Intrinsic motivation for cognitive engagement in recently retired adults

Dorothea Bye

A Thesis in

The Department of Psychology

Presented in Partial Fulfillment of the Requirements

For the Degree of Doctor of Philosophy at

Concordia University

Montreal, Quebec, Canada

March 2012

CONCORDIA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

This is to certify that the thesis prepared

By: **Dorothea Bye**

Entitled: **Intrinsic Motivation for Cognitive Engagement in the Recently Retired**

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

DOCTOR OF PHILOSOPHY (Psychology)

complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Signed by the final examining committee:

_____ Chair
Dr. S. Betton

_____ External Examiner
Dr. R. Koestner

_____ External to Program
Dr. M. Gagné

_____ Examiner
Dr. K. Li

_____ Examiner
Dr. C. Wrosch

_____ Thesis Supervisor
Dr. D. Pushkar

Approved by _____
Dr. A. Chapman, Graduate Program Director

March 14, 2012

_____
Dr. B. Lewis, Dean, Faculty of Arts and Science

ABSTRACT

Intrinsic motivation for cognitive engagement in the recently retired

Dorothea Bye, Ph.D.
Concordia University, 2012

This thesis examines how need for cognition, the dispositional tendency to engage in and enjoy effortful cognitive activity, predicts subjective well-being over time in older adults in recent retirement. Previous investigations of motivational factors in retirement have been cross-sectional; the original research in the two studies presented here is longitudinal. The goals of this thesis were to position need for cognition within need-based motivational theories, demonstrate its direct and indirect benefits to individuals over the course of two years in early adjustment to retirement, show how individual differences in motivational needs and their satisfaction through appropriate goal-seeking activities predicts emotional well-being for recently retired individuals, and provide suggestions of particular application to both individuals and professionals who are interested in the potential psychological challenges unique to the transition to retirement.

Research data were collected from recently retired adults (mean age = 60 years) who completed four consecutive annual waves of testing as part of the Concordia Longitudinal Retirement Study (2005-2009). Study 1 found that those who were higher relative to lower in need for cognition (i) reported higher levels of positive affect across time; (ii) were more frequently engaged in specific freely chosen activities involving creativity, internet use, and formal volunteering; (iii) scored higher on measures of problem-focused coping and goal re-engagement; and (iv) were more likely to have retired to pursue their own interests than for other reasons. Study 2 revealed that people

higher in either need for cognition, competence, or purpose reported higher levels of positive affect at baseline; however, those initially higher in either need for cognition or purpose showed significant drops in positive affect over time relative to their peers' lower stable affective trajectories. Interaction analyses revealed the counter-intuitive finding that those lowest in both need for cognition and purpose reported a significant increase in positive affect over time, though still having lower affect scores than those with significantly higher initial levels of both need for cognition and purpose who reported stable positive affect during the same period. Both social and motivational implications of these findings are discussed.

ACKNOWLEDGEMENTS

My supervisor Dr. Dolores Pushkar has provided consistent support and guidance throughout this academic journey, for which I am grateful. Claude Senneville of the Centre for Research in Human Development, Dr. Lucie Bonneville, and Dr. Carsten Wrosch have been indispensable in coaching statistical and methodological procedures. I'd like to thank lab mates Sarah Etezadi, Joelle Jobin, and Stephanie Torok, as well as my philosophical muse Linda Cochrane, for myriad motivational and academic contributions.

This research was supported by a grant from the Canadian Institutes of Health Research (CIHR) to Dolores Pushkar, Jamshid Etezadi, June Chaikelson, Michael Conway, Constantina Giannopolous, Karen Li, and Carsten Wrosch, as well as by my own graduate scholarship funding from the Fonds Québécois de Recherches en Société et Culture (FQRSC).

Above all, this body of work is dedicated with respect to the curious and cognitively engaged older adults of my past and present acquaintance, whose positive affect continues to inspire me.

CONTRIBUTION OF AUTHORS

Dorothea Bye developed the research questions, designed and interpreted the statistical analyses, and wrote and edited all chapters included herewith, with active joint participation from Joelle Jobin, PhD candidate, in the statistical analysis and results section of Study Two. Drs. Dolores Pushkar, Carsten Wrosch, and Karen Li provided helpful commentary on both manuscripts.

TABLE OF CONTENTS

List of Figures ix

List of Tables ix

Chapter 1: General Introduction 1

1.1 Thesis overview 2

1.2 Effectance motivation 3

1.3 The Organismic Perspective of Cognitive Evaluation Theory. 5

1.4 Differentiations of Intrinsic Motivation 9

1.4.1 Vallerand's Hierarchical Model of Motivation 9

1.4.2 Sheldon's Self-Concordance Model 12

1.5 Need for Cognition *in situ* 15

Chapter 2: Study 1 - Need for cognition, activity, and subjective well-being in recently retired individuals 21

2.1 Abstract 21

2.2 Introduction 22

2.3 Method 31

2.4 Results 38

2.5 Discussion 52

Chapter 3: Study 2 - Need for cognition and valued goals: A "what" and "why" of positive affect in retirement 65
3.1 Abstract 65
3.2 Introduction 66
3.2.1 Need for cognition and competence 67
3.2.2 Need for cognition and purpose in valued goals 70
3.2.3 Contextual characteristics 73
3.2.4 The present research 74
3.3 Method 75
3.4 Results 81
3.5 Discussion 92
3.5.1 Competence and need for cognition 94
3.5.2 Pursuit of valued goals and need for cognition: The what and why 97
3.5.3 Summary, limitations, future directions 100
3.5.4 Conclusion 101
Chapter 4: General Discussion
4.1 Summary and interpretation of major findings 103
4.1.1 Need for cognition and purpose in life 105
4.1.2 Need for cognition in social context 107
4.1.3 Why low need for cognition levels predict increased positive affect in recent retirement 108
4.2 Summary and interpretation of secondary findings 111
4.3 Clinical and Social Policy Applications 116
4.3.1 Implications for Individual Counselling 116
4.3.2 Social Policy Implications 121
4.4 Strengths and Limitations 123
4.5 Future Directions 127
4.6 Conclusion 130
References 132
Appendices A to L 152

List of Figures:

Study 2, Figure 1 87

Study 2, Figure 2 90

Study 2, Figure 3 91

List of Tables:

Study 1, Table 1 39

Study 1, Table 2 41

Study 1, Table 3 43

Study 1, Table 4 45

Study 1, Table 5 48

Study 1, Table 6 50

Study 2, Table 1 82

Study 2, Table 2 85

Intrinsic motivation for cognitive engagement in recently retired adults

Chapter 1: General Introduction

Human motivation is the psychological process which energizes and directs our behavior. In sustaining motivation across the lifespan, interest and enjoyment provide the emotional fuel, and the proactive efforts of individuals to fulfill needs and reach goals provide the directive processes (Reeve, 2008). According to Deci and Ryan's (2008) self-determination theory, all humans have certain innate needs for physical, social, and psychological well-being which persist regardless of age or the timing of normative life events. Transitional periods during the life course provide ideal opportunities to study how individual differences in motivational needs vary and interact to protect, buffer, and sustain subjective well-being in new contexts. Most literature on the transition to retirement has tended to focus on income and physical health outcomes, while psychological factors which can be operationalized and used to predict subjective well-being outcomes have been relatively overlooked. This research targets the relevance of motivational factors to older adults' perceived quality of life as they adjust to retirement within our current socio-historic context.

