionnaires five times across the first four years of their postsecondary education, beginning in the first month or two of their university experience. Multilevel modeling was used to investigate trajectories of CSA, and possible between-persons predictors (expecting parental financial support, parental autonomy support, whether they had left their parents' home, financial stress) of two growth parameters (their CSA at baseline as well as rate of change over time in CSA). Financial stress was also investigated as a within-person predictor to learn whether its deviations from baseline covaried across time with CSA. Contrary to the hypothesis of a downward linear trend across four years in CSA, the rate of change was not significant. Expecting more parental financial support was linked to a younger CSA at baseline, but parental autonomy support and whether the student had left home were not related to CSA at baseline or to change over time. Financial stress was a significant time-varying covariate of CSA; at times when students reported increases in financial stress from baseline, they also reported a younger CSA compared to times when they reported decreases in financial stress. Findings suggest that financial expectations and experiences matter for university students' subjective age, in line with a maturity gap perspective which proposes that delays in achieving adult status (e.g., financial independence) are associated with feelings of immaturity.

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CHAPTER I

Introduction

Age is fundamental to the study of human development. It is also a popular topic of discussion in everyday life. After all, how many times in our lives do we ask and answer the question "How old are you?" The most frequently and widely measured age construct is chronological age, defined as how long the individual has been living since birth, typified in the usual response (in years) to the "how old are you" question (Schwall, 2012). Although the measurement of chronological age has its practical and methodological value, this practice has received a considerable amount of criticism (Schwall, 2012). Some researchers argue that chronological age in fact measures the passage of time instead of the aging process, and alternative age constructs (e.g., biological age, subjective age) should be considered when trying to understand age-related changes in development (Montepare, 2009; Schwall, 2012).

Subjective age—how young or old individuals perceive themselves to be—is another age indicator, which was introduced and empirically studied since the 1950s (Barak & Stern, 1986; Montepare, 2009). But it is likely that subjective age questions such as "How old do you feel?" have been around informally for quite some time, as comparisons of age-related aches and pains seem to be a common topic of conversation around the kitchen table and in any coffee shop! Although subjective age was initially investigated in aging research (see Barak & Stern, 1986), it has attracted researchers with interests in other aspects of human development and even in other disciplines (e.g., marketing; Barak, 2009).

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One reason that it is important to consider alternatives to chronological age is because chronological age does not necessarily directly map onto other age indicators. For example, research shows a distinct pattern of chronological age differences in subjective age across the lifespan. In general, younger people (i.e., adolescents) tend to perceive themselves as older than their chronological age, whereas older individuals (i.e., age 30 and above) tend to perceive themselves as younger than their chronological age. Indeed, chronological age appears to be inversely related to subjective age among people in their late teens and 20s (Galambos, Turner, & Tilton-Weaver, 2005). From about age 30 onwards, most people feel younger than their chronological ages, unless and until they begin to experience poor physical health (Bowling, See-Tai, Ebrahim, Gabriel, & Solanki, 2005).

The apparent disconnect between one's chronological and subjective age suggests that the way that individuals experience their age is a psychological phenomenon that may be important to understand. And the fact that the average adolescent feels older than his or her age whereas the average 30-year-old feels younger than his or her age is a clue that there is an interesting underlying developmental process that is in need of further study. Indeed, to the extent that the pattern of chronological age differences in subjective age across the lifespan reflects actual within-person change, then individuals must cross over from a younger subjective age to an older one at some point in their 20s, a trajectory labeled the "crossover effect" (Galambos et al., 2005). The best way to understand this phenomenon is to observe, with a longitudinal research design, whether most individuals feel increasingly younger as they move from their teens into their 20s. However, there is

minimal, if any, longitudinal research examining subjective age among people as they pass from their teens and into their early 20s.

Although previous cross-sectional research has documented average chronological age differences in subjective age, it has also documented great interindividual variability in subjective age. In other words, even if the average adolescent feels older than his or her age, there are plenty of adolescents who feel younger (Montepare, 2009; Galambos, Kolaric, Sears, & Maggs, 1999). Similarly, some people in their 20s feel quite a lot older than others (Galambos et al., 2005). Such diversity in subjective age at any given chronological age deserves study and explanation. It is important to try to understand what makes some individuals feel older and others feel younger when they are in the same chronological age bracket.

The current study draws on a longitudinal study of university students to answer two broad questions that arise from the literature on subjective age in young people. First, can we begin to see a transition from an older to a younger subjective age in a group of first-year university students followed for four years (approximately ages 18 to 22)? Second, what factors might influence interindividual differences and intraindividual changes in subjective age among a sample of university students?

In this chapter, the concept of subjective age and its measurement will be discussed first, followed by a brief review of age-related trends in subjective age, with a particular focus on adolescence and the transition to adulthood, including the apparent crossover from an older to a younger subjective age, suspected to occur in the 20s. Known correlates of subjective age in adolescence and the transition to adulthood are then discussed, followed by research on the transition from adolescence to young

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adulthood in university students, providing a rationale for examining trajectories of change in subjective age and predictors of these trajectories in this population. Next, two theoretical perspectives guiding this study will be proposed. Specifically, the "maturity gap" and "subjective weathering" perspectives will be discussed as ways of considering how experiences associated with being a university student (e.g., level of perceived stress) might predict or covary with change in subjective age. These two perspectives can be considered complementary as, together, they lead to several largely compatible hypotheses that, when tested, may provide a more comprehensive picture of subjective age in a university population than if either perspective were considered alone. Potential predictors of interindividual differences in subjective age trajectories also will be reviewed in this section on these two perspectives. Finally, the chapter will conclude by posing the specific research hypotheses for the current study.

The Construct of Subjective Age

Subjective age is commonly defined as individuals' perceptions of how young or old they experience themselves to be (Montepare, 2009; Schwall, 2012). Its conceptualization and operationalization vary across studies. Some researchers argue that, because of the multidimensionality of the aging process (Schwall, 2012), subjective age should also be considered as a multidimensional construct with a variety of subcomponents and measured with multiple indicators. Barak and Stern (1986) proposed that subjective age consists of felt age ("I feel as though I am in my…[participant inserts a number reflecting their chronological age or chooses from a selection of different options provided by the researcher]"), look age ("I look as though I am in my…"), do age ("I do most things as though I were in my…"), and interest age ("My interests are mostly

those of a person in his/her…") (p. 571). Furthermore, Montepare (1996) suggested

subjective age consists of three dimensions: psychological (e.g., "Most of the time I

feel…"), physical (e.g., "My medical health is most like that of people who are…"), and

social (e.g., "When I'm with my family I feel…") (p. 202). However, other researchers

contend that subjective age should be treated as a unidimensional construct due to the fact

that responses to each dimension are highly intercorrelated (Montepare, 2009). Thus, a

single-item measure has often been used to assess the global subjective age construct.

One example of this type of measure is: "If you compare yourself to people your age,

how old do you feel in general?" (Teuscher, 2009, p. 25).

Furthermore, there are different types of subjective age response scales. For

example, some researchers prefer to measure a person's *absolute subjective age*, while

others prefer to measure *comparative subjective age* (Rubin & Berntsen, 2006; Teuscher,

2009). Absolute subjective age is assessed by asking participants to provide their

estimates in exact years (or in decades) in response to each stem question in a measure

(Rubin & Berntsen, 2006; Teuscher, 2009). In this case, numerical values assessing

subjective age in years are typically generated. Comparative subjective age is usually

assessed by asking participants to indicate whether they are younger than, the same as, or

older than their chronological age with respect to each item in a measure (Barak & Stern,

1986; Galambos et al., 2005; Rubin & Berntsen, 2006). In this case, comparisons are

made by participants without necessarily having an exact number in mind. For the current

study, comparative subjective age will be used as it provides firm lower (e.g., I feel a lot

younger than my age) and upper (e.g., I feel a lot older than my age) boundaries for

responses, leaving less room for questionable responses (e.g., I feel like I am 1000 years old).

Age-related Patterns in Subjective Age

Despite differences in conceptualization and operationalization of subjective age from study to study, consistent chronological age-related patterns of subjective age have been identified. Barnes-Farrell and Piotrowski (1989) conducted a cross-sectional study among U.S. individuals whose ages ranged from 18 to 65 years. The results showed that the majority of people under the age of 29 felt the same as or older than their chronological age, whereas the majority of people between the age of 30 and 65 felt the same as or younger than their chronological age. In addition, with increased age, there were increases in the discrepancies between chronological age and subjective age. Another U.S. cross-sectional study among individuals whose ages ranged from 15 to 83 years yielded similar results: adolescents felt older than, young adults felt the same as, and older adults felt younger than their chronological age (Montepare & Lachman, 1989). Similarly, for older adults with a younger subjective age, the older they were, the more pronounced the discrepancies between their chronological age and subjective age. More recently, a cross-sectional study of Danish participants between 20 and 97 years of age reported similar patterns of subjective age across the lifespan (Rubin & Berntsen, 2006). Furthermore, by asking participants to estimate their felt age in years, Rubin and Bertnsen (2006) calculated the discrepancies between chronological age and subjective age. Despite increased discrepancies in years with advancing chronological age, the proportional discrepancy remained stable after age of 40. Specifically, adults who were

40 years old or above and who had younger subjective ages consistently reported feeling approximately 20% younger than their chronological age.

Given these cross-sectional patterns particularly with respect to people in their teens and 20s, several authors have proposed that individuals cross over from an older to a younger subjective age around age 25 (Galambos et al, 2005; Montepare & Lachman, 1989; Rubin & Berntsen, 2006). However, to my knowledge, no longitudinal study has examined trajectories of change in subjective age in the transition to adulthood, the only way to learn whether and when a crossover happens. One objective of the present study is to document the trajectory of change in subjective age in a group of university students followed for four years of university. Although it is not possible with these data to examine trajectories of change in subjective age beyond the first few years of the early 20s or to observe whether the change from an older to a younger subjective age occurs by age 25, we ought to be able to see a decrease in subjective age, consistent with the beginning of a crossover, in university students as they develop from 18 to 22.

Although most research on subjective age has relied either on cross-sectional data in samples ages 18 or above or concentrated in aging populations, there is some research on subjective age in adolescence that can inform the current study. The research on people in their 20s (i.e., the transition to adulthood) is quite limited. Given the population of interest for the present study, research on subjective age in adolescence and the transition to adulthood is discussed in the following section.

Subjective Age in Adolescence and the Transition to Adulthood

Although teenagers tend to feel slightly older than their chronological age, there still is considerable variability in subjective age (Arbeau, Galambos, & Jansson, 2007;

Montepare & Lachman, 1989; Montepare, 2009). What predictors might help to explain subjective age in adolescents? Pubertal timing, externalizing and internalizing problems, personal relationships, and childhood abuse and economic hardship are examples of predictors of subjective age in adolescence.

A study of adolescents ages 10 and 14 showed that late maturing boys and girls had a lower mean subjective age than their on-time or early maturing counterparts (Hubley & Arim, 2012). Early pubertal timing was associated with an older subjective age in a select sample of adolescent girls (Turner, Runtz, & Galambos, 1999). Hubley and Arim (2012) also found that higher levels of externalizing (e.g., alcohol use, drug use, and swearing) and internalizing (e.g., anxious and depressed feelings) problems were associated with an older subjective age in adolescent girls, but not boys. In another study of a select sample of 15-year-olds, Galambos et al. (1999) found that higher levels of problem behaviours, such as substance use, were associated with an older subjective age for both girls and boys. Arbeau et al. (2007) showed similar associations in a larger, more representative sample aged 12 to 19 years. In addition, when these 12- to 19-year-olds were followed up two years later, more use of alcohol and drugs predicted an increase in subjective age (Galambos, Albrecht, & Jansson, 2009). This study also found that adolescents who were dating at the beginning of the study felt older than non-dating adolescents after two years. Moreover, having had sexual experience, especially at a younger age, was associated with an increase in subjective age. Another large-scale study that followed females from age 11 to 21 demonstrated that childhood and adolescent stressors (e.g., sexual abuse) and economic hardship were associated with feeling older than their peers at age 21 (Foster, Hagan, & Brooks-Gunn 2008). From these studies, we

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conclude that an older subjective age in adolescence may be associated with internalizing and externalizing problems and stress.

Compared to research on subjective age in adolescence, little is known about the psychological correlates of subjective age during the transition to adulthood. In a study of university students between the ages of 17 to 29, higher levels of self-reported psychosocial maturity (i.e., autonomy, identity, and intimacy) were linked with an older subjective age (Galambos et al., 2005). A similar relationship was found in another study of individuals with motor disabilities between the ages of 20 to 30—an older subjective age was associated with higher levels of self-reported psychosocial maturity with respect to industry, autonomy, identity, and intimacy (Galambos, Darrah, & Magill-Evans, 2007). In addition, in people in their late teens and early 20s, the highest levels of life satisfaction were found in those with the oldest subjective ages (Montepare & Lachman, 1989). An older subjective age was also positively related to self-confidence in a sample of university students (Montepare, 1991). This limited body of research on subjective age in the transition to adulthood indicates that an older subjective age is associated with indicators of psychosocial maturity, typically based on self-report measures, contrasting with findings that an older subjective age is associated with poorer adjustment in adolescence. Given the relative lack of research on psychosocial correlates of subjective age in people in their early 20s, it is important to look further into constructs that might influence or covary with level of and changes in subjective age during this age period.

The Transition from Adolescence to Young Adulthood for University Students

The period from the late teens through early 20s has long been recognized by scholars in many areas of scholarship (e.g., psychology and sociology) as an important

period of life (Benson, 2013; Furstenberg, Rumbaut, & Settersten, 2005), and has been

variously labeled as the transition to adulthood, youth, and emerging adulthood (Arnett,

2007). This is an interesting portion of the lifespan because of the many opportunities and

challenges experienced by young people in their late teens and early 20s (Furstenberg et

al., 2005). Their decisions and actions —with respect to education, career, and

relationships—not only take shape during this period, but have substantial influences on

subsequent life experiences (Benson, 2013). Thus, it is important for researchers to

understand development during the transition to adulthood. It is interesting that this

portion of the lifespan has received little empirical attention in general from lifespan

developmental psychologists, relative to other segments (such as childhood, adolescence,

and late life), and that subjective age specifically has been studied rarely.

One major decision that young people make in their late teens and early 20s

concerns the choice to pursue higher education. Postsecondary education used to be an

option for just a small group of young people from higher socioeconomic (SES) family

backgrounds (Benson, 2013; Bynner, 2005; Sewell, 1971). However, with globalization

of the economy, advances in technology, and the structure of the modern labor market,

obtaining at least some postsecondary education (PSE) has almost become a necessity for

young people who wish to land jobs that pay well, have potential for advancement and

benefits, and allow them to flourish (Benson, 2013; Bynner, 2005). Indeed, a Statistics

Canada study showed that, in 1999, 21% of young people aged 18 to 20 years attended

university, but by 2005, the number was 40% (Shaienks, Gluszynski, & Bayard, 2008).

Thus, the university context is an important part of the ecology of human development

for a substantial proportion of Canadians.

The reason that subjective age is interesting in this context specifically rests with the fact that involvement in PSE necessarily prolongs the transition to adulthood. During the transition from high school to university, parents have greater expectations about autonomous behaviours in their children, while the latter expect to be emotionally and functionally still dependent on their parents (Kenyon & Koerner, 2009). In fact, many young people in university do not feel as though they have become adults (Arnett, 1994; Nelson & Barry, 2005). By following young people upon entering university, the current study may be able to shed some light on how subjective age changes as their life experiences unfold through the first four years of university.

Although university students have a common goal—the achievement of a postsecondary degree—they carry different levels of instrumental and psychosocial resources into the transition, and they make various life choices that differ from person to person and from one situation to another. Therefore, there are bound to be both substantial interindividual differences in and intraindividual change in subjective age among university students during their prolonged transition to adulthood. The current study aims to explore intraindividual changes, as well as interindividual differences in intraindividual changes, in subjective age across four years of university.

Moreover, given that the crossover from having an older to a younger subjective age is projected to occur around age 25 (Galambos et al., 2005; Montepare & Lachman, 1989; Rubin & Berntsen, 2006), four years of university will likely bring students closer to the proposed point at which individuals are expected to feel younger than they are. The current study intends to document a decreasing trend in subjective age, if it actually exists.

"Maturity Gap" and "Subjective Weathering" Perspectives on Subjective Age

Two complementary theoretical perspectives have been taken into consideration to guide the present study: *maturity gap* and *subjective weathering*. These two perspectives are complementary in that each contributes towards identifying possible covariates of subjective age, which together, will provide a more comprehensive picture of determinants of subjective age. First, the maturity gap perspective proposes that delays in making adult role transitions will lead to feelings of immaturity, or a younger subjective age, whereas timely entrance into new adult roles should lead to feeling more mature, or an older subjective age (Moffitt, 1993; Galambos, Barker, & Tilton-Weaver, 2003). Second, the subjective weathering perspective proposes that the accumulation of hardship and stress experiences will accelerate the experience of aging, and may therefore lead to an older subjective age (Foster et al., 2008; Johnson & Mollborn, 2009). These two perspectives will be reviewed next, considering how they contribute to an understanding of the unfolding of subjective age in university students.

Maturity gap perspective. Many youth experience a gap between their biological maturity and their social status, a discrepancy that produces discomfort (Moffitt, 1993). Specifically, adolescents reach physical maturity long before they are entitled to the desired rights and privileges associated with adulthood, and well before most establish emotional, financial, and social independence (Moffitt, 1993; Stattin & Magnusson, 1990; Tilton-Weaver, Kakihara, Marshall, & Galambos, 2011). Furthermore, this gap is prolonged for university students as many of them may have to wait years before the achievement of important role transitions—leaving home, completing their education,

obtaining their first "real" job, getting married, and starting a family (Benson, 2013;

Furstenberg et al., 2005).

Some researchers have argued that individualistic criteria for adulthood (i.e.,

behaviours such as being responsible for one's actions) are more important than role

transitions for creating self-perceptions of feeling older, more mature, and more like an

adult. Indeed, studies of individuals in their late teens and early 20s consistently indicate

that the majority considered being responsible for their own actions, independent

decision-making, and financial independence as necessary for adulthood, more so than

making role transitions such as getting married (Arnett, 1994, 1998). Nevertheless, some

research revealed that, despite changing timing and sequencing in modern societies, role

transitions (e.g., leaving home, getting married, and becoming a parent) were still

essential in predicting self-perceived adulthood in young people (Kins & Beyers, 2010;

Shanahan, 2000; Shanahan, Porfeli, Mortimer, & Erickson, 2005).

With respect to adolescent samples, research has shown that some seem to try to

overcome the maturity gap by engaging in adult-like behaviors (e.g., smoking and

drinking), which helps them to acquire a sense of maturity (Galambos & Tilton-Weaver,

2000), or engaging in delinquency, which rewards them with material goods, privileges,

and power over peers, all of which could lead to a (false) sense of maturity (Moffitt,

1993). Indeed, an older subjective age, which is an indicator of subjective maturity, was

linked to higher levels of adolescent problem behaviors, involvement with troubled peers,

more experience with dating, and sexual experience (Arbeau et al., 2007; Galambos et al.,

2009; Galambos et al, 1999).

Although many university students are also caught in a maturity gap, smoking, drinking, and having sex are all legal and normative at this age, unlike for their younger counterparts. Thus, engaging in these behaviours are not likely to carry the same meaning or have the same import with respect to subjective age. Given this, what behaviours might we expect to be related to an older subjective age in university students? Considering the fact that both individualistic criteria and transition markers are thought to be important for self-perceptions of maturity, the present study will focus on four possible predictors (expecting parental financial support, experiencing financial stress, having parental support for autonomy, and leaving home) of subjective age that are important because they may speak to the level of self-sufficiency in university students.

Being able to support oneself financially has been named by individuals in the transition to adulthood as one of the hallmarks of becoming adult (Arnett, 1994, 1998, 2000). The achievement of financial independence can bring a sense of maturity, and hence an older subjective age in young people. However, attending university as a full-time student is usually in conflict with having a full-time job and being financially independent from parents (Arnett, 1998). How financial independence is related to interindividual differences and intraindividual changes in subjective age in students across four years of university is an intriguing question. In particular, the current study plans to examine financial independence in university students by asking what their expectations are for parental financial support (i.e., expecting parents to pay for some expenses). Expecting parental financial support refers to the extent to which students believe that their parents should be responsible for paying tuition, living expenses, and transportation. It makes sense that the more that students expect their parents to

financially support them, the less their financial independence. But there are few, if any, studies on expectations of parental financial support and subjective age. From a maturity gap perspective, it is likely that stronger expectations for parents' financial support will be negatively related to subjective age. That is, students who expect more financial support from their parents will feel younger than students who expect less financial support. Expecting financial support from parents implies that the student is caught in the maturity gap.

In addition, the association between subjective age and financial stress will also be examined. Financial stress refers to students' subjective judgements—whether they are worried or relaxed—regarding their current financial situation. Many university students have high debt loads such as student loans and credit card debt, which puts them in difficult situations and makes them feel unsettled financially (Cooke, Barkham, Audin, Bradley, & Davy, 2004; Roberts et al., 2000). The economic downturn of 2008 and related decreases in full-time student employment rates (Marshall, 2010) may amplify the stresses that university students experience around money. Higher levels of financial stress may be interpreted by students as a lack of financial independence to the extent that financial stress implies a lack of self-sufficiency. As a result, higher financial stress could be associated with feeling younger – or of still being caught in a maturity gap. On the other hand, financial stress could be interpreted as an indicator of growth towards self-sufficiency, as students increasingly take on more responsibility for their financial affairs even if they cannot comfortably cover all of their own expenses. Therefore, it is possible that higher financial stress could be related to an older subjective age, as financial

independence in the early years of adulthood is likely to be accompanied by financial stress.

In addition to financial independence, an important criterion for adulthood named by young people involves feelings of autonomy and independence from parental influence with respect to beliefs, values, and making one's own decisions (Arnett, 1994, 1998, 2000). A longitudinal study of young adolescents and high school seniors showed that authoritative parenting practices, especially higher levels of psychological autonomy granting, seemed to enhance psychosocial maturity and promote academic success in young adolescents (Steinberg, Elmen, & Mounts, 1989). Similarly, perceived parental autonomy support was positively related to late adolescents' feelings of autonomy and academic persistence (Ratelle, Larose, Guay, & Senécal, 2005). Moreover, higher levels of psychosocial maturity were associated with an older subjective age in a sample of university students (Galambos et al., 2005). Therefore, whether mothers or fathers facilitate university students' sense of autonomy and independence may be linked to individual differences and changes in subjective age as well.

Few studies, however, have examined the potential relationship between parental autonomy support and subjective age. In an exception, Galambos et al. (2007) did not find perceived mothers' and fathers' autonomy facilitation to be associated with subjective age in their sample of 20- to 30-year-old individuals with and without motor disabilities. But perhaps parental autonomy facilitation was less important for this sample, as the majority were already employed and had moved away from parents. In addition, they found that individuals without motor disabilities reported significantly higher levels of father autonomy facilitation than did individuals with motor disabilities,

but there was no group difference in the extent to which mothers were perceived as facilitating autonomy. This suggests that mothers and fathers might differ with respect to how much autonomy support they provide. Therefore, mothers and fathers are considered separately in the present study, and consistent with a maturity gap perspective, lower levels of autonomy support are expected to predict a younger subjective age in university students.

One of the critical transition markers of adulthood that ought to be taken into consideration in studying university students is home leaving (Shanahan et al., 2005). Although, in general, young people today delay the completion of school and entry into the work force, marriage, and parenthood, many still leave the parental home for various reasons, including the pursuit of higher education (Benson, 2013; Clark, 2007). A random sample of undergraduate students in Canada revealed that 60% were not living with parents at the time of the survey (Canadian University Survey Consortium [CUSC], 2011), and recent census data from Statistics Canada (2012) showed that, among young people aged 20 to 24, 40.3% lived in a non-parental home. It is also worth noting that there has been a growing number of young people returning to the parental home after their initial departure in recent decades (Mitchell, 2006; Settersten & Ray, 2010). For university students, this move-in-and-out phenomenon may occur as they proceed though their education. In a sample of young Belgians in their early 20s, living with parents was associated with achieving fewer criteria for adulthood than independent living (Kins & Beyers, 2010). Whether leaving home will be linked with subjective age in the same direction in a sample of university students remains an open question. Specifically, living

in the parental home is expected to be associated with a younger subjective age in the present study because it prolongs the maturity gap.

Subjective weathering perspective. The idea of weathering has been discussed in the study of aging and health (Geronimus, 1996; Geronimus, Hicken, Keene, & Bound, 2006). The weathering hypothesis suggests that the accumulation of stress due to repeated experiences of economic adversity and social inequality can lead to health consequences for disadvantaged groups, resulting in early physical maturation, early health deterioration, and accelerated aging (Geronimus et al., 2006; Obeidallah, Brennan, Brooks-Gunn, Kindlon, & Earls, 2000). Foster and colleagues (2008) further argue that there is also a psychosocial component in the weathering process, namely subjective weathering. Subjective weathering implies that earlier exposure to stress will lead to accelerated subjective aging, observable in adolescence and young adulthood, before early health deterioration in middle age (Foster et al., 2008).

For instance, in the National Longitudinal Study of Adolescent Heath (Add Health) 15-year-old adolescent girls followed to age 21 revealed that childhood stresses (i.e., neglect) as reported at age 21 and adolescent stresses (i.e., verbal abuse) as reported at age 16 were associated with feeling older than peers at age 21. Furthermore, early adult role transitions such as having become a parent and having left home in the early 20s were also associated with feeling older and more mature at age 21 (Foster et al., 2008). In another study based on Add Health data, having less educated parents, coming from lower SES backgrounds, not living in married biological-parent families, feeling unsafe or having experienced violence, and having experienced recent residential moves predicted an older subjective age at approximately age 22. Role transitions such as

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childrearing, marriage/cohabitation, independent living, and not being a student as reported at age 22 were also linked with an older subjective age (Johnson & Mollborn, 2009). These results suggest again that stresses might accumulate, leading to feeling older, and recent stresses might trigger an immediate response with respect to subjective aging.