Need for cognition, the dispositional tendency to engage in and enjoy effortful cognitive activity, is a specific motivational orientation of relevance to lifespan development research (Cacioppo & Petty, 1982). In an increasingly information-based world, is there a niche for those recently retired people who have a strong desire to be engaged in effortful cognitive activity? They will require need satisfaction, if no longer through the continuous demands of employment, then through meaningful and committed

on-going goals which involve sufficiently challenging cognitive engagement in another domain. This thesis will a) position need for cognition within the topography of extant motivation literature on needs and goals, b) provide an empirical demonstration of its benefits to individuals over the course of two years in the early adjustment period of retirement, c) show how motivational needs and goals have distinct but synergistically potent affective predictive value for recent retirees, and in conclusion, d) derive implications and provide suggestions of particular application to both individuals and professionals who are interested in the potential psychological challenges unique to the transition to retirement.

1.1 Thesis Overview

The two studies included in this thesis were designed to examine how need for cognition as a specific motivational orientation is of particular use in predicting subjective well-being in older adults. Data were drawn from the Concordia Longitudinal Retirement Study (2005-2009) investigating adjustment to life in recent retirement. Participants were among 369 adults (mean age approximately 60 years at start of study) who completed four consecutive annual waves of small group testing in our university laboratories. Study 1 uses data from years two and four of the larger study to extend previous cross-sectional results showing need for cognition and associated behavioral strategies as an advantageous motivational trait for recent retirees over time (Bye & Pushkar, 2009), thus adding to other findings that aspects of intrinsic motivation contribute positively to life satisfaction in retirement (Stephan, Fouquereau & Fernandez, 2008). In conjunction with active behavioral patterns and other strategies such as problem-focused coping and goal re-engagement, need for cognition forms a basis from which to develop a profile of subjective well-being for the recently retired. A set of repeated measures multiple analyses of co-variance (MANCOVAs)

is used to compare and contrast results which bookend this particular two-year time period in recent retirement.

Study 2 employs hierarchical linear modeling to explore the potential value of need for cognition as a predictive tool for use with people about to retire or those who have recently done so. Positive affect would be expected to be maintained over time (measured here in years two, three, and four of the larger study) by those reporting a stronger need for cognition at a baseline measurement point (year two of the larger study). Added value is introduced to this thesis' research by associating nuanced gradations of two additional motivational influences with need for cognition. First, competence measured as a self-evaluation rating of effectance or ability for each cognitively-related activity is tested as a potential supplement to positive affect variance at baseline. Second, a sense of purpose in life is shown to contribute unique variance to positive affect both at baseline and over time to complete a motivational snapshot of sustained subjective well-being in the early years of retirement. The interactions found between motivational variables provide finely tuned insight into the relations between need, goals, and meaning, and imply future directions for the social context of retirement.

Before presenting the two studies, the next sections of this introduction situate need for cognition within a larger conceptual web to demonstrate its common roots and compatibility with self-determination theory.

1.2 Effectance motivation

Current paradigms of human lifespan motivation acknowledge the seminal contribution of White's (1959) monograph on competence, in which "effectance motivation" was first proposed as a necessary alternative to then prevalent drive theories

(Haidt & Rodin, 1999; Deci & Ryan, 1985). The term effectance emerged from White's definition of competence as any organism's ability to interact *effectively* with its environment, and to derive satisfaction from having made an *effect*. Although the terms competence and effectance have been used interchangeably both by him and others, White (1959) specified that effectance includes an emphasis on the rewarding feeling that follows from competent interactions with the environment. Despite various subsequent elaborations on this definition (Deci & Ryan, 1985; Elliot, McGregor & Thrash, 2002), effectance motivation remains commonly understood as an innate source of constructive energy sustained by the pleasure of self-perceived competence in effecting environmental change.

In his comprehensive review of relevant psychological theory and empirical evidence reaching back to the beginning of the twentieth century, White (1959) proposed that behaviors like exploratory play or novelty-seeking can be sustained independent of any drive or deficit-based operant reinforcements. He described how researchers had distinguished between approach and avoidance behaviors in animals who displayed both an apparently innate curiosity about environmental anomalies and a preference for activities allowing manipulation of complex objects. White used Piaget's (1952) descriptions of children's transactions with their environments to illustrate the central importance of volitional energy and physical motility to play and learning. He integrated the idea of mastery from psychoanalytic ego psychology with Maslow's (1954) growth motivation hierarchy from the humanistic field. He invoked Hebb's (1949) concept of a "difference-in-sameness" stimuli paradigm that incites optimal interest and learning, bringing both perception and cognition to the topic. The biological roots and evolutionary significance of competence motivation were included in White's treatise, foreshadowing future

developments in evolutionary psychology. Altogether, White's meticulous review is a detailed blueprint for human motivation which assumes that we have an inherent tendency toward growth and development throughout the lifespan.

Many recurring themes to be found in the present thesis were first addressed in White's (1959) groundbreaking collation of insights, since more than fifty years after its publication, his work continues to yield relevant hypotheses for further study. For example, White described the behavioral and affective outcomes of differing motivational styles and environments. He suggested there may be increased motivational complexity throughout the life course. He raised questions about whether we are driven more by dispositional curiosity, or by needs for activity, mastery, cognizance or power, or by achievement goals. Ultimately White asked us to include all aspects of the interactions between physical and social environmental stimuli, perception, personality, needs, and goals as part of a single holistic motivational process explained as effectance. This thesis will address these topics within the life course context of recent retirement.

1.3 The Organismic Phenomenological Perspective of Cognitive Evaluation Theory

Unlike mechanistic theories which view humans as passively reacting to environmental stimuli, organismic theories (such as White's) view humans as proactive agents with an intrinsic need to engage in action and experience satisfaction from having demonstrated the capacity to do so. The source of energy to act arises from within the individual, and the direction of the action reflects interplay between the individual's initiative and ambient stimuli. It is accompanied by an experience of vitality and affective well-being, which leads to repeated approach activities and the gradual development of an increasingly complex internal self, as Deci and Ryan (1985) describe in their

conceptualization of cognitive evaluation theory. More recently, Fredrickson (1998) proposed a parallel process, broaden-and-build, which uses these organismic principles in application to the energy and direction of cognitive growth. In fact, the organismic view of human behavior has been referred to as the common metatheoretical assumption underlying various views of the agentic self (Little, Hawley, Henrich & Marsland, 2002), and it has been connected with related concepts such as flow (Csikszentmihalyi, 1990), interest (Izard, 1977; Silvia, 2006), curiosity (Kashdan & Steger, 2007), lifespan theories of motivation (Heckhausen & Schulz, 1995; Heckhausen, Wrosch & Schulz, 2010), adaptive coping (Carver, Scheier & Weintraub,1989; Skinner, 1996), control (Haidt & Rodin, 1999), positive psychology (Seligman & Csikszentmihalyi, 2000), educational psychology (Renninger, Hidi & Krapp, 1992; Sansone & Harackiewicz, 2000), self-efficacy (Bandura,1997), and, as will be shown here, with need for cognition (Cacioppo & Petty, 1982).