It is essential to understand stress accumulation as a gradual process (Ferraro & Shippee, 2009) which does not stop after adolescence. Attending university, especially for the first time, can lead to stress accumulation as well (Dyson & Renk, 2006; Wintre & Yaffe, 2000). University students must meet challenging and demanding academic requirements, form new interpersonal relationships, move away from home, and experience financial difficulties (Andrews & Wilding, 2004; Buote et al., 2007; Fisher & Hood, 1987; Paul & Brier, 2001; Shim, Barber, Card, Xiao, & Serido, 2010; Tao, Dong, Pratt, Hunsberger, & Pancer, 2000). However, there is no known longitudinal study examining what influence such stresses may have on subjective aging across the first few years of university. Given that accelerated subjective aging (i.e., subjective weathering) was documented among stress-exposed participants in their early 20s (Foster et al., 2008; Johnson & Mollborn, 2009), the current study examines whether subjective weathering due to two types of stress-exposure (financial and living away from parents) will be observed in university students.

Financial stress (i.e., whether students feel comfortable or anxious about their current financial situation) is directly relevant, as it is one of the most frequently reported stressors experienced by university students (Ross, Niebling, & Heckert, 1999). In contrast to the two alternatives posed by the maturity gap perspective, in which the

direction of the relationship between financial stress and subjective age could be positive or negative, the subjective weathering perspective leads to a clear prediction in which higher levels of financial stress should be associated with an older subjective age due to accelerated subjective aging.

Independent living can be a stressful experience for university students as they have to balance school and household routines on a daily basis. As a result, students who have left their parents' home may experience higher levels of stress, and in turn may have an older subjective age. This prediction is in the same direction as that derived from the maturity gap perspective. Although both the maturity gap perspective and the subjective weathering perspective lead to the same prediction, the rationale behind the former is driven by the idea that the maturity gap can be reduced through self-sufficiency while the latter is based on the supposition that leaving home is inherently stressful and contributes to psychological aging.

It is unclear how the subjective weathering perspective would lead to predictions concerning expectations for parents' financial support and perceptions of parental autonomy granting. Specifically, expecting parental financial support is not necessarily indicative of stress exposure. Students who expect more financial support from their parents might do so as a result of experiencing more financial stress but they might also be from high-SES families with the means and the will to provide high levels of financial support not only while growing up but also during university. Similarly, it is unclear whether perceptions of parental autonomy granting imply more or less stress in university students' lives. Higher levels of parental autonomy support may be beneficial for more mature and independent students, while the same levels of autonomy granting could be

stressful for those who are not psychologically ready. As a result, no associated

hypotheses are generated from the subjective weathering hypothesis.

The Current Study

In this longitudinal study, a group of first-year university students of the same

chronological age (i.e., under 19 years old) were tracked from their first semester through

their fourth year, completing paper-and-pencil or web-based questionnaires. They

participated monthly in their first year and completed questionnaires annually in their

second, third, and fourth year. For the present study, I ask the following research

questions with respect to interindividual (between-persons) differences and

intraindividual (within-person) changes in comparative subjective age (CSA; e.g., how

old they feel relative to their chronological age):

1. Across four years of university, what is the average trajectory of change in

   CSA among students? Based on previous cross-sectional research on

   subjective age in adolescents and young adults (Galambos et al., 2005;

   Montepare & Lachman, 1989; Rubin & Berntsen, 2006), I hypothesized that,

   on average, university students will feel older than their chronological age to

   start with, and their CSA will decrease in a linear fashion as individuals

   develop from their late teens (approximately age 18) through their early 20s.

2. Are expectations of parental financial support at study onset (a between-

   persons predictor) a source of interindividual differences in CSA? Students

   who expect more financial support from parents are less financially

   independent and further away from narrowing the maturity gap. Therefore,

   based on the *maturity gap* perspective, I hypothesized that students entering

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university with higher expectations of parental financial support would on average have a younger CSA at baseline than their peers with lower expectations. Or in other words, there would be level differences in trajectories of CSA based on students' expectations for how much financial support they expect from their parents. It is unclear how the rates of change in CSA would be influenced by expectations for parents' financial support. There is no obvious hypothesis to be derived from the subjective weathering perspective with respect to expectations for parents' financial support.

3. Is financial stress related to CSA, and if so, what is the nature of the relationship? As financial stress is a construct that may be time-dependent, it will be treated as a time-varying covariate of CSA in the current study, as long as there is evidence that financial stress is not stable across four years (e.g., high stability in financial stress from one year to the next would suggest that financial stress might be better treated as a time-invariant or between-persons predictor rather than a time-varying covariate). Following the *maturity gap* perspective, university students may perceive higher levels of financial stress as a lack of financial independence or alternatively, as indicative of financial independence. I therefore allowed for the possibility of both negative and positive associations with subjective age. On the other hand, from the *subjective weathering* perspective, it is clear that higher levels of financial stress could be hypothesized to accelerate subjective aging in university students. Thus, if I find that higher financial stress is linked with an older

CSA, then there may be support for subjective weathering. No predictions of rates of change in CSA were derived from the two perspectives.

4. Are mothers' and fathers' autonomy support related to CSA, and if so, what is the nature of the relationship? Because parents' support for autonomy could change as students embark upon and progress through university, parental autonomy support may be treated as a time-varying covariate in the current study, unless stability coefficients indicate that it should be treated as time-invariant. Lower levels of parental autonomy support may reinforce the feeling of being caught in the maturity gap. As a result, from the *maturity gap* perspective, I hypothesized that university students with lower levels of perceived parental autonomy support would have a younger CSA compared to their peers with higher levels of parental autonomy support. The subjective weathering hypothesis does not lead to a clear hypothesis about the nature of the association between parental autonomy support and CSA.

5. Are living arrangements (specifically, whether students have left the parental home) related to CSA? Given students' potential propensity to move back and forth between parents' homes and other living situations, whether they left home or not will be treated as a time-varying covariate in the current study if preliminary analysis shows that there is instability in living arrangements over time. From the *maturity gap* perspective, home leaving may be considered as an important role transition that would help close the gap, while living with parents may be perceived as a lack of independence. Therefore, I hypothesized that university students, if living in the parental home, would have a younger

CSA than their independently living counterparts. From the *subjective weathering* perspective, living independently may lead to greater daily hassles and increased levels of stress. Thus, this perspective also leads to the hypothesis that university students who lived with parents would have a younger CSA.

CHAPTER II

Method

Participants

Participants were 190 students (60% female) in a longitudinal study at a large university in Canada who were followed for up to four years beginning in September or October of their first year (baseline): *Making the Transition II*. *Making the Transition II* was designed to observe how first-year students experienced their first and subsequent years of university and included measures of their academic, psychosocial, and health and risk behaviours. At baseline, the average age of the 190 participants was 18.36 years (*SD* = .48); 74% self-identified as Caucasian, 12% Asian, 3% Indo-Canadian, 5% other visible minorities (i.e., Black, Arabic, Latino, and Aboriginal), and 5% other. At study onset, 52% of the participants lived with parents, 28% lived in campus residence, 15% lived in their own place (either alone or with roommates), and 5% lived with relatives other than parents. Most (97%) had never married. The majority (86%) of the participants grew up in two-parent households. Three quarters of their mothers and fathers completed some kind of postsecondary education (i.e., college, technical school, or university). The largest proportion of participants were enrolled in the Faculty of Science (41%), followed by 32% in Arts, 21% in Engineering, and 7% in other faculties (e.g., Agricultural, Life, and Environmental Sciences). Table 1 presents sample characteristics at study onset.

The characteristics of the current sample of 190 students at baseline reasonably represents the undergraduate population in Canada at the time the sample was recruited. For example, a survey of undergraduates across Canada showed that, in large institutions, 63% were female compared with 60% in the current sample; 18% self-identified as non-

Table 1

Sample Characteristics at Wave 1

Variable	%
Age	
16 or 17	19.5
18 or 19	80.5
Gender	
Female	60.0
Male	40.0
Ethnicity	
Aboriginal	0.5
Arabic	1.1
Asian	12.1
Black	2.1
Caucasian	74.2
Indo-Canadian	3.2
Latino	1.1
Other	5.2
Parent's highest level of education	
Mother	
Elementary school	2.1
High school	22.6
College/Technical school	32.1
University	42.6
Father	
Elementary school	3.7
High school	20.5
College/Technical school	33.2
University	41.6
General living situation growing up	
With both parents	86.3
With single parent	2.6
Combination	11.1
Current living arrangement	
With parents	51.6
With other relatives	5.3
In residence	28.4
Own place	14.7
Marital status	
Never married	96.8
Married	1.1
Cohabiting	1.6
University faculty in which enrolled	
Agricultural, Life, and Environmental Sciences	4.2

Arts	31.6
Engineering	21.1
Native Studies	.5
Physical Education and Recreation	2.1
Science	40.5

Note. Total *N* = 188-190.

Caucasian compared to 16% in the current sample; 49% lived with parents compared to 52% in the current sample (Canadian Undergraduate Survey Consortium [CUSC], 2005). The distribution of Faculties enrolled at baseline was similar to the actual distribution of first-year students in this participating institution around the time of the study onset. For instance, 33% of first-year full-time students at the university were enrolled in the Faculty of Science compared to 41% in the current sample, and 31% at the university were enrolled in Arts compared to 32% in the current sample (University of Alberta, 2006).

Procedure

In fall 2005 and in an effort to obtain a broad and representative cross-section of first-year students at the university, participants were recruited from compulsory courses (e.g., English) that served nearly the entire population of first-year students. Research assistants went into classes to provide information and invite students to participate if they met the study criteria. Criteria were that they were in their first year of any postsecondary education and that they were under 20 years of age. These criteria ensured that the sample's transition through the first year of university was a new experience and that chronological age was controlled by being restricted. Interested full-time students (N = 198) signed up for an initial group session held in either September or October, 2005. During the group session, participants completed consent forms and pen-and-paper baseline questionnaires. At this session, participants were also invited to take part in monthly, web-based surveys throughout their first year. Later they were invited to complete a pen-and-paper questionnaire near the end of their second year, and web-based surveys near the end of their third and fourth years. From the baseline questionnaire,

monthly surveys, and annual questionnaires, five waves of data were used for the current study. Wave 1 data were taken from the baseline (September/October 2005) questionnaire, Wave 2 data were taken from monthly surveys completed near the end of the first academic year (February or March or April 2006), Wave 3 data were taken from the questionnaire completed in March 2007, Wave 4 data were taken from the questionnaire completed in February 2008, and Wave 5 data were taken from the questionnaire completed in March 2009.

Of the original sample of 198 students, retention was 76% (151 students) at Wave 2 (March 2006), 46% (92 students) at Wave 3 (March 2007), 54% (106 students) at Wave 4 (February 2008), and 46% (92 students) at Wave 5 (March 2009). Of the original sample, 30% (60 students) participated in these five waves of data collection, 16% (32 students) in four waves, 13% (25 students) in three waves, 28% (55 students) in two waves, and 13% (26 students) only at baseline. It should be noted that in any given wave, some non-participating students were not registered at the university (dropped out of the university either temporarily or permanently). For example, 35 of the original 198 participants were no longer registered at the university in the fourth year, making the effective four-year retention rate 57% (92/163 who remained at the university). In order to form the sample for the current study, students who failed to respond to key variables at baseline were excluded. Eight cases were omitted due to missing values for whether they had left home, financial stress, or mother or father autonomy support, resulting in a final sample of 190 students for the current study.

Attrition Analysis

A series of comparisons on variables examined in the present study (i.e., subjective age, expecting parental financial support, financial stress, mother autonomy support, father autonomy support, living arrangement, chronological age, and parental education) as well as on gender, were conducted to compare the students who were present (nonattritors) to students who were missing (attritors) at each wave of data collection. They were compared on their responses on the selected measures as reported at baseline.

Comparing the Wave 2 nonattritors and attritors, only financial stress differed significantly at baseline: nonattritors experienced lower levels of financial stress ($M =$ 1.84, $SD = .67$) at baseline compared to attritors ($M = 2.09$, $SD = .71$), $t(188) = 2.17$, $p \leq$ *.05*. Wave 3 nonattritors were more likely to have lived with their parents at baseline than attritors, $t(188) = 2.09$, $p \leq .05$. Wave 4 nonattritors appeared to have higher levels of father autonomy support ($M = 2.83$, $SD = .60$) at baseline than attritors ($M = 2.64$, $SD =$ .75), $t(188) = -2.01$, $p \leq .05$. Finally, Wave 5 nonattritors, again, were more likely to have lived in the parental home at baseline compared to attritors, $t(188) = 2.71$, $p \leq .05$. Overall, there was no evidence that nonattritors and attritors were significantly different with respect to baseline subjective age, expecting parental financial support, mother autonomy support, chronological age, parental education, and gender. The effect of attrition (dropout status) on the main findings is examined in a supplementary analysis reported at the end of the Results section.

Measures

Appendix A lists all the measures by time. *Time* was coded as 0 = *Wave I/baseline (September or October 2005)*, *.42 = Wave 2 (March 2006)*, *1.42 = Wave 3 (March 2007)*,

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2.34 = *Wave 4 (February 2008)*, and 3.42 = *Wave 5 (March 2009)*, which represented the amount of time, in years, that had passed since baseline. Because Wave 2 variables were taken from data collected in February, March, or April 2006 (see Appendix A for more details), I decided to code Wave 2 based on when subjective age, the outcome variable for the current study, was assessed. Major study variables and their psychometric properties are presented in Table 2.

Students'*comparative subjective age* (CSA) was measured at all waves with a four-item scale taken from a seven-item scale used in previous studies (e.g., Galambos et al., 2003; Galambos et al., 2007; Galambos & Tilton-Weaver, 2000; see Appendix B for the complete list of seven items from which four were derived after examining measurement invariance). Sample items include: "Compared to most people my age, most of the time I feel ___;" "My interest and activities are most like people who are ___ (Montepare, Rierdan, Koff, & Stubbs, 1989);" "Compared to most people my age, I think of myself as ___ (Galambos & Tilton-Weaver, 2000)." Items were rated on a scale ranging from 1 (*a lot younger*) to 4 (*the age I am*) to 7 (*a lot older*).

Confirmatory factor analysis was performed on the original seven items to test a 1-factor model and measurement invariance, across both gender and time, using Mplus 7.11 (Cheung & Rensvold, 2002; Kline, 2010; Little, 2013; Vandenberg & Lance, 2000). General CFA identified items 2, 4, and 5 as problematic due to small factor loadings (standardized factor loading = .43 for item 2, .47 for item 4, and .53 for item 5). In addition, the content of items 4 and 5 raised issues about their face validity—the two items asked participants to make assumptions about how their friends and peers perceived them with respect to subjective age. Therefore, I decided to drop items 4 and 5. I then

Table 2

Psychometric Properties of the Major Study Variables

Variable	n	α	Range of Scores
Comparative subjective age			
Wave 1	190	.82	2.25 – 7.00
Wave 2	143	.87	2.25 – 6.75
Wave 3	86	.80	2.25 – 7.00
Wave 4	96	.87	1.50 – 7.00
Wave 5	84	.86	2.25 – 6.75
Expecting parental financial support			
Wave 1	190	.73	0.00 – 7.00
Financial stress			
Wave 1	190	.93	1.00 – 3.88
Wave 2	157	.95	1.00 – 4.00
Wave 3	87	.93	1.00 – 4.00
Wave 4	95	.93	1.00 – 4.00
Wave 5	83	.94	1.00 – 4.00
Mother autonomy support			
Wave 1	190	.88	0.86 – 3.86
Wave 2	152	.90	0.36 – 4.00
Wave 3	86	.85	0.29 – 3.86
Wave 4	95	.84	0.64 – 3.86
Wave 5	83	.86	0.14 – 4.00
Father autonomy support			
Wave 1	190	.87	0.50 – 3.93
Wave 2	153	.88	0.43 – 4.00
Wave 3	87	.79	1.07 – 3.93
Wave 4	94	.77	1.07 – 4.00
Wave 5	82	.82	0.79 – 4.00

tried to test gender invariance by first fitting a configural invariance model using the remaining five items. Standardized factor loadings for item 2 remained small for both women (.47) and men (.25), which suggested that item 2 might not be a good indicator for the latent construct of subjective age. I then decided to drop item 2 from the scale. Subsequent measurement invariance analyses were all based on the final four-item scale.

With respect to gender invariance at Wave 1, as show in Table 3, the configural invariance model demonstrated good model fit, $\chi^2 (4) = 13.10$, RMSEA = .15, CFI = .97, SRMR = .04. I then proceeded to test metric invariance, and obtained good model fit statistics, $\chi^2 (7) = 13.44$, RMSEA = .10, CFI = .98, SRMR = .04. Finally, the scalar invariance model was tested and supported with good model fit indices, $\chi^2 (10) = 17.31$, RMSEA = .09, CFI = .98, SRMR = .05. Chi-square difference tests showed no significant differences between the configural and metric invariance model, as well as the metric and scalar invariance model (see Table 3 for details).

I then tested invariance across time by first fitting a configural invariance model. Model fit statistics were good, $\chi^2 (144) = 297.23$, RMSEA = .07, CFI = .91, SRMR = .08. Next, a metric invariance test was performed. Model fit indices suggested invariance of factor loadings over time, $\chi^2 (156) = 312.78$, RMSEA = .07, CFI = .90, SRMR = .10. Finally, a scalar invariance model was tested and supported, $\chi^2 (168) = 323.51$, RMSEA = .07, CFI = .91, SRMR = .10. No significant results were obtained from chi-square difference tests (see Table 3 for details). The mean across four items was calculated, with higher mean scores indicating an older CSA (α = .80 to .87 across waves). In the final analysis, CSA was centered by subtracting 4 from the mean score for each participant. Therefore, a centered CSA of 0 means feeling the same age as one is chronologically.

Table 3

Measurement and Invariance Models for Subjective Age (4-Item Version)

Models	Exact Fit Test χ^2 (df, N)	Approximate Model Fit Indices			Standardized Loadings	Model Comparisons	$\chi^2 \Delta$ (df)
		CFI	*RMSEA* (90% C.I.)	SRMR			
Measurement Models at W1							
General CFA 1 (All 7 items)	51.34 (14, 197)*	.91	.12 (.08–.15)	.06	.43–.80		
General CFA 2 (Item 2, 4, 5 removed)	11.45 (2, 197)*	.97	.16 (.08–.25)	.03	.66–.80	CFA 2–CFA 1	39.89 (12)*
Gender Invariance Models at W1 (Based on CFA 2)							
Configural	13.10 (4, 197)*	.97	.15 (.07–.25)	.04	.62–.90		
Metric	13.44 (7, 197)	.98	.10 (.00–.17)	.04	.63–.89	Metric–Configural	.34 (3)
Scalar	17.31 (10, 197)	.98	.09 (.00–.15)	.05	.63–.89	Scalar–Metric	3.87 (3)
Time Invariance Models (Based on CFA 2)							
Configural	297.23 (144, 198)*	.91	.07 (.06–.09)	.08	.50–.91		
Metric	312.78 (156, 198)*	.90	.07 (.06–.08)	.10	.58–.89	Metric–Configural	15.55 (12)
Scalar	323.51 (168, 198)*	.91	.07 (.06–.08)	.10	.58–.88	Scalar–Metric	10.73 (12)

Note: $* p \leq .05$

Expects parental financial support was measured at baseline using a seven-item scale (see Appendix C for the complete list of items generated by investigators of the *Making the Transition II* study). The stem question was: "Do you think it's your parents' responsibility to…" followed by items such as "Lend or give you a car to drive?" and "Pay for part or all of your university tuition?" Responses to each item were coded as 0 = *no* or 1 = *yes*. The sum of responses of all items was calculated. Possible scores ranged from 0 to 7, and higher scores indicated that the student expected greater financial support from parents (α = .73).

Financial stress was measured at all waves with a widely used eight-item scale (Pearlin & Schooler, 1978; see Appendix D for the complete list of items). Students were instructed to respond to the question: "When you think of your current financial situation, how do you feel?" by rating eight items (e.g., "Worried?" "Relaxed?") on a scale ranging from 1 (*not at all*) to 4 (*very*). Two items were reverse-coded. The mean across the items was calculated, and higher scores indicated higher levels of financial stress (α = .93 to .95 across waves).

Mother autonomy support and *father autonomy support* were assessed at all waves with a 14-item parental fostering of autonomy subscale (Kenny, 1987; Kenny, Lomax, Brabeck, & Fife, 1998; see Appendix E for the complete list of items). Sample items include: "Respects my privacy;" "Tries to control my life." Seven items were reverse-coded. Mothers and fathers were rated separately on a scale ranging from 0 (*not at all*) to 4 (*very much*), with higher mean scores indicating higher levels of mother or father autonomy support, respectively (α = .84 to .90 across waves for mother; α = .77 to

.88 across waves for father). The intercorrelations between mother and father autonomy support within wave ranged from .40 to .57.

Whether students lived with their parents or *left home* was measured at all waves with a single question: "Where do you live now?" Responses were coded as 0 = *lives with parent(s)* or 1 = *left home.* Across four years, 43% to 50% reported that they were not living at home at the time of the survey.

Chronological age and *parental education.* Chronological age and parental education were demographic variables controlled in the current study. Chronological age was coded as years since birth. Although some studies found no significant relationship between chronological age and subjective age, others showed that chronological age was a strong predictor of subjective age (Schwall, 2012). Parental education was assessed by asking students about the highest levels of education that their mothers and fathers obtained. Responses were coded as 0 = *no university degree* or 1 = *at least one parent with a university degree.* This indicator of parental education has been found in previous research to be a robust measure of family socioeconomic status (Krahn, 2009).

CHAPTER III

Results

Descriptive Statistics

Means and standard deviations for the outcome variable (i.e., comparative subjective age; CSA), the between-persons predictor (i.e., expecting parental financial support), and possible time-varying covariates (i.e., financial stress, mother autonomy support, father autonomy support, and left home) at all five waves are presented in Table 4. Students' CSA indicates that the average student at all waves felt older than their chronological age (a mean of 4 would indicate that they feel the age that they are) but CSA appears to have decreased slightly from Wave 1 to Wave 5 at the mean level. At Wave 1, students on average expected little financial support from their parents (they endorsed less than three out of seven possible ways their parents could support them). Mean levels of financial stress indicated a low level of stress, but it appeared to increase as students gained more years of education. The means for mother and father autonomy support were above the mid-point of the scale, indicating that students perceived relatively high levels of support for autonomy from their parents; support for autonomy seemed to increase slightly by the end of university. At each time point, approximately half of students were living away from their parents.

Table 5 shows the correlations of chronological age and parental education (the control variables) with the major study variables across waves. Chronological age was positively associated with mother autonomy support at Wave 2 and father autonomy support at Waves 1 and 2. An older chronological age was also related to having left the parental home at Waves 1 and 2. No significant correlations were found between parental

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education and other major study variables. Table 6 presents the intercorrelations between CSA and the predictor variables across waves. Expecting parental financial support was negatively associated with CSA at baseline. Greater financial stress at baseline was linked to an older CSA at Wave 5. Three out of 25 coefficients between father autonomy support and CSA were significantThere was no significant correlation between mother autonomy support and CSA, or between leaving home and CSA.

Table 7 shows the intercorrelations among all the predictor variables across all five waves. Students who expected more financial support from parents tended to have lower levels of financial stress and lower levels of parental autonomy support, and they were also likely to live in their parents' home. Levels of financial stress were consistently negatively associated with perceived parental autonomy support, although not all of these correlations were significant. Students who reported more autonomy support from mothers were also likely to report more autonomy support from fathers. Moreover, students with higher levels of parental autonomy support were more likely to have left home.

Importantly, the autocorrelations for mother autonomy support, father autonomy support, and left home for the current sample from one wave to the next were all significant and strong. These coefficients ranged from .71 to .86 for mother autonomy support, .70 to .78 for father autonomy support, and .85 to .99 for left home. These high levels of stability suggest that parental autonomy support and left home would be better treated as time-invariant in the present study. As such, baseline levels of each will serve as between-persons predictors of CSA trajectories.

Table 4

Means and Standard Deviations for Major Study Variables by Wave

Variable	n	M	SD	Maximum Possible n[6]
Comparative subjective age[1]				
Wave 1	190	4.761	.940	190
Wave 2	143	4.662	1.030	144
Wave 3	86	4.657	.950	87
Wave 4	96	4.629	.985	100
Wave 5	84	4.640	1.000	85
Expecting parental financial support[2]				
Wave 1	190	2.879	1.947	190
Financial stress[3]				
Wave 1	190	1.897	.687	190
Wave 2	157	2.132	.833	157
Wave 3	87	2.122	.773	87
Wave 4	95	2.031	.693	100
Wave 5	83	2.285	.778	85
Mother autonomy support[4]				
Wave 1	190	2.702	.686	190
Wave 2	152	2.699	.734	157
Wave 3	86	2.605	.834	87
Wave 4	95	2.804	.737	100
Wave 5	83	2.809	.808	85
Father autonomy support[4]				
Wave 1	190	2.741	.680	190
Wave 2	153	2.780	.700	157
Wave 3	87	2.768	.639	87
Wave 4	94	2.952	.648	100
Wave 5	82	2.866	.691	85
Left home[5]				
Wave 1	190	.484	.501	190
Wave 2	159	.465	.500	160
Wave 3	87	.425	.497	87
Wave 4	100	.500	.503	100
Wave 5	85	.447	.500	85

Note. [1]Possible range: 1 (*a lot younger than my age*) to 7 (*a lot older than my age*). [2]Possible range: 0 to 7, with 0 = *not expecting any financial support*. [3]Possible range: 1 (*not at all*) to 4 (*very*). [4]Possible range: 0 (*not at all*) to 4 (*very much*). [5]Possible range: 0 (*lives with a parent or parents*) to 1 (*left home*). [6]Number of participants who completed the wave, out of the final analysis sample of 190.