At its foundational level, Deci and Ryan's (1985) self determination theory arises from this organismic perspective that each individual has the capacity to generate his/her own growth choices independent of external reinforcement contingencies. Deci and Ryan's approach subsumes White's effectance theory into *intrinsic motivation*, the conceptual cornerstone of cognitive evaluation theory, which is itself an embryonic form of the subsequently more fully elaborated version of self-determination theory. Intrinsic motivation assumes that the locus of behavioral causality originates within the organism, in contrast to extrinsic motivation where the locus of behavioral causality is perceived as external to the self. Three decades of empirical research have confirmed that intrinsic or "autonomous" regulation leads to increased energy, vitality, and enjoyment, while extrinsic

or controlled regulation can constrain, hinder or undermine the individual's initiative, leading to lowered satisfaction, passivity, and even alienation (Ryan & Deci, 2000a; Deci & Ryan, 2008). Based on these findings, cognitive evaluation theorists maintain that optimal mental health requires fulfillment of the two innate, essential, and universal needs for autonomy and competence.

Autonomy is synonymous with self-determination, and represents the autotelic aspect of intrinsic motivation. The goal of an autotelic activity, for example, is to experience it for its own sake (Csikszentmihalyi, 1997). For intrinsic motivation to be maintained, the activity must be freely chosen, or perceived to be of autonomous origins. *Competence*, or the need to feel competent, means that the more effective a person perceives him- or herself to be at performing a given activity, the more intrinsically motivated the person will be to continue to pursue that activity. Concordant with White's effectance theory, the activity must be optimally challenging, neither too difficult nor too trivial; the challenge must roughly match the capability. This competence dynamic has been captured in Csikszentmihalyi's (1997) description of flow. Research in older adults has demonstrated that balanced relations between cognitive ability and activities of matched cognitive demand are necessary for the experiential outcome of flow (Payne, Jackson, Noh & Stine-Morrow, 2011). *Relatedness*, a third universal need included in the full self-determination model, is not directly addressed by either cognitive evaluation theory or this thesis.

According to Ryan and Deci (2000b), competence and autonomy are inseparable and both must be present for intrinsic motivation to exist. Little and colleagues (2002), however, challenge this basic tenet by attributing greater importance to the need for competence. They suggest that autonomy is mediated by effectance-directed activity,

implying a role of greater importance for competence than autonomy. Other self-determination scholars have demonstrated that an equal balance in the satisfaction of the needs for competence, autonomy and relatedness is important for maximized well-being (Sheldon & Niemiec, 2006). The defining propositions of Cognitive Evaluation Theory specify that intrinsic motivation will be present when ample autonomy-supportive feedback is incurred in conjunction with clear contingencies between competent behavior and appropriate contextual outcomes. "Informational" or effectance-relevant feedback must be provided to support competence and an internal perceived locus of causality. Both "controlling" feedback (from external perceived loci of causality) and "amotivational" conditions (which occur in a complete absence of feedback) are detrimental to perceived competence and subjective well-being (Deci & Ryan, 1985). The full self-determination model describes a continuum of varying degrees of extrinsic motivation ranging between end-points of fully internal to fully external causality, including combined gradations of the two states in between (Ryan & Deci, 2000a).

Specifically, and consistent with the goals of this thesis, cognitive evaluation theory endeavours to determine the social and environmental factors necessary for the maintenance of intrinsic motivation. Sheldon, Ryan, and Reis (1996) assert that competence and autonomy variables "are likely to relate to well-being in any measurement context, time frame, or level of analysis" (p. 1277), a position which supports the use of need for cognition as a compatible research tool for the longitudinal monitoring of retirees' subjective well-being. The original research presented here will underline the importance of optimal environmental challenges and effectance-supportive feedback to the sustenance of intrinsic motivational need fulfillment in recently retired individuals.

1.4 Differentiations of Intrinsic Motivation

Cognitive evaluation theory allows intrinsic motivation to be further differentiated by type and level. The literature has been consistent in showing that optimal results for motivational outcomes are determined by the fit between individuals and their social contexts, whether it is examined proximally or distally, at or across temporal measurement points, within or between persons, as reflections of global trait or changing state variables, and/or via interdisciplinary venues representing the full kaleidoscope of biopsychosocial influences (Deci & Ryan, 2002; Haidt & Rodin, 1999).

All extensions of the cognitive evaluation theory framework retain the common assumptions that intrinsic motivation is prototypically self-determined, sustained by interest and enjoyment, and is sensitive to contextual events which can either support or thwart it. Two well-established differentiations of cognitive evaluation theory which invite comparisons with need for cognition are Vallerand's (1997; 2000) Hierarchical Model of Intrinsic and Extrinsic Motivation, and Sheldon and Elliot's (1999) Self-Concordance Model. Each is embedded in outcomes involving affect, cognition, and behavior, as is need for cognition.

1.4.1 Vallerand's Hierarchical Model of Intrinsic and Extrinsic Motivation

First, Vallerand (1997) divided intrinsic motivation into three subtypes: 1) intrinsic motivation to know, 2) intrinsic motivation to achieve accomplishments, and 3) intrinsic motivation to be stimulated. Distinguishing between these types of intrinsic motivation allows a more specific focus on the match between type of motivation and its appropriate need fulfillment with accompanying outcome. Of interest to this thesis is "intrinsic motivation to know", defined as "engaging in an activity for the pleasure and satisfaction

that one experiences while learning, exploring, or trying to understand something new" (Vallerand, 1997, p. 280). This is similar to Caccioppo and Petty's (1982) definition of need for cognition as the tendency to enjoy cognitively effortful activities, and quite different from an intrinsic tendency to pursue accomplishments or an intrinsic tendency to experience stimulation, either of which would potentially lead to different behavioral manifestations and outcomes. Vallerand's clarification between types of intrinsic motivation is critical to understanding self-determination theory: the intrinsic motivation to know relates most to eudemonic or meaning-based motives; the intrinsic tendency to experience stimulation relates most to hedonic or pleasure-based motives; and the intrinsic tendency to achieve accomplishments relates most to goal-fulfillment, mastery and control. These distinctions will emerge as important to the interpretation of the results of Study 2, and will inform the general discussion of this thesis.

Second, Vallerand's (1997) hierarchical model of intrinsic and extrinsic motivation delineates between global, contextual, and situational levels, allowing potential effects between source and consequence to occur both horizontally and vertically among these general levels. In keeping with self determination theory, the needs for autonomy, competence and relatedness are preserved categories within each level, and social factors are prime predictors of the respective strengths of motivation at the global (stable personality), contextual (activity domain), or situational (specific immediate responses to environmental demands) levels. Although initially it was maintained that the three levels operated in mutual exclusivity with the exception of possible top-down effects, Vallerand and colleagues later amended the model to allow for bottom-up recursive influences between the levels of generality (Vallerand & Ratelle, 2002). As a result of this potential

multi-directionality of influence, it is important to clarify which level is being addressed when studying determinants and consequences. In this set of studies on the activities and well-being of recent retirees, for example, it could be hypothesized that a change in their contextual level from workplace to home environment might initially disrupt the effects of their global intrinsic motivation through contextual to situational levels. Alternatively, strength at the global motivational level seen in those who are high in need for cognition may have led to a lifelong build-up at the contextual level through education, job status or practiced leisure pursuits which may, in turn, contribute advantageously to higher motivation and more positive affect at the level of new daily situational challenges.