Table 5

Correlations of Chronological Age and Parental Education with Major Study Variables

Across Waves

Variable (Wave)	Chronological Age	Parental Education
Chronological Age		
Parental Education	.08	
CSA (1)	.11	-.02
CSA (2)	.07	.07
CSA (3)	-.17	.07
CSA (4)	.04	.08
CSA (5)	.03	.04
EPFS (1)	-.08	.02
FS (1)	.10	.07
FS (2)	-.03	-.02
FS (3)	.04	-.08
FS (4)	-.08	-.01
FS (5)	-.03	-.10
MAS (1)	.06	.03
MAS (2)	.17*	.04
MAS (3)	.05	-.05
MAS (4)	.07	-.04
MAS (5)	-.01	.07
FAS (1)	.15*	.01
FAS (2)	.17*	.07
FAS (3)	.05	-.03
FAS (4)	.04	.11
FAS (5)	-.02	.10
LH (1)	.16*	.11
LH (2)	.16*	.09
LH (3)	.15	.11
LH (4)	.18	.16
LH (5)	.15	.03

Note. CSA = comparative subjective age; EPFS = expects parental financial support; FS = financial stress; MAS = mother autonomy support; FAS = father autonomy support; LH = left home. *$p \leq .05$.

Table 6

Correlations of Comparative Subjective Age with Predictor Variables across Waves

Variable (Wave)	CSA (1)	CSA (2)	CSA (3)	CSA (4)	CSA (5)
CSA (1)					
CSA (2)	.70*				
CSA (3)	.62*	.63*			
CSA (4)	.61*	.59*	.72*		
CSA (5)	.62*	.53*	.63*	.82*	
EPFS (1)	-.15*	-.08	-.14	-.09	-.11
FS (1)	.04	.04	.20	.19	.33*
FS (2)	.01	-.01	-.05	.06	.16
FS (3)	.02	-.00	-.08	.03	.07
FS (4)	-.02	-.04	-.10	.02	.12
FS (5)	.00	.00	.01	-.06	.04
MAS (1)	.07	-.01	.01	.12	-.08
MAS (2)	.14	.13	.14	.18	.17
MAS (3)	.05	.03	-.04	.05	.05
MAS (4)	.20	.18	.13	.15	.10
MAS (5)	.18	.13	.08	.19	.09
FAS (1)	-.05	-.03	.04	.07	-.09
FAS (2)	.05	.04	.14	.14	.10
FAS (3)	-.07	-.14	-.07	.13	.14
FAS (4)	.17	.16	.27*	.25*	.15
FAS (5)	.17	.13	.24	.31*	.10
LH (1)	.13	.10	.09	.16	.21
LH (2)	.15	.07	.05	.14	.16
LH (3)	.04	.01	.11	.05	.25
LH (4)	.15	.13	.12	.16	.21
LH (5)	.17	.12	.22	.19	.21

Note. CSA = comparative subjective age; EPFS = expects parental financial support; FS = financial stress; MAS = mother autonomy support; FAS = father autonomy support; LH = left home. *$p \leq .05$.

Table 7

Correlations among Expects Parental Financial Support, Financial Stress, Mother Autonomy Support, Father Autonomy Support, and

Left Home Across Waves

Variable (Wave)	1	2	3	4	5	6	7	8	9	10
1. EPFS (1)										
2. FS (1)	-.16*									
3. FS (2)	-.12	.62*								
4. FS (3)	-.27*	.45*	.49*							
5. FS (4)	-.06	.51*	.38*	.48*						
6. FS (5)	.10	.36*	.45*	.24	.44*					
7. MAS (1)	-.18*	-.19*	-.11	-.11	-.04	-.09				
8. MAS (2)	-.28*	-.02	-.17*	-.06	-.03	-.22	.71*			
9. MAS (3)	-.09	-.22*	-.16	-.22*	-.17	-.05	.76*	.73*		
10. MAS (4)	-.15	-.17	-.20	-.04	-.18	-.13	.61*	.74*	.80*	
11. MAS (5)	-.14	-.05	-.15	-.04	-.10	-.23*	.58*	.66*	.79*	.86*
12. FAS (1)	-.12	-.23*	-.15	-.02	-.30*	-.25*	.40*	.37*	.40*	.25*
13. FAS (2)	-.22*	-.11	-.16*	.09	-.19	-.18	.42*	.57*	.51*	.55*
14. FAS (3)	-.03	-.20	-.29*	-.02	-.15	-.12	.38*	.49*	.55*	.43*
15. FAS (4)	-.18	-.22*	-.15	.08	-.41*	-.13	.31*	.41*	.51*	.57*
16. FAS (5)	-.05	-.15	-.19	.16	-.30*	-.27*	.41*	.43*	.44*	.57*
17. LH (1)	-.23*	.10	.14	.08	.00	-.09	.11	.22*	.14	.34*
18. LH (2)	-.20*	.09	.14	.04	.00	-.06	.12	.23*	.20	.30*
19. LH (3)	-.26*	.13	.07	.11	.04	-.01	.04	.30*	.12	.38*
20. LH (4)	-.14	.05	.02	.07	.03	-.03	.18	.26*	.24*	.40*
21. LH (5)	-.27*	.06	.13	.13	.02	-.06	.13	.25*	.16	.39*

Note. CSA = comparative subjective age; EPFS = expecting parental financial support; FS = financial stress; MAS = mother autonomy support; FAS = father autonomy support; LH = left home. *$p \leq .05$

Table 7 (continued)

Correlations among Expects Parental Financial Support, Financial Stress, Mother Autonomy Support, Father Autonomy Support, and

Left Home Across Waves

Variable	11	12	13	14	15	16	17	18	19	20
11. MAS (5)										
12. FAS (1)	.14									
13. FAS (2)	.39*	.73*								
14. FAS (3)	.41*	.72*	.78*							
15. FAS (4)	.52*	.64*	.72*	.70*						
16. FAS (5)	.55*	.53*	.66*	.59*	.76*					
17. LH (1)	.24*	.15*	.22*	.18	.31*	.35*				
18. LH (2)	.21	.15	.21*	.17	.27*	.32*	.99*			
19. LH (3)	.26*	-.07	.30*	.08	.28*	.34*	.91*	.90*		
20. LH (4)	.38*	.03	.31*	.24*	.27*	.35*	.85*	.82*	.85*	
21. LH (5)	.29*	.10	.30*	.20	.31*	.36*	.82*	.83*	.88*	.89*

Note. CSA = comparative subjective age; EPFS = expecting parental financial support; FS = financial stress; MAS = mother autonomy support; FAS = father autonomy support; LH = left home. *$p \leq .05$.

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Multilevel Models

The Hierarchical Linear Modeling (HLM) program was used to construct a series of multilevel models (Raudenbush & Bryk, 2002) in order to answer the five research questions. First, an unconditional means model, as described below, partitioned the variance in CSA across time into within-person and between-persons variance. This analysis allowed me to determine whether there was sufficient variation in CSA within and across persons to model intraindividual change over time and interindividual differences in such change. Second, an unconditional growth model (referred to here as Model 1) examining growth trajectories in CSA was run (with no between-persons predictors or time-varying covariates), and compared against the unconditional means model to determine whether inclusion of a linear growth component improved model fit. Third, I added control variables (chronological age and parental education) to the unconditional growth model testing any effects of chronological age and parental education on baseline CSA (the intercept growth parameter) and the rate of change over time in CSA (the rate of change growth parameter). This model (referred to here as Model 2) was compared to the unconditional growth model (Model 1), using the Chi-square difference test to examine whether it was a better fitting model. Fourth, each between-persons variable (expecting parental financial support, mother autonomy support, father autonomy support, and left home) was entered in separate models to predict baseline CSA as well as the rate of change over time in CSA, while simultaneously controlling for any effects of chronological age and parent education on these growth parameters. These models (referred to here as Models 3 through 6) were compared to Model 2, using Chi-square difference tests, to learn whether model fit was

improved with the addition of the selected between-persons predictor. Any significant between-persons predictor in Models 3 through 6 would appear in a final model. Fifth, Model 7 tested whether the time-varying covariate of financial stress was significant. This model was also compared to Model 2. Finally, Model 8 (the final model) tested whether the time-varying covariate of financial stress was still significant while including the two control variables (chronological age and parental education) and any significant between-persons predictor from Models 3 through 6. Model 8 was compared to Model 7.

Multilevel modeling as a data analysis technique allows simultaneously modeling both intraindividual change (Level 1) and interindividual differences in intraindividual change (Level 2). Specifically, the HLM program estimates (a) within-person growth trajectories and their corresponding growth parameters (i.e., intercepts and slopes) for each participant, and (b) between-person differences in these parameters, by treating within-person intercepts and slopes as outcome variables regressed on time-invariant between-person predictors. Given that the attrition analyses revealed considerable dropout across the course of the study, full information maximum likelihood (FIML) was employed to handle missing data in the estimation procedure. This estimation procedure allows all participants' data to be included in the analysis as long as no data are missing for between-persons predictors; parameter estimates are provided even when there are some data missing for Level 1 variables. FIML produces less biased results than listwise deletion, pairwise deletion, or mean substitution (Acock, 2005).

A multilevel model can be expressed as two separate submodels: a Level 1 within-person model and a Level 2 between-persons model. Before modeling change over time, however, I first fit an *unconditional means model* in order to assess and

partition the variance of the outcome variable (CSA; Singer & Willett, 2003). This model

is expressed as:

Level 1: $\text{CSA}_{ti} = \pi_{0i} + \varepsilon_{ti}$ (1)

Level 2: $\pi_{0i} = \beta_{00} + r_{0i}$ (2)

In Equation 1, CSA_{ti} represents the observed value of CSA for individual i on

occasion t, π_{0i} represents the true mean of CSA for individual i on occasion 0 (i.e., at

baseline), and ε_{ti} represents the distance between the observed value of CSA for

individual i on occasion t and the true mean of CSA for individual i on occasion 0—or in

other words, the within-person variance. In Equation 2, β_{00} represents the population true

mean of CSA across all occasions, and r_{0i} represents the distance between the true mean

of CSA for individual i at baseline and the population true mean of CSA across all

occasions—or in other words, the between-persons variance.

The results for the unconditional means model indicated that 37% of the variation

in CSA was within-person variation, while 63% was between-persons. Such substantial

variation at both levels suggested further analysis of the data would be fruitful. I then

proceeded to the main analyses. Model results are presented in Table 8. As mentioned

previously, CSA was centered at zero so that a positive CSA indicated an older subjective

age and a negative CSA indicated a younger subjective age.

Average Trajectory of Change in Comparative Subjective Age

In order to answer my first research question asking "What is the average

trajectory of change in CSA among students?" I fit an *unconditional growth model* to

assess the within-person growth trajectory of CSA across five waves of measurement, in

which time was the only predictor entered in the model (see Model 1, Table 8). With

respect to the raw data, Figure 1 depicts a random sample of 15% of individual growth

trajectories in the sample. The model can be expressed as:

$$\text{Level 1: CSA}_{ti} = \pi_{0i} + \pi_{1i}\,\text{TIME}_{ti} + \varepsilon_{ti} \tag{3}$$

$$\text{Level 2: } \pi_{0i} = \beta_{00} + r_{0i} \tag{4}$$

$$\pi_{1i} = \beta_{10} + r_{1i} \tag{5}$$

Equation 3 refers to the individual growth trajectories of CSA as a function of

individual's initial status (π_{0i}), rate of change (linear time slope, π_{1i}), and deviation from

his or her growth trajectory (ε_{ti}). TIME_{ti} represents the number of years from the onset of

the study. Equation 4 is identical to Equation 2, and Equation 5 models the linear time

slope as a function of the grand mean of the linear slope (β_{10}) and a random component

(r_{1i}). [Preliminary analyses showed that the quadratic time slope was not significant for

the outcome variable, thus it was not included in the models reported here.]