From this perspective, the present research on older adults in the early years of retirement can be seen as an implicit theoretical test of Vallerand's conceptual model. If either the global or the situational levels of intrinsic motivation to enjoy cognitive challenge are closely dependent on the proximal middle contextual level, changing that context from work to non-work may weaken the affective, cognitive, or behavioral consequences at adjacent levels. By having to re-establish activity patterns with renewed motivational energy in a new context to replace pre-retirement lifestyle factors dictated by the demands of working fulltime, recently retired individuals are potentially compensating in one context to replace losses in self-determination from another. Vallerand refers to this kind of situation as "motivational compensation" (Vallerand & Ratelle, 2002).

The multi-dimensional aspect of Vallerand's model is useful not only in allowing interlocking interpretations between levels, but also because it helps preclude circularity between motivational cause and effect. Affective and behavioral factors are too often used simultaneously as both indicators and consequences of intrinsic motivation (Vallerand,

1997). The definition of need for cognition itself as the stable dispositional tendency to enjoy effortful cognitive challenge (Cacioppo, Petty, Feinstein & Jarvis, 1996) is open to this criticism. However, the increased depth and broadened scope of Vallerand's model promote cross-checking and necessitate a clear line of conceptual logic. Vallerand's hierarchical model prescribes a specific direction across each level: social factor → psychological mediators → motivation style → consequence. Fitting my research interests on need for cognition to the model yields this corollary: retirement → need for cognition → motivation to engage in cognitive activities with greater frequency → subjective well-being. While affect is embedded in the definition of need for cognition, the eventual measured outcome of these studies will be shown to have been mediated by several other global, contextual and situational intervening factors.

1.4.2 Sheldon's Self-Concordance Model of Healthy Goal Striving

Another major extension of self-determination theory has influenced the hypotheses and interpretations of the two studies in this thesis: Sheldon and colleagues' concept of *self-concordance*, which focuses on the congruence of organismic needs and personal goals at the idiographic level (Sheldon & Kasser, 1995; Sheldon & Elliot, 1999). In this context, idiographic refers to a person's intrinsically-motivated choices in goal-directed activity engagement. As with other forms of intrinsic motivation, self-concordance theory predicts that its ensuing commitment and sustained effort will lead to increasing subjective well-being over time (Sheldon & Elliot, 1999). To benefit psychologically from goal achievement, the goals reached must satisfy the individual's organismic needs; the goals must be concordant, or in agreement, with the idiographic need (Sheldon & Kasser, 1995).

Individuals will be at risk for reduced well-being either if they are prevented from reaching their goals, or if a set goal is incongruent with an organismic need. When goals are not of authentic organismic origin, volitional strength will not be sustained (Sheldon & Elliot, 1999; Sheldon, 2002a). In the context of recent retirement, those with a strong need for cognition will need to find sufficiently meaningful activity pursuits to remain motivated and content.

Self-concordance research is necessarily longitudinal from two theoretical angles. First, in differentiating between type of need and goal orientation, it describes a temporal sequence where needs precede goals, with the two being motivationally twinned to be congruent. Ideally, autonomy needs should be filled through pursuit of autonomous goals, relatedness needs through relatedness goals, and competence needs through competence goals (Sheldon & Niemiec, 2006). This preferred match between need and goal type equates to a match between interests and tasks; in practice, it takes time for this relation between components to develop and for the results to become measureable.

Second, longitudinal self-concordance research allows within-person motivational trait descriptions to amalgamate from repeated or clustered specific state situations, as shown in both short term day-to-day, semester-length, and year-long periods with undergraduates (Sheldon, 2002b; Sheldon & Elliot, 1999; Sheldon, Ryan, Deci & Kasser, 2004; Sheldon et al.,1996). Here the self-concordance model shares perspective with Vallerand's hierarchical model in that each recommends either horizontal or vertical trajectories in measuring causal effects between time points or domains. Sheldon and Kasser (1995) describe vertical coherence as occurring when state-specific goals are consistent with or regulated by trait-level goal orientations, necessitating both bottom-up and top-down

influence. Activity-based satisfying experiences, for example, provide a bottom-up influence through congruence with higher level trait preferences, leading to subjective well-being. Horizontal coherence occurs when success at specific goals transfers to success at other goals on the same system or domain level. To use an architectural analogy, locating the support beams within the motivational structure of idiographic needs, goals, and effort informs our ability to identify any needed social system foundational reinforcements.

Most relevant to older adults who have recently retired are the results of previous self-concordance research directed toward the process of making pro-active choices or the re-direction of meaningful, appropriate goals in a new setting. Consistent with all other organismic theories, the perceived locus of causality in self-concordant people is autonomously generated, or self-determined, reflecting lifelong personal interests and core values. When applied to the social context of retirement, self-concordance theory dovetails with Atchley's (2003) continuity theory; both theories would predict that recently retired people will be motivated to choose activities consistent with earlier, repeatedly shown preferences and habits. However, for some people, removal of the extrinsic pressures of employment may force a search for intrinsically motivated needs, or for new forms of need-goal congruence, as Study 2 will indicate.

Self-concordance is sensitive to domain-specific variations, and attempts to identify which personally-chosen need-satisfying experiences are incorporated into a particular context of goal direction. Will recently retired people with a strong need for effortful cognitive challenge be better able to achieve and sustain self-concordance in the domain of retirement than those with a lesser need for cognition? As Study 1 demonstrates, the need for cognition scale is helpful in addressing this motivational question because it measures

within-person trait characteristics, and is based on responses to specific questions about respondent preferences without assigning general context. How will affective and behavioral outcomes vary over time for recently retired people depending on the self-determination of their intrinsic need for cognitive challenge? Both studies included here have found well-being outcomes based on varying idiographic responses to specific items reflecting the need for knowledge in people within the social context of retirement. Thus need for cognition is presented here as a "candidate need" (Sheldon et al., 1996) which uniquely predicts criterion measures of subjective well-being.

1.5 Need for Cognition *in situ*

As described above, antecedents of the need for cognition construct can be traced from White's effectance theory through organismic to intrinsic theories of motivation, which have been subsequently embodied in Deci and Ryan's cognitive evaluation theory. Further differentiations within the larger self-determination need satisfaction paradigm, such as the models provided by Vallerand and Sheldon and their respective colleagues, also serve as affiliates of the need for cognition construct. These ideas from the history and development of scholarship on conation converge to underline the functional value of specific need-fulfilling experiences for people of any age or life context.

Need for cognition, defined as a stable individual difference in the tendency to engage in and enjoy cognitively effortful tasks in a wide range of settings, was first operationalized in a 34-item scale (Cacioppo & Petty, 1982), and later shortened to the equally valid 18-item inventory (Cacioppo, Petty & Kao, 1984), which is used in this thesis' research. Subsequently, Cacioppo and colleagues (1996) produced a comprehensive review article describing over 100 empirical studies which reported how individual differences in

need for cognition were related to other variables, primarily but not exclusively using undergraduate samples. They reported that need for cognition has been found to correlate positively with variables representing cognitive innovativeness, creativity, state and trait curiosity, desire for control, introspectiveness, self-esteem, information retrieval, and knowledge concerning current events. Need for cognition has also been shown to correlate negatively with uncertainty, external locus of control, a diffuse-avoidant coping style, dogmatism, perceived stress, anxiety, the importance of social values, and low self-appraised problem-solving effectiveness. Non-significant relations have been found between need for cognition and abstract reasoning ability, sociability, shyness, social desirability, and worry. Cacioppo and colleagues (1996) repeatedly detail how individual differences in need for cognition have been shown to vary independently of gender, income, cognitive ability, or age, confirming its usefulness as a measure in a wide range of domains.

Additionally, as a result of their tendency to derive meaning, adopt positions, and tackle dilemmas differently than those lower in need for cognition, people higher in need for cognition are expected to have a richer behavioral history of active informational searches and knowledge acquisition (Cacioppo et al., 1996), which over time, and with opportunity, might lead them to have acquired higher education and occupation levels. Further, because they are more likely to enjoy engagement in cognitive effort, and since they have been shown as less likely to procrastinate, we might expect to find that those higher in need for cognition would be more likely to have given their retirement plans more thought, a topic explored further in Study 1of this thesis. Altogether, Cacioppo and colleagues' (1996) review of research to that date presented need for cognition as a high intrinsic motivation to

use available resources for engagement in effortful problem-solving, a stable cognitive style of potential value to older adults in transition to retirement.

In a second landmark review, Petty, Brinol, Loersch and McCaslin (2009) report a further widespread use of need for cognition in the marketing and organizational psychology literatures, where the effectiveness of persuasion and argument methods in information processing and decision-making are shown to vary as a function of need for cognition. This line of research has shown that people lower in need for cognition tend to rely on simple cues or stereotyping in evaluating situations, while those higher in need for cognition are more likely to be influenced by the quality and complexity of arguments or evidence provided (Petty et al., 2009). Although most research on need for cognition in these fields continues to be done with undergraduate samples, there are some studies using experienced mid-life managers, usually drawn from executive education programs (i.e. Anderson, 2007; Carnevale, Inbar & Lerner, 2011; Nair & Ramnarayan, 2000). Sevenants, Verschueren and Schaeken (2011) used comparative groups of students and business consultants to differentiate need for cognition as a cognitive style from respective measures of cognitive ability and expertise in the prediction of decision-making competence. The only previous specific mention of need for cognition in older retired adults, to this author's knowledge, was made by Pushkar, Basevitz, Conway, Mason, and Chaikelson (2003) who found that need for cognition scores correlated positively with both extent of values expressed ($r = .22$, $p < .05$) and experience of aging scores ($r = .24$, $p < .05$) in a sample of 80 adults mean age = 74.13, $SD = 6.12$, a precursor to the findings of Study 2. However, other related motivation concepts in later life have been examined, such as the role of personal projects and positive mental health in adults mean age 77.4, $SD = 6.76$ (Lawton,

Moss, Winter & Hoffman, 2002), as well as conditions for achieving flow in cognitive tasks for adults mean age 72.1, *SD* = 7.7 years (Payne et al., 2011), while aspects of self-determination theory and retirement satisfaction have been explored by Stephan and colleagues (2008), whose participants' mean age was 63.23, *SD* = 4.22, as well as need satisfaction and exercise behavior in adults mean age = 63.8, range 50-79 (Kirkland, Karlin, Stellino and Pulos (2011).

The value of need for cognition itself to older adults who are transitioning from fulltime paid employment to less structured retirement lifestyles has been previously illustrated in a path model positioning need for cognition between predictors of conscientiousness, openness, and education, and subsequent mediators of problem-focused coping and frequency of cognitive activities, converging to explain 38% of the variance in recent retirees' positive affect (Bye & Pushkar, 2009). Within the same path analysis, neuroticism, health, and perceived control explained 22% of recent retirees' negative affect, with need for cognition itself remaining unrelated to either perceived control or negative affect. Thus need for cognition was shown to enhance subjective well-being by increasing positive affect rather than buffering negative affect. Comparable findings clarifying relations among need for cognition and openness, conscientiousness, other aspects of personality, and intelligence using undergraduate samples have been subsequently reported (Fleischhauer, Enge, Brocke, Ullrich, Strobel & Strobel, 2010), providing further consistent support for the conceptual validity of need for cognition.

As an extension and elaboration of previous cross-sectional research (Bye & Pushkar, 2009), the longitudinal studies which follow continue to develop an understanding of motivation in the context of retirement by a) testing hypotheses regarding the behavioral

choices of retirees higher versus lower in need for cognition, b) exploring relations among need for cognition and related motivational variables to further refine its conceptualization, and c) illustrating need for cognition's unique ability to predict subjective well-being over time for recently retired individuals. The global research goal of this thesis, to create a motivational profile of individuals more likely to experience high subjective well-being during the early adjustment years of retirement, is served by two different methodological approaches, each tailored to answer separate questions. In Study 1, repeated measures multiple analyses of variance or co-variance (MANCOVAs) were employed to maximize the contrast between those remaining consistently higher and lower in need for cognition while minimizing random error. This doubly multivariate approach was chosen for two reasons: first, because much of the extant literature on need for cognition is oriented toward such high/low group comparisons (e.g. Steinhart & Wyer, 2009); and second, the method allows accompanying analysis of demographic and contextual variables which might potentially cause variation in outcome(s) due to changed personal circumstances in this heterogeneous sample. However, in creating groups which remained consistently above or below the need for cognition scale mean at both time points measured, twenty percent of the full available sample was not used. Study 2 corrects for this limitation by using need for cognition scores from all available participants at the baseline time point to predict positive affect outcomes measured at two subsequent time points. Hierarchical linear modelling (HLM) is advantageous because it can be used to provide information on how variables affect both within- and between-person change over time.

In combination, the differing perspectives of the two study designs provide multi-faceted information explicating the valuable contribution of the intrinsic motivation

construct need for cognition to subjective well-being in a representative sample of recently retired people.

Chapter 2: Study 1

Need for cognition, activities, and subjective well-being: Motivation in the context of retirement

To be submitted to either Activity and Aging or
The International Journal of Aging and Human Development

Abstract

This study examined motivational characteristics and activity choices of 275 recently retired individuals over a two-year period to produce an empirically-based profile of those more likely to navigate this life transition with higher levels of subjective well-being. After accounting for demographic influences, we found that those who were higher in *need for cognition,* the dispositional tendency to enjoy effortful cognitive challenge, also (i) reported higher levels of positive affect across time; (ii) were more frequently engaged in specific freely chosen activities involving creativity, internet use, and formal volunteering; (iii) scored higher on measures of problem-focused coping and goal re-engagement; and (iv) were more likely to have retired to pursue their own interests than for other reasons. These findings link motivational theory with behaviors to show how recent retirees can benefit from an intrinsic motivation to actively learn, explore, and create during a new life stage.

Key words: retirement, older adults, need for cognition, subjective well-being, coping, goal adjustment, activity engagement, internet use, volunteering, creativity

Introduction

The goal of this study is to provide a profile of those individuals who are more likely to experience greater subjective well-being during their earliest years of retirement. By linking individuals' *need for cognition* to their most important reason for retirement, to the frequency and type of self-chosen activities over two years of retirement, and to their accompanying style of coping and goal re-engagement strategies, the beneficial value of this specific motivational mechanism is shown to predict recent retirees' well-being as they actively engage in adjusting the pattern of their lives.