The results indicated that the average initial level of CSA was .73 ($SE = .07$, $p \leq$

.05). At baseline, students on average had an older subjective age relative to their

chronological age. However, although the coefficient for the rate of change in CSA was

negative (i.e., in the direction of a decrease over time), it was not significant ($\beta = -.04$, SE

$= .04$, $p = .76$). In addition, a negative correlation between the intercept and slope ($r = -$

.29) indicated a moderate, inverse relationship between initial status and rate of change;

students entering university with younger CSAs showed more rapid change in CSA over

time relative to those who started out feeling older. Chi-square tests of the variance

components for CSA showed significant variation in initial level, $\chi^2(162) = 784.01$, $p \leq$

.05, and in the linear time slope, $\chi^2(162) = 312.66$, $p \leq .05$. Thus, exploration in

subsequent analyses of both within-person and between-persons predictors of the

Table 8

Multilevel Results Predicting Change in Comparative Subjective Age from Baseline Variables and Time-Varying Covariates

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Fixed effects	Coeff (*SE*)	Coeff (*SE*)	Coeff (*SE*)	Coeff (*SE*)	Coeff (*SE*)	Coeff (*SE*)	Coeff (*SE*)	Coeff (*SE*)
Initial status	.73 (.07)*	.72 (.09)*	.71 (.09)*	.72 (.09)*	.72 (.09)*	.63 (.11)*	.75 (.09)*	.74 (.09)*
CAGE		.16 (.14)	.14 (.14)	.16 (.14)	.18 (.14)	.13 (.14)	.18 (.14)	.16 (.13)
PE		.02 (.13)	.03 (.13)	.02 (.13)	.02 (.13)	.00 (.13)	-.01 (.13)	.00 (.13)
EPFS			-.06 (.03)*					-.07 (.03)*
MAS				.07 (.10)				
FAS					-.07 (.11)			
LH						.20 (.14)		
FS W1							.05 (.10)	.02 (.10)
Rate of change	-.01 (.03)	-.04 (.04)	-.04 (.04)	-.04 (.04)	-.04 (.04)	-.05 (.04)	-.03 (.04)	-.03 (.04)
CAGE		-.10 (.06)	-.09 (.06)	-.09 (.06)	-.10 (.06)	-.09 (.06)	-.06 (.05)	-.06 (.05)
PE		.06 (.06)	.06 (.06)	.06 (.06)	.06 (.06)	.05 (.06)	.04 (.05)	.04 (.05)
EPFS			.01 (.01)					.01 (.01)
MAS				-.04 (.04)				
FAS					-.00 (.05)			
LH						.02 (.06)		
FS W1							.06 (.04)	.06 (.04)
FSD							-.11 (.05)*	-.11 (.05)*
Var. component								
Initial status	.68*	.67*	.66*	.67*	.67*	.66*	.67*	.64*
Rate of change	.04*	.04*	.04*	.04*	.04*	.04*	.04*	.03*
Model comparison								
Deviance	1379.99	1376.30	1372.93	1375.12	1375.81	1373.35	1326.54	1322.70
Chi-square (*df*)	19.51 (3)*	3.69 (4)	3.37 (2)	1.18 (2)	.49 (2)	2.95 (2)	49.77 (3)*	3.84 (2)
Compared with	UnMs	Model 1	Model 2	Model 2	Model 2	Model 2	Model 2	Model 7

Note. $N = 190$. Coeff = unstandardized coefficient; *SE* = standard error; CAGE = chronological age; PE = parental education; EPFS = expects parental financial support; MAS = mother autonomy support; FAS = father autonomy support; LH = left home; FS W1 = financial stress at wave 1; FSD = financial stress deviations; Var. = variance; UnMs = unconditional means model. *$p \le .05$.

Figure 1

Individual Growth Trajectories in Comparative Subjective Age across Four Years of

University for Random Sample of 15% of Participants (Based on Model 1)
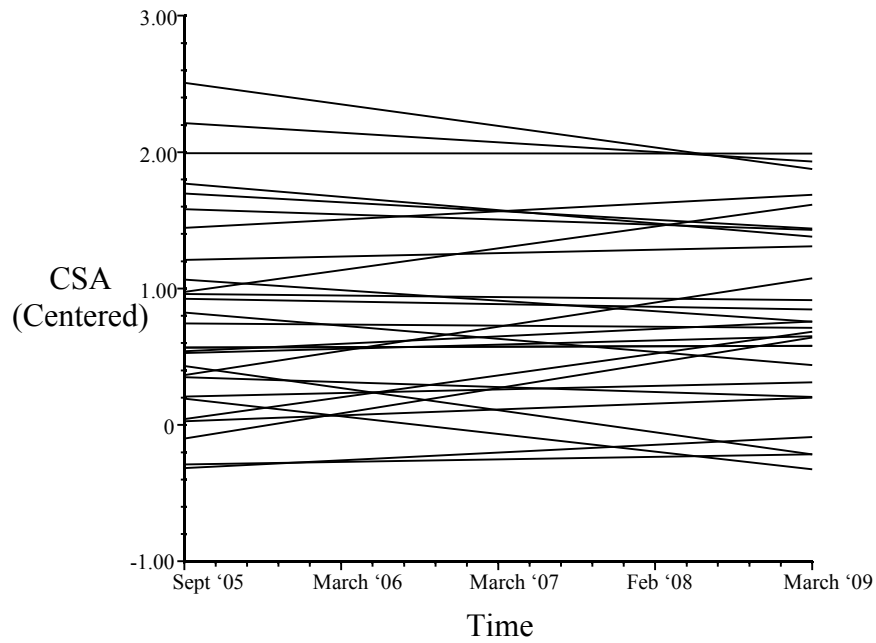

Figure 1. CSA (comparative subjective age) is centered at zero.

intercept and slope was justified. Deviance testing showed that, compared to the unconditional means model, the unconditional growth model (i.e., Model 1), was better fitting, $\chi^2(3) = 19.51$, $p \leq .05$.

In order to examine any effects of control variables (i.e., chronological age and parental education) on initial status and the rate of change of CSA, I added both chronological age and parental education to the unconditional growth model (see Model 2, Table 8). Neither chronological age nor parental education was significant in predicting baseline and change over time in CSA. Deviance testing indicated that, compared to the unconditional growth model, adding control variables did not produce a better fitting model, $\chi^2(4) = 3.69$, $p > .50$.

Between-Person Predictors

Expects parental financial support. In order to answer the second research question "Are expectations of parental financial support at baseline a source of interindividual differences in CSA?", I added the between-persons predictor (i.e., expects parental financial support, EPFS) to Model 2 to test its effects on initial status and the linear slope (see Model 3, Table 8). This model can be expressed as:

Level 1: $\text{CSA}_{ti} = \pi_{0i} + \pi_{1i}\,\text{TIME}_{ti} + \varepsilon_{ti}$ (6)

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}\text{AGE} + \beta_{02}\text{PARENTAL EDUCATION}$

$+ \beta_{03}\text{EPFS} + r_{0i}$ (7)

$\pi_{1i} = \beta_{10} + \beta_{11}\text{AGE} + \beta_{12}\text{PARENTAL EDUCATION}$

$+ \beta_{13}\text{EPFS} + r_{1i}$ (8)

Equations 7 and 8 model the between-persons effect of chronological age, parental education, and EPFS on both initial levels of CSA at study onset (i.e., the

Figure 2

Expecting Parental Financial Support as A Source of Differences in Initial Status in Comparative Subjective Age (Based on Model 3)
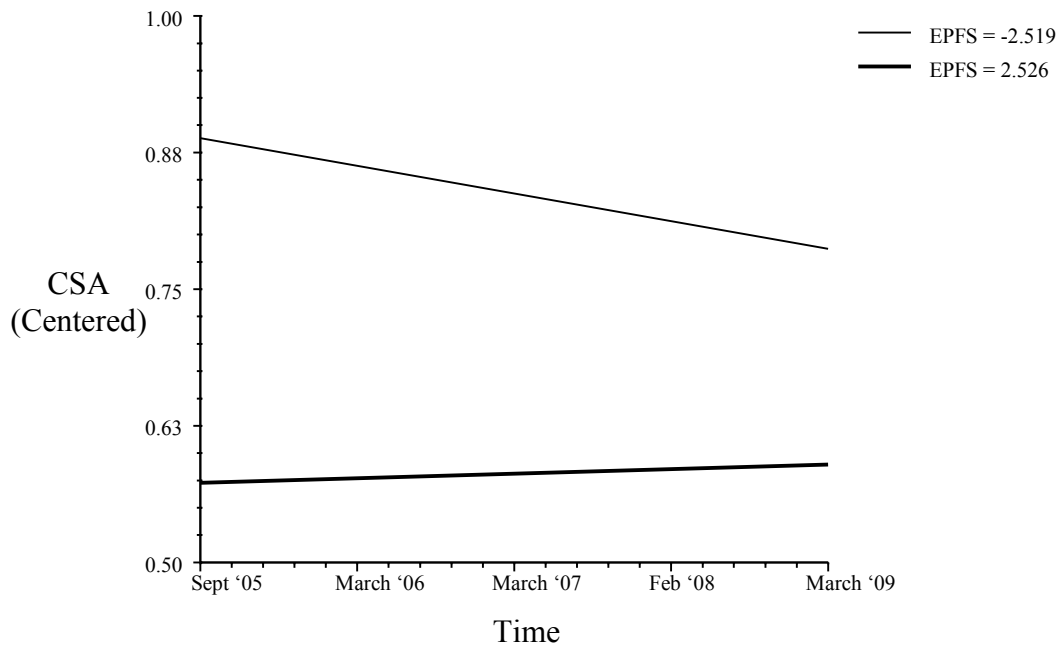

Figure 2. CSA (comparative subjective age) is centered at zero. EPFS (expects parental financial support) is grand centered. Average trajectories are plotted for high (averaged upper quartile) and low (averaged lower quartile) levels of expectations.

intercept; Equation 7) and the rate of change in CSA across five waves (i.e., the linear

time slope; Equation 8). Specifically, in Equation 7, the initial levels of CSA for

individual i (π_{0i}) is modeled as a function of the grand mean of CSA at baseline (β_{00}), the

between-persons effects of chronological age (β_{01}), parental education (β_{02}), and EPFS

(β_{03}), and a random error component (r_{0i}). In Equation 8, the linear time slope of CSA

(π_{1i}) is modeled as a function of the grand mean of rate of change (β_{10}), the between-

persons effects of chronological age (β_{11}), parental education (β_{12}), and EPFS (β_{13}), and a

random component (r_{1i}).

Results for Model 3 indicated a significant effect of expects parental financial

support on the initial level of CSA ($\beta = -.06$, $SE = .03$, $p \leq .05$). In other words, expecting

more financial support from parents predicted a younger CSA at baseline (see Figure 2).

But expecting parental financial support did not predict the rate of change ($\beta = .01$, $SE = .01$, $p = .63$). Thus, expectations of parental financial support contributed to level

differences in trajectories of CSA. Also, neither chronological age nor parental education

was related to the growth parameters in CSA. In addition, the inclusion of the set of

between-persons predictors did not improve model fit (Model 3 compared to Model 2),

$\chi^2(2) = 3.37$, $p = .18$.

Mother autonomy support. Equations 9 through 11 model the between-persons

effect of chronological age, parental education, and mother autonomy support at baseline

(MAS) on both initial status of CSA at baseline and the rate of change in CSA across five

waves (see Model 4, Table 8). Specifically, in Equation 10, the initial status of CSA for

individual i (π_{0i}) is modeled as a function of the grand mean of CSA at baseline (β_{00}), the

between-persons effects of chronological age (β_{01}), parental education (β_{02}), and MAS

(β_{03}), and a random error component (r_{0i}). In Equation 11, the linear time slope of CSA (π_{1i}) is modeled as a function of the grand mean of rate of change (β_{10}), the between-persons effects of chronological age (β_{11}), parental education (β_{12}), and MAS (β_{13}), and a random error (r_{1i}).

Level 1: $CSA_{ti} = \pi_{0i} + \pi_{1i} TIME_{ti} + \varepsilon_{ti}$ (9)

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01} AGE + \beta_{02} PARENTAL\ EDUCATION$

$\qquad\qquad + \beta_{03} MAS + r_{0i}$ (10)

$\qquad \pi_{1i} = \beta_{10} + \beta_{11} AGE + \beta_{12} PARENTAL\ EDUCATION$

$\qquad\qquad + \beta_{13} MAS + r_{1i}$ (11)

Results indicated that mother autonomy support was not a significant between-persons predictor of the initial level of ($\beta = .07$, $SE = .10$, $p = .47$) and the rate of change ($\beta = -.04$, $SE = .04$, $p = .35$) in CSA. Other results with respect to chronological age and parental education remained unaltered. The model comparison showed no improvement in model fit, $\chi^2(2) = 1.18$, $p > .50$.

Father autonomy support. Equations 12 through 14 model the between-persons effects of chronological age, parental education, and father autonomy support at baseline (FAS) on both initial status of CSA and the rate of change in CSA over time (see Model 5, Table 8). Specifically, in Equation 13, the initial level of CSA for individual i (π_{0i}) is modeled as a function of the grand mean of CSA at baseline (β_{00}), the between-persons effects of chronological age (β_{01}), parental education (β_{02}), and FAS (β_{03}), and an error component (r_{0i}). In Equation 14, the linear slope of CSA (π_{1i}) is modeled as a function of the grand mean of rate of change (β_{10}), the between-persons effects of chronological age (β_{11}), parental education (β_{12}), and FAS (β_{13}), and a random component (r_{1i}).

Level 1: $\text{CSA}_{ti} = \pi_{0i} + \pi_{1i}\text{TIME}_{ti} + \varepsilon_{ti}$ (12)

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}\text{AGE} + \beta_{02}\text{PARENTAL EDUCATION}$

$\qquad + \beta_{03}\text{FAS} + r_{0i}$ (13)

$\pi_{1i} = \beta_{10} + \beta_{11}\text{AGE} + \beta_{12}\text{PARENTAL EDUCATION}$

$\qquad + \beta_{13}\text{FAS} + r_{1i}$ (14)

Results for Model 5 showed that father autonomy support was unrelated to the initial levels of (β = -.07, *SE* = .11, *p* = .53) and the rate of change (β = -.00, *SE* = .05, *p* = .99) in CSA. Results for the control variables did not change. There was no improvement in model fit based on the comparison of Model 5 and Model 2, $\chi^2(2)$ = .49, *p* > .50.

Left home. Equations 15 through 17 model the between-persons effect of chronological age, parental education, and whether participants had left home or not at Wave 1 on both initial status of and the rate of change in CSA over time (see Model 6, Table 8). Specifically, in Equation 16, the initial level of CSA for individual *i* (π_{0i}) is modeled as a function of the grand mean of CSA at baseline (β_{00}), the between-persons effects of chronological age (β_{01}), parental education (β_{02}), and left home (β_{03}), and a random error (r_{0i}). In Equation 17, the linear time slope (π_{1i}) is modeled as a function of the grand mean of rate of change (β_{10}), the between-persons effects of chronological age (β_{11}), parental education (β_{12}), and left home (β_{13}), and an error component (r_{1i}).

Level 1: $\text{CSA}_{ti} = \pi_{0i} + \pi_{1i}\text{TIME}_{ti} + \varepsilon_{ti}$ (15)

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}\text{AGE} + \beta_{02}\text{PARENTAL EDUCATION}$

$\qquad + \beta_{03}\text{LEFT HOME} + r_{0i}$ (16)

$\pi_{1i} = \beta_{10} + \beta_{11}\text{AGE} + \beta_{12}\text{PARENTAL EDUCATION}$

$\qquad + \beta_{13}\text{LEFT HOME} + r_{1i}$ (17)

Results for Model 6 indicated that whether participants left home or not was not associated with the initial levels of ($\beta = .20$, $SE = .14$, $p = .15$) and the rate of change ($\beta = .02$, $SE = .06$, $p = .76$) in CSA. Results for chronological age and parental education did not change over previous models. Model fit did not improve when Model 6 was compared against Model 2, $\chi^2(2) = 2.95$, $p = .23$.

Time-Varying Covariate

Financial stress. I then tested the time-varying relation between financial stress and CSA. In order to control for the biases in estimation due to person-level effects, financial stress was decomposed into two components, financial stress at Wave 1 and financial stress deviations (i.e., deviations from Wave 1 for each subsequent wave), according to the Time-1 centering procedure (Singer & Willett, 2003). Financial stress at Wave 1 was added to the Level 2 models of Model 2 as a between-persons predictor, while financial stress deviations were added to the Level 1 model of Model 2 as a time-varying covariate. In addition, financial stress was specified as nonrandomly varying, which allows different effects at different waves (Raudenbush & Bryk, 2002). Equation 18 models the growth trajectory of CSA for individual i across t occasions as a function of the initial status (π_{0i}), the rate of change (π_{1i}), the effect of financial stress deviations (π_{2i}), and a random error component (ε_{ti}). Equation 19 models the initial level of CSA for individual i (π_{0i}) as a function of the grand mean of CSA at baseline (β_{00}), the between-persons effects of chronological age (β_{01}), parental education (β_{02}), and financial stress at baseline (β_{03}), and a random error (r_{0i}). In Equation 20, the linear time slope (π_{1i}) is modeled as a function of the grand mean of rate of change (β_{10}), the between-persons

effects of chronological age (β_{11}), parental education (β_{12}), and financial stress at Wave 1 (β_{13}), and an error component (r_{1i}).

Level 1: $CSA_{ti} = \pi_{0i} + \pi_{1i} TIME_{ti}$

$$+ \pi_{2i}FINANCIAL\ STRESS\ DEVIATIONS_{ti} + \varepsilon_{ti} \qquad (18)$$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}AGE + \beta_{02}PARENTAL\ EDUCATION$

$$+ \beta_{03}FINANCIAL\ STRESS + r_{0i} \qquad (19)$$

$$\pi_{1i} = \beta_{10} + \beta_{11}AGE + \beta_{12}PARENTAL\ EDUCATION$$

$$+ \beta_{13}FINANCIAL\ STRESS + r_{1i} \qquad (20)$$

Results of this model are shown in Model 7, Table 8. Financial stress at baseline did not predict initial levels of (β = .05, *SE* = .10, *p* = .63) or rate of change (β = .06, *SE* = .04, *p* = .11) in CSA. Financial stress deviations covaried significantly across time with CSA (β = -.11, *SE* = .05, *p* ≤ .05). Specifically, at times when participants' financial stress increased more from baseline, they felt subjectively younger than at times when their financial stress decreased relative to Wave 1. Figure 3 illustrates average trajectories of CSA for students who would have consistently positive and consistently negative levels of financial stress deviations across four years. Adding financial stress deviations as a time-varying covariate did not change the significant and nonsignificant results found in Model 2. Model 7 was a better fitting model compared to Model 2, $\chi^2(3)$ = 49.77, *p* ≤ .05, indicating that adding financial stress contributed over and above the control variables in predicting CSA.

I then added the significant between-persons predictor, expecting parental financial support, to the Level 2 models of Model 7 in order to build a final model (see Model 8, Table 8) including all significant predictors from previous models. Expecting

Figure 3

Prototypical Trajectories for Comparative Subjective Age for Students with Consistently

Positive and Consistently Negative Deviations from Their Financial Stress at Wave 1
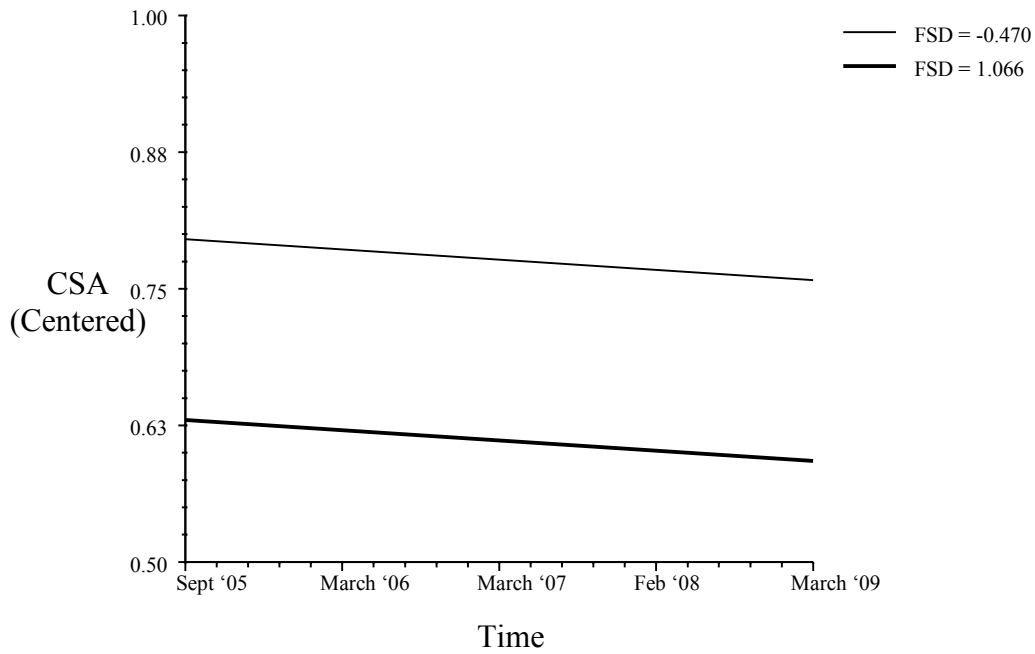
Across Four Years (Based on Model 7)

Figure 3. CSA (comparative subjective age) is centered at zero. FSD (financial stress

deviations) is centered at zero. Average trajectories are plotted for high (averaged upper

quartile) and low (averaged lower quartile) levels of financial stress deviations.

parental financial support remained significant in predicting initial status in CSA (β = -.07, SE = .03, $p \leq$ .05), while covarying financial stress deviations (β = -.11, SE = .05, $p \leq$ .05). Effect sizes, calculated using the t to r transformation, were small: r = .15 for expecting parental financial support and r = .14 for financial stress deviations. Other nonsignificant results found in Model 7 were not altered. Compared to Model 7, Model 8 was not a better fitting model, $\chi^2(2)$ = 3.84, p = .15.

Overall, Model 2 testing the control variables was not a better fitting model than the unconditional growth model (Model 1), and none of the four models testing between-persons predictors appeared to be better fitting than the control model (Model 2). Model 7, however, with financial stress as a time-varying covariate was a significant improvement in fit over Model 2, while Model 8 had the smallest deviance but was not a better fitting model than Model 7. Additional model comparison (i.e., comparing AICs and BICs; Singer & Willet, 2003) showed that the difference between Model 7 and 8 was rather small. Because expecting parental financial support and financial stress contributed independently in Model 8, I concluded that Model 8 was the best fitting model.

Supplementary Analyses

A series of followup analyses was conducted to control for or examine other possible explanatory variables. First, Montepare (2009) suggested that gender might moderate associations of subjective age with other variables, although previous research has been mixed. Additional analyses replacing chronological age with gender in the models presented in Table 8 found no association of gender with CSA, nor did the pattern of results change as a function of gender. In university samples similar to the current one,

gender was also unrelated to CSA and did not moderate associations of CSA with its predictor variables (Fang & Galambos, 2014; Galambos et al., 2005).

Second, I conducted a supplementary analysis in order to control for baseline internalizing problems (which have been shown in research on adolescents to be associated with an older subjective age) and attrition. Depressive symptom scores at Wave 1 (CES-D; Radloff, 1977) was treated as an indicator of baseline internalizing problems, and whether participants were present at Wave 5 (1) or not (0) was treated as an indicator of their dropout status. I added to Model 8 (Table 8) both baseline internalizing problems and dropout status as between-persons predictors of both the initial status and rate of change in subjective age. Neither of these variables was significant in predicting initial status and rate of change. In addition, adding these variables did not alter other significant and nonsignificant results in Model 8.

Finally, financial stress at Wave 1 was tested as the only between-persons predictor of initial status and rate of change in CSA (excluding even the control variables of chronological age and parental education). Financial stress at Wave 1 was positively related to the rate of change in this model, indicating that without controlling for any other between-persons or time-varying predictors, first-year students who started university with more financial stress showed less decline or perhaps even increased in how old they felt.

CHAPTER IV

Discussion

The late teens and early 20s are an important period of life in which the transition to adulthood is expected to take place. For many reasons, such as the increased demand for higher education and credentials in the job market, more and more young people today choose to pursue postsecondary education (e.g., university) after graduation from high school. University students are presented with great opportunities and unique challenges. One of the challenges that they face is a prolonged transition to adulthood due to their student status. In fact, many university students express uncertainty about whether they are adults or not (Arnett, 1994; Nelson & Barry, 2005). Through the course of university, how students' subjective maturity changes, as indicated by their subjective age in the current study, is an intriguing question. In addition, there is always substantial variation in subjective age in any given group of individuals (Montepare, 2009). Therefore, it is also interesting to examine between-persons and within-person variability in subjective age for students as they progress through years of university.

The present study examined interindividual differences and intraindividual changes in comparative subjective age or CSA (i.e., how old individuals feel relative to their chronological age) in a group of university students who were tracked from their first semester of university for up to four years. First of all, the average trajectory in CSA across four years of university was explored. Second, it was hypothesized that expecting parental financial support, financial stress, parental autonomy support, and whether students had left home would predict CSA at baseline and might even be related to how CSA changed over time. Multilevel modeling was used for investigating the research

questions in the present study. In this chapter, I will discuss my research questions and their corresponding hypotheses, and consider whether the hypotheses were supported by the results of the analyses. I will then address the limitations of the present study. I will end this chapter with some suggestions for future research and a conclusion.

Trajectory of and Intraindividual Variability in Comparative Subjective Age

The first research question asked "what is the average trajectory of change in comparative subjective age among students?" It was hypothesized that, at baseline, university students would feel older than their chronological age on average. In addition, from the late teens to early 20s, students' CSA was expected to decrease in a linear fashion. Findings support the first part of the hypothesis: on average, students felt older than their chronological age when they entered university (at an average age of 18 years). This finding is consistent with the patterns of age-related differences in subjective age observed in adolescents, who tend to feel older than they are (e.g., Montepare & Lachman, 1989).

Whereas mean-level descriptive data and the negative coefficients for rate of change in CSA (as shown in the growth models) suggested a decrease across five waves, the downward trend was not strong enough to be statistically significant. I suspect that a significant downward trend would be observed if these participants were followed over a longer time span. After all, students were only 22 years old by the end of their fourth year. Scholars have suggested that the crossover from an older to a younger CSA occurs around the mid-20s (Galambos et al., 2005; Montepare & Lachman, 1989; Rubin & Berntsen, 2006), so the fact that this study ended well before this point likely restricted the range.