Need for cognition was originally operationalized as the stable dispositional tendency to engage in and enjoy effortful cognitive activity (Cacioppo & Petty, 1982; Cacioppo et al., 1984). The measure has been used extensively in both academic and organizational settings where it has correlated positively with trait curiosity, openness to ideas, information processing, creativity, effective problem solving, and intrinsic motivation for cognitive exploration (Cacioppo et al., 1996). Items in the need for cognition questionnaire were constructed to be as context-free as possible for use in diverse settings (Cacioppo & Petty, 1982). This makes the measure relevant for use with retired individuals who by definition are exempt from the pressures of performance evaluations. Need for cognition has been shown to be a meaningful tool in the study of heterogeneous populations of older adults outside structured domains like schools or workplaces because it also varies independently of age, gender, or health to predict behaviors leading to positive affect (Bye & Pushkar, 2009). Additionally, need for cognition itself is not an evaluation of intellectual capacity, but instead a motivational orientation which may relate only indirectly to cognitive ability scales (Cacioppo et al., 1996; See, Petty & Evans, 2009). As such, need for cognition

retains predictive value in an aging population with varied and changing levels of cognitive abilities.

A true psychological need is distinguished from a passing idiosyncratic desire because it is essential to adjustment and psychological well-being (Sheldon & Niemiec, 2006). Specifically, when there is congruence between a person's primary activities and his or her organismic needs for autonomy and competence, greater well-being will occur (Sheldon et al., 1996). Need for cognition unites autonomy and competence, two essential need components in Deci and Ryan's (1985) cognitive evaluation theory of intrinsic motivation. Satisfaction of the needs for autonomy (the desire for personal initiative) and competence (the desire for effective interaction within the environment) through self-chosen activities contributes to subjective well-being at any stage in the life course (Ryan, 1998). Self-determination theory has been used as a framework in the study of relations between motivation and important aspects of the lives of nursing home residents (mean age 76.3 years) (Vallerand & O'Connor, 1989); the prediction of older adult exercise behaviors (mean age 68.7 years) (Kirkland et al., 2011); and the prediction of life satisfaction in active retirees (mean age 63.2) (Stephan et al., 2008). Such studies have shown that motivational resources are necessary to our understanding of the retirement adjustment process (Wang, Henkins & van Solinge, 2011).

The context of retirement

In his overview of current frontiers of research on retirement, Ekerdt (2010) states, "It is always true that every cohort retires in the context of its times" (p. 69), as older adults bring with them the skills and habits acquired through decades of experience. Learned adaptive strengths and general patterns of selective activity persist to create well-being

during personal transitions, which is why most people cope well with retirement, according to Atchley's (2003) continuity theory. However, some retirees organizing their lives in the context of the information age will cope better than others, with resulting higher levels of subjective well-being. For example, technological change shapes activity choice: in 1989, Fouts reported on the frequency, selection, and psychological outcomes of television use by people then over 60 years of age, concluding that their life satisfaction was enhanced and maintained by fulfillment of needs for information, entertainment and social interaction through this medium. More recently, Erickson and Johnson (2011) found a significant relation between internet use for communication and information gathering purposes and self-efficacy in older adults after controlling for demographic characteristics. Such studies share an underlying theme across cohorts, which links the active use of accessible information-providing technological tools with satisfying and productive outcomes for motivated older adult consumers. Cacioppo and colleagues (1996) have described need for cognition as an individual difference which has been developed by past experience, is reinforced by cognition and behavior across the lifespan, is influential in the acquisition or processing of information particularly relevant to problem-solving, and is manifested in current experience. By comparing retirees higher and lower in need for cognition on their reasons for retirement, their activity frequency and selection, their dispositional coping and goal adjustment tendencies, and their respective levels of subjective well-being, this study will show how the motivational construct of need for cognition is useful to older adults who embrace new information and enjoy various effortful cognitive activities in retirement.

Need for cognition and reasons for retiring

Retirement is perceived by many to be an opportunity to finally engage in activities of intrinsic value without interference from the extrinsic pressures typical of working life. In Weiss's (2005) qualitative sample of 89 retirees, several leading reasons for retirement were generated, with "wanting the freedom to do something new" endorsed as most important by 20% of the study participants. However, the remaining majority of participants divided their primary reasons for retirement between extrinsic factors such as family responsibilities, physical disability, dislike of job, workplace initiative, or alternative to unemployment.

Individuals highly motivated by their need for cognition, who enjoy the pursuit of cognitively complex activity for its own sake, would be most likely to embrace an expansion of time allowing self-directed activity commitment. Having greater freedom to exercise autonomy and demonstrate competence through activities of choice represents a prototypical intrinsically motivated situation (Deci & Ryan, 2000). Those higher in need for cognition would be more likely to embrace this reason for retirement instead of, or in addition to, other social, health, or financial reasons because it would lead to greater congruence between their strong dispositional need for cognitive activity engagement and opportunities to satisfy it. In this study we expected to find that individuals higher in need for cognition would place greater weight on having more time to pursue their own interests as a reason for retirement, while those lower in need for cognition would prioritize alternative varied reasons (hypothesis 1).

Need for cognition and chosen activities

If individuals higher in need for cognition view retirement as a time of freedom to fulfill the need for self-directed goals, then we can expect that they will, in fact, engage

more frequently in activities requiring cognitive effort than those less dispositionally motivated to do so. This prediction arises from Sheldon and Elliot's (1999) self-concordance motivation model, where chosen goals must be congruent with enduring needs and interests for adjustment and well-being to occur. Previous research has found that retired individuals with higher levels of intrinsic motivation for knowledge, stimulation, and accomplishment were more likely to be involved in structured post-retirement activities, and that intrinsic motivation for accomplishment and stimulation related to satisfaction with retirement (Stephan et al., 2008). Similarly, cognitively effortful activities have been shown to be a mediating vehicle between need for cognition and positive affect in a cross-sectional study (Bye & Pushkar, 2009). Longitudinal findings also support the activity theory of aging, which contends that both physical and leisure activity correlate positively to subjective well-being in older adults (Lampinen, Heikkinen, Kauppinen & Heikkinen, 2006). Activities which are freely chosen (autonomously generated), which require high investment or time and energy commitment and are of sufficient challenge to existing knowledge and skills (competence-supportive), contribute most to quality of life in older adults (Mannell, 1993). People of any age who are higher in need for cognition should be significantly more likely than those lower in need for cognition to prefer such specific activities reflecting complex cognitive engagement or information seeking and processing (Petty et al., 2009).

Need for cognition is a stable trait; individuals who have habitually enjoyed cognitive challenge will continue to do so after retiring by building on accumulated motivational and knowledge resources (Hobfoll, 2002). Post-retirement leisure activities tend to be the same as those of pre-retirement, although the frequencies of these activities

may vary (Atchley, 2003; Nimrod, Janke & Kleiber, 2009), indicating lifestyle continuity. Given their dispositional curiosity, it is likely that recent retirees higher in need for cognition will report both a higher mean frequency score in all voluntary or optional activity engagement combined (hypothesis 2a), as well as a higher mean frequency of engagement in specific choice of higher demand activities, reflecting consistent enjoyment of cognitive engagement over two years in recent retirement (hypothesis 2b).

Need for cognition, coping, and goal re-engagement

The strategies of problem-focused coping and goal re-engagement may contribute behavioral impetus to the convergence of needs and goals creating subjective well-being; problem-focus coping has already been shown to mediate between need for cognition and positive affect cross-sectionally (Bye & Pushkar, 2009). Need for cognition has been associated with such pro-active strategies as greater confidence in solving problems, better processing of information relevant to problems, and greater likelihood of seeking out new information (Cacioppo et al., 1996). Problem-focused coping involves planning, taking direct action, screening out other activities, and exercising restraint where appropriate (Carver et al., 1989). Those higher in need for cognition, being better problem-solvers, are more likely than those lower in need for cognition to report the use of a coping style characterized by focused effort consistently over time.