Furthermore, Galambos et al. (2005) speculated that the reference group that individuals compare themselves to may have an influence on their subjective age. Specifically, they suggested that individuals in their mid- to late 20s might compare themselves with older adults (e.g., in their 30s), resulting in feelings of relative youthfulness. Participants in the current sample were deliberately selected to be of the same chronological age (18 years old at baseline) with no other postsecondary experience, so their major reference group is likely to have been similarly young, with few having made any role transitions other than leaving home. Therefore, the reference group for these students may have been people (university students) like themselves, and not older individuals who had already made the transition from school to work. Thus, it may not be surprising that the average CSA did not become significantly younger over the course of a few years.

Although the downward trend in CSA was not significant, examination of individual growth trajectories showed that there was a great variability, both between-persons and within-person in CSA in the current sample. Thus, while there was no decrease or increase in subjective age for the sample as a whole, there was significant growth in CSA, with some individuals feeling younger and others feeling older at various times as they progressed through four years of university. Such interindividual differences in intraindividual change across time beg for explanation. Therefore, I proceeded to investigate potential sources of this variability.

Expecting More from Parents, Feeling Younger

The second research question concerned whether expecting parental financial support was a source of interindividual differences in CSA at baseline. Guided by the

maturity gap perspective, I hypothesized that students who expected more financial support from parents would have a younger CSA at study onset than their peers with lower expectations of parental support. This hypothesis was supported by the results: even after controlling for chronological age and parental education, first-year university students with higher expectations for parental financial support reported lower initial levels of CSA compared to their counterparts. I consider this as one piece of evidence that supports the maturity gap perspective. Reliance on parents for financial support runs counter to the achievement of adult status.

A recent Statistics Canada (2012) report shows that there has been a 17% increase in undergraduate tuition fees over the past five years. On one hand, higher education has become increasingly expensive; on the other hand, full-time student employment rates did not show an upward trend (Marshall, 2010). This may put many university students in a situation in which seeking financial support from parents is necessary. The fact that students in the current sample, on average, believed that parents should only be responsible for a small portion of their tuition and living expenses suggests that they were working towards financial independence. But *believing* parents should pay more for them shows both financial and psychological dependence on parents. According to Arnett (1994, 1998, 2000), being able to support oneself financially is one of the most important hallmarks of adulthood. It is not surprising that expecting less parental financial support is associated with an older CSA.

Parental Autonomy Support and Comparative Subjective Age

Because both mother and father autonomy support appeared to be stable over time, they were tested as sources of interindividual differences in initial levels and rate of

change in CSA. Based on the *maturity gap* perspective, I hypothesized that lower levels of autonomy support would predict a younger CSA in the current sample. However, results showed that neither mother nor father autonomy support was related to CSA at baseline or over time.

It is possible that, as Galambos et al. (2007) suggested, parental autonomy facilitation has a stronger link with subjective age in adolescence than in the transition to adulthood. High mean levels of parental autonomy support observed at baseline converge with research showing that parents expect higher levels of autonomy from their children in university (Kenyon & Koerner, 2009). The fact that perceived parental autonomy support remained stably high on average suggests that the between-persons differences in their subjective age may be derived from other sources, such as their own autonomous behaviours. In other words, their subjective age may be influenced by their autonomous actions more than the autonomy support that they receive from parents.

Home Leaving and Comparative Subjective Age

Students' living arrangement (i.e., living at home or living away from parents) showed very little change over time, so it was considered as a between-persons predictor for both initial levels and rate of change in CSA. Both the *maturity gap* and *subjective weathering* perspectives were consistent with the hypothesis that having left the parental home would be associated with an older CSA. Although all correlations between living arrangement and CSA were in the expected direction (Table 5), they were not strong enough to be statistically significant. As such, whether students had left home was not related to how old they felt.

In the current sample, at baseline, the majority of students who left home lived in on-campus residence halls where many services were provided in order to ease the transition from high school to university for first-year students. Therefore, living in the residence may not be considered as living completely independently; thus, this particular role transition may not have as meaningful an impact on subjective age compared to leaving the parental home for other purposes such as starting a new family or a new full-time job. In addition, more than one third of the current sample expected their parents to pay living expenses such as phone bills and rent. Expecting financial support for rent from parents may counteract the potential impact of leaving the parental home on CSA.

More Financial Stress, Feeling Younger

My last research question asked whether financial stress covaries positively or negatively with CSA over time. Following the *maturity gap* perspective, I speculated that higher levels of financial stress could be associated with either a younger CSA or an older CSA, whereas from the *subjective weathering* perspective, I hypothesized that higher levels of financial stress would be associated with an older CSA. Findings suggested that, after controlling for baseline financial stress, at times when there were higher positive deviations (i.e., larger increases in financial stress) compared to baseline, students had a younger CSA than did their less stressed peers. Thus, this finding did not support the subjective weathering perspective and was more in concert with the maturity gap perspective.

Descriptive statistics showed that students in the current sample reported moderate levels of financial stress on average. Their levels of financial stress also appeared to increase over time. Although most adults may experience financial stress at

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least at some point in their lives, a lot of university students who are still learning to manage their own finances may interpret high levels of financial stress or increases in financial stress as a lack of financial independence rather than a normal part of adulthood. According to Arnett (1998, 2000), being financially independent is one of the essential criteria by which people in the transition to adulthood judge their own and others' status as adults. For the students in this study, feelings of insecurity about one's financial situation may serve as a reminder that they have not yet achieved this necessary criterion for adulthood, resulting in feeling less mature and younger.

Higher levels of financial stress may be related not only to a younger CSA, but also to poor mental health. A longitudinal study in the U.K. revealed that a) over time university students became increasingly concerned about their financial situations— similar to findings in the present study, and b) students with higher levels of financial concerns felt more anxious and experienced more sleep difficulties (Cooke et al., 2004). A supplementary analysis in which I controlled for mental health (i.e., depressive symptoms) at baseline did not alter the significant association between financial stress deviations and CSA. Thus, while financial stress might be significantly related to internalizing problems, it stands on its own as an important covariate of subjective age.

Finally, a U.S. survey showed that university students' financial knowledge was less than satisfactory, and a lack of financial knowledge was associated with more debt (Norvilitis et al., 2006). Increasing debt has been shown to be associated with longer work hours and more thoughts of dropping out in a U.K. study of university students (Roberts et al., 2000). Together, these findings suggest that it may be helpful to provide university students with financial education as they progress through university.

Limitations and Future Directions

The biggest limitation of the present study is sample attrition. By the end of the fourth year, more than half of the participants dropped out of the study. It is important to remember, though, that at least 35 of the dropouts were no longer students at the university. Attrition analyses showed that students who lived with their parents were more likely to remain in the study, and that students who remained in the study at Wave 2 experienced less financial stress at baseline. This could lead to biased estimation. For instance, little evidence in the current study supports predictions based on the subjective weathering perspective, which may be partly due to sample attrition—more stressed individuals tended to leave the study. How to deal with sample attrition should also be taken into consideration when planning future studies. Although this is the first longitudinal study that I know of examining trajectories of subjective age across the university years, as mentioned earlier, the length of this study may not be able to capture the interindividual differences and intraindividual changes in perceived maturity that are likely triggered by the transition from school to work. Therefore, future research may consider a prospective longitudinal design with an even longer time span (e.g., from high school to work). A longer time span will also allow participants to make more role transitions and achieve more criteria for adulthood, which in turn may affect their subjective age. The present study focused on university students, their subjective age and correlates. Therefore, it is not appropriate to generalize the findings to a community sample in which same-aged individuals may have started full-time employment, gotten married, or had children. It would be interesting for future research to incorporate a larger community sample that is more representative of young Canadians in general.

Conclusion

The present study explored the average trajectory and psychological correlates of students' CSA across the first four years of university. The findings suggest that expectations and experiences around finances matter the most with respect to subjective age. Furthermore, there was no support for the subjective weathering hypothesis in this sample, most likely because university students may be more privileged than disadvantaged. Results were most in line with the *maturity gap* perspective—expectations and experiences reflecting financial dependence are likely to catch young people in a maturity gap. Having to rely on others for money and feeling stressed about it appears to be have an infantilizing effect. Money matters. Future research is needed to further understand how and why the maturity gap narrows and perhaps disappears in young people as they grow into adulthood.

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Appendix A

List of Measures by Time

	Wave 1 (Baseline)	Wave 2	Wave 3	Wave 4	Wave 5
Subjective age	September/ October, 2005	March, 2006	March, 2007	February, 2008	March, 2009
Expecting parental financial support	September/ October, 2005				
Financial stress	September/ October, 2005	April, 2006	March, 2007	February, 2008	March, 2009
Mother and father autonomy support	September/ October, 2005	April, 2006	March, 2007	February, 2008	March, 2009
Left home	September/ October, 2005	February, 2006	March, 2007	February, 2008	March, 2009
Gender	September/ October, 2005				
Parental education	September/ October, 2005				

Appendix B

Subjective Age Scale Items

Respond to the following statements with the following options:

1	2	3	4	5	6	7
A lot younger than my age			The age I am			A lot older than my age

1. Compared to most people my age, most of the time I feel   1 2 3 4 5 6 7

2. Compared to most people my age, most of the time I look*   1 2 3 4 5 6 7

3. My interest and activities are most like people who are   1 2 3 4 5 6 7

4. My same-sex friends act towards me as if I am*   1 2 3 4 5 6 7

5. Opposite-sex peers act towards me as if I am*   1 2 3 4 5 6 7

6. Compared to most people my age, I think of myself as   1 2 3 4 5 6 7

7. Compared to most people my age, most of the time I act   1 2 3 4 5 6 7

*removed after examining measurement invariance

Sources for the scale:

Galambos, N.L., & Tilton-Weaver, L.C. (2000). Adolescents' psychosocial maturity, subjective age, and problem behavior: In search of the adultoid. *Applied Developmental Science, 4*, 178–192.

Montepare, J. M., Rierdan, J., Koff, E., & Stubbs, M. (1989, May). *The impact of biological events on females' subjective age identities*. Paper presented at the Eighth Meeting of the Society for Menstrual Cycle Research, Salt Lake City, UT.

Appendix C

Expecting Parental Financial Support Scale Items

Please respond to each of the following questions.

0	1
No	Yes

Do you think it's your parents' responsibility to…

1. Lend or give you a car to drive (a car you call your own)?   0 1

2. Pay for your car insurance?   0 1

3. Pay for any textbooks or other supplies for university?   0 1

4. Pay for part or all of your university tuition?   0 1

5. Provide you with a computer to use at home or school?   0 1

6. Pay for part or all of your groceries and/or meals?   0 1

7. Pay any of your regular bills, other than food (e.g., rent, phone)?   0 1

Appendix D

Financial Stress Scale Items

When you think of your current financial situation, how do you feel?

1	2	3	4
Not at all	Only a little	Somewhat	Very

1. Worried?   1 2 3 4

2. Bothered or upset?   1 2 3 4

3. Unhappy?   1 2 3 4

4. Tense?   1 2 3 4

5. Frustrated?   1 2 3 4

6. Insecure?   1 2 3 4

7. Relaxed?*   1 2 3 4

8. Contented?*   1 2 3 4

*reverse coded

Source for the scale:

Pearlin, L. I., & Schooler, C. (1978). The structure of coping. *Journal of Health and*

    Social Behavior, 19, 2–21.

Appendix E

Perceived Parental Autonomy Support Scale Items

Please answer these questions about the female/male parent you spent the most time with when you were growing up.

0	1	2	3	4
Not at all	Somewhat	A Moderate Amount	Quite a Bit	Very Much

In general, my mother/father…

1. Respects my privacy   0 1 2 3 4

2. Restricts my freedom or independence   0 1 2 3 4

3. Takes my opinions seriously   0 1 2 3 4

4. Encourages me to make my own decisions   0 1 2 3 4

5. Is critical of what I can do   0 1 2 3 4

6. Imposes her/his ideas and values on me   0 1 2 3 4

7. Is a person to whom I can express differences of opinion on   0 1 2 3 4
    important matters

8. Has provided me with the freedom to experiment and learn   0 1 2 3 4
    things on my won

9. Has trust and confidence in me   0 1 2 3 4

10. Tries to control my life   0 1 2 3 4

11. Gives me advice whether or not I want it   0 1 2 3 4

12. Respects my judgment and decisions, even if different from   0 1 2 3 4
    what she/he would want

13. Does things for me, which I could do for myself   0 1 2 3 4

14. Treats me like a younger child   0 1 2 3 4

Sources for the scale:

Kenny, M. E. (1987). The extent and function of parental attachment among first-year

college students. *Journal of Youth and Adolescence*, *16*, 17–29.

Kenny, M. E., Lomax, R., Brabeck, M., & Fife, J. (1998). Longitudinal pathways linking

adolescent reports of maternal and paternal attachments to psychological well-

being. *The Journal of Early Adolescence*, *18*, 221–243.