Goal re-engagement has also been previously associated with positive affect in older adults (Wrosch, Scheier, Miller, Schulz & Carver, 2003). Goal re-engagement describes the ability to re-direct effort toward new attainable interests after letting go of unattainable goals. This aspect of goal adjustment is a critical part of adaptive self-regulation across the lifespan, since preoccupation with new goal-directed activity not only provides on-going

purpose and helps to sustain long-term development, but may also serve to reduce failure-related emotions such as regret (Wrosch et al., 2003). Consistent with the lifespan theory of control (Heckhausen et al., 2010), the ability to reset or adjust goals in retirement reflects an active striving toward fulfillment of the fundamental need for competence, the need to control one's environment and life outcomes. Both problem-focused coping and goal re-engagement describe features of a pro-active personality most likely to be typical of individuals higher in need for cognition, who are intrinsically motivated to pursue effortful cognitive engagement within their everyday environments. We expected to find that, over a two-year period, individuals higher in need for cognition would report higher levels of both problem-focused coping and goal re-engagement (hypothesis 3), which are two behavioral strategies useful to older adults who are in the process of actively constructing their retirement experience.

Need for cognition and subjective well-being

Equipped with the expressed desire for more freedom to pursue personal interests in retirement, higher frequency of activity engagement (specifically in activities requiring cognitive effort), and the customary use of problem-focused coping and goal re-engagement strategies, recently retired individuals higher in need for cognition can be expected to report greater subjective well-being over time. Subjective well-being encompasses both affective (positive and negative) and cognitive judgment (life satisfaction) domains. Emotion researchers agree that positive and negative affect are two distinct and separate factors that vary independently in intensity and duration (Schimmack, 2008), have distinct predictors, and are not necessarily bipolar extremes of the same scale (Lawton, 1994). For example, need for cognition has been found to be a mediating factor in the pathway to positive affect,

but not to negative affect (Bye and Pushkar, 2009). Therefore we did not expect to find group differences in negative affect due to level of need for cognition at either test time point, consistent with Cacioppo and colleagues' (1996) description of need for cognition as stochastically independent of negative emotionality (hypothesis 4a). We did expect to find that level of need for cognition would continue to differentially predict positive affect at both years two and four of post-retirement, with those higher in need for cognition reporting higher levels of positive affect (hypothesis 4b).

Life satisfaction measures have also been used frequently as indicators of adjustment to retirement (Nimrod, 2007; van Solinge and Henkens, 2008), and are reported to index different aspects of well-being than affective measures (Stone, Schwartz, Broderick & Deaton, 2010). This component of subjective well-being represents a global judgment, or cognitive assessment, of quality of life which differs from positive and negative emotion measures by reflecting a more stable evaluation based on consistently accessible information about important life domains (Schimmack & Oishi, 2005). Since need for cognition is affiliated with a reflective and rational decision-making approach (Petty et al., 2009) and is instrumental in the path to positive affect, we hypothesized that those higher in need for cognition would also report higher levels of life satisfaction over time (hypothesis 4c).

Contextual characteristics

Given the inevitable heterogeneity of any representative sample of older adults, demographic and life situation variables which might potentially influence participants' subjective well-being were included in our analyses. As Ekerdt (2010) has described, multiple characteristics of adult life must be considered as either antecedents to, or

proximate components of retirement adjustment, depending on the structure of a given study's design. Without making specific directional hypotheses, we have accounted for variables of interest common to other studies on retirement or older adults; age, gender, illness, income, prior occupation, education, cognitive ability, and stress. Kim and Moen (2002) have reported that prior occupational and retirement status, as well as the transition to retirement process itself, may be experienced differentially for men and women, so gender was entered as a covariate in all present analyses. Age, illness, income, cognitive ability, and stress are considered as potential covariates of subjective well-being because intrinsic motivation is present as a motivator unless it is blocked by factors representing "real time needs which interrupt goal-directed behavior" (Deci & Ryan, 1985, p. 234). Little (1998) also emphasizes the need to control for stress levels for a full understanding of the dynamics of personal project pursuits.

Although it has been shown that activities, personality, and motivation variables are more powerful predictors of subjective well-being than demographic or situational factors (Diener, Lucas & Scollon, 2006; Kahneman and Deaton, 2010; Tkach & Lyubomirsky, 2006), the inclusion of demographic variables informs this study's profile of recent retirees and facilitates comparisons between our sample and those of other similar studies. When applicable, contextual variables which correlated significantly with the outcome measure were included in each analysis to control for their potentially influential interactions with other variables.

Summary of hypotheses

Two groups of recently retired people, those scoring in the higher and lower halves of the need for cognition continuum, were compared to test the hypotheses that the higher

need for cognition group would be more likely to report having retired with the primary intention of having more freedom to pursue their own interest (H1); would report greater mean frequency of overall activity engagement (H2a) as well as greater mean frequency of engagement in activities specifically requiring cognitive effort over time (H2b); would repeatedly score higher on measures of problem-solving coping and goal re-engagement (H3); and would report higher levels of positive affect (H4b) and life satisfaction (H4c) over time, with no change in negative affect (H4a). The overall goal of the study was to produce an empirically grounded profile of those experiencing higher levels of subjective well-being in retirement, allowing one descriptive prediction of those more likely to make an easier adjustment from work to retirement.

Method

Participants and procedure

As part of a longitudinal study (2005-2009) investigating adjustment to life in retirement, a total of 369 adults (mean age at start of study = 59 years, *SD* = 4.98, range 44 to 77 years) completed four consecutive annual waves of testing in groups of 2-6 at our university laboratory, with key measures relevant to this study being given at years two and four. Prior to each given testing session, participants completed a battery of demographic and health questions mailed to their home (see Appendix A). Once in the lab, consent forms were presented first (see Appendix B), then tasks were administered in the same order to all participants, with self-paced timing except for the cognitive ability measure. Participants were recruited through a large corporation, retiree associations, and newspaper advertisements. Inclusion criteria were recent cessation from at least 20 years of full-time employment, no current paid employment over 10 hours per week, and language fluency to

ensure comprehension of written test measure instructions. This resulted in participants at the start of the study having previously worked fulltime for an average of 34.10 years (*SD* = 6.57), and having been retired an average of 1.85 years (*SD* = 1.77). The relatively young mean age of our study participants was consistent with the then-current trend to early retirement. The average exit age from the labor force at the time of our study was 61 years in Canada (Statistics Canada, 2006). Women represented 52% of the sample. Participants were fairly well educated overall (mean years of education = 14.9, *SD* = 2.5, range = 7 to 22 years), and rated themselves on average to be slightly better off than most others of the same age according to a 7-point financial status scale. The mean family income for our participants was $68,428 Cdn. (*SD* = $38, 890), comparable to $69,033, the mean family income in Montreal at year two of the study (Binet, 2010).

Measures

Education. Level of education was measured by the number of years enrolled in formal educational institutions, and did not include extra-curricular, adult education, or job training programs.

Former occupation. Participants' former occupations as self-reported in the demographic information questionnaire were coded according to the Standard International Occupational Prestige Scale (SIOPS) (Ganzaboom & Treiman, 1996), a widely used measure of socioeconomic classification. The resulting stratification assumes a hierarchy of job complexity placing professionals, senior officials, and large-scale managers at the top and semi-skilled manual laborers at the other end. In this sample, scores ranged from a minimum of 33 to a maximum of 78; median = 56, mode = 60, indicating that most participants were coded as middle management, high sales or professional, with lower

representation from routine clerical, small business or the labor field. The mean for the higher need for cognition group was 55.5 (*SD* = 8.2); and for the lower need for cognition group *M* = 52.5 (*SD* = 8.4).

Illness. An abridged version of the Seriousness of Illness Rating Scale (SIRS) (Wyler, Masuda & Holmes, 1971) elicited self-reported total number of illnesses recently experienced. In year two, *M* = 3.75 illnesses per person, range 0 – 22, *SD* = 3.36; in year four, *M* = 4.3 illnesses per person, range 0-24, *SD* = 3.69, reflecting some variability in health status over time (see Appendix C).

Stress Measure. Participants indicated on a 9-point scale ("not at all stressed" at the bottom, "extremely stressed" at the top, and "average Canadian" rated as 5 in the middle) their response to the question "Where would you put yourself on this scale?" (see Appendix D).This test is based on a measurement approach originally developed by Schonfield (1973). The test-retest reliability for this sample was $r = .63$ ($p < .01$).

Cognitive Ability: Trails A and B. Parts A and B of the widely-used Trail Making Test (Reitan, 1958) together provide a sensitive neuropsychological measure of visual perceptual ability, motor speed, working memory and aspects of executive functioning (Stuss et al., 2001), with Part A measuring mainly visuoperceptual abilities as participants connect 25 numbered circles in ascending order, and Part B assessing further working memory and task-switching skills in a task with the same number of circles, but now requiring the sequenced ordering of numbers and letters in alternation (Sanchez-Cubillo et al., 2009). The derived B-A scores reported in this study reflect time differences in completion of part A and the more complex part B, with higher scores reflecting a longer response time and slower ability. The B-A difference score yields a net indication of task

switching ability, which is an essential executive control mechanism reported to decline with age (Hertzog, Kramer, Wilson, & Lindenberger, 2009). A paired samples t-test showed no significant difference in overall mean scores between year 2 (M = 33.75 seconds) and year 4 (M = 35.52 seconds) in this study sample.

The Need for Cognition Scale (Cacioppo et al., 1996) measures preference for effortful cognitive processing of complex material. The 18-item short form includes transparent self-descriptive statements such as "*I prefer my life to be filled with puzzles that I must solve*" or *"Learning new ways to think doesn't excite me very much*" arranged on a 5-point scale from "*extremely uncharacteristic of me*" to "*extremely characteristic of me*". Half the items are worded positively and half are worded negatively (see Appendix E). Higher scores on the scale indicate a dispositional tendency toward greater need for cognition. The test-retest coefficient for this sample was .90 ($p < .001$).

The Everyday Activities Questionnaire (Pushkar, Arbuckle, Conway, Chaikelson & Maag, 1997) was used to measure the frequency of 16 items assessing voluntary developmental activities requiring consistent and active maintenance of cognitive and social engagement, including social visiting, correspondence, helping others, receiving help, physical activity, cultural activity, performing music, taking courses, reading, playing games, creative activities, TV/radio use, internet use, religious activity, volunteer work, and travel (see Appendix F). Participants were asked to rate their current frequency of engaging in each activity on a 5-point scale with responses ranging from 0 (*not at all*), 1 (*less than once a month*), 1 (*monthly*), 3 (*weekly*), to 4 (*daily*). The test-retest reliability coefficient for activity frequency has been reported as $r = .73$, $p < .001$ (Pushkar et al., 1997). Past research with the EAQ has shown a high and significant correlation among frequency and number of

activities, $r = .93$ and $r = .90$ for 3 and 12 month test-retest reliabilities respectively, suggesting that people who perform activities more frequently also engage in a wider range of activities (Rousseau, Pushkar & Reis, 2005).

Problem-focused Coping. Participants completed a 52-item modified version of Carver and colleagues' (1989) Dispositional Coping Inventory which assesses several coping styles including "problem-focused" strategies such as planning, taking direct action, screening out other activities, or exercising restraint where appropriate (see Appendix G). To indicate what they "*generally do or feel*" in response to stressful events, participants chose from a 4-point scale ranging from "*I usually don't do this at all*" (1) to "*I usually do this a lot*"(4). The internal level of reliability for the 12 problem-focused items in this study was acceptable, with a Cronbach's alpha of .86. The test-retest reliability for this sample over two years was $r = .63$ ($p < .01$).

Goal Re-Engagement. As a subscale of the Goal Adjustment Scale (Wrosch et al., 2003), goal re-engagement measures participants' tendency to re-engage in novel goals when facing constraints in the pursuit of former goals now unattainable, such as work-related goals (see Appendix H). Participants were asked to indicate responses on a five-point scale ranging from "strongly disagree" to "strongly agree" to items such as "*If I have to stop pursuing an important goal in my life, I think about other new goals to pursue*" or "…*I put effort into other meaningful goals*". A Cronbach's alpha of .90 indicated high internal reliability. Test-retest reliability for this sample over two years was $r = .45$ ($p < .01$).

Reasons for Retirement from the Retirement Satisfaction Inventory (Floyd et al., 1992) allowed participants to indicate their subjective evaluation of possible factors in their

reasons to retire on a scale from 1 = *very unimportant* to 6 = *very important*, allowing potentially more than one reason to be endorsed by each individual (see Appendix I). Ranked here by their overall cumulative relative strength of endorsement in this sample, the importance of specific reasons were: wanted more time to pursue personal interests; finally could afford it; experienced too much stress at work; wanted to spend more time with family; offered incentives to retire by company; reached mandatory retirement age; wanted to make room for younger people; poor health; had difficulty handling the physical demands of the job; disliked my job; was experiencing difficulty with people at work; pressured to retire by employer; spouse wanted me to retire; was laid off, fired, or had hours cut back; spouse in poor health.

Positive and Negative Affect Schedule (PANAS). Ten positively valenced descriptive terms (*interested, excited, strong, enthusiastic, proud, alert, determined, inspired, attentive, active*) and ten negative terms (*distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery, afraid*) were used to measure affect (see Appendix J). Participants were asked to indicate to what extent they had experienced each of these particular emotions during the past few weeks on a 5-point scale ranging from "*very slightly or not at all*" to "*extremely*" (Watson, Clark & Tellegen, 1988). Test-retest reliability for this sample over two years was .67 for positive affect ($p < .01$) and .47 ($p < .01$) for negative affect across two years.

Life Satisfaction. In response to the question, "Overall, how satisfied are you now with your life?" participants indicated a choice on a 5-point scale ranging from *"not at all"* to *"very much"*. This question is positioned at the end of a sequence of questions about satisfaction or dissatisfaction with different important domains in life before requesting a

single reflective and comprehensive rating of global life satisfaction. These life satisfaction scores produced an alpha coefficient of .73. Test-retest reliability for this sample over two years was $r = .60$ ($p < .01$).

Plan of Analysis

Cacioppo and colleagues (1984; 1996) conceptualized individual differences in need for cognition as being on a bipolar continuum from low to high, contrasting "chronic cognitive misers" with "chronic cognizers". To compare those higher and lower in need for cognition for this study, a subsample was selected of participants representing the 80% of the total sample who consistently scored above (N = 136) or below (N = 139) the median of 62.0 (range 26 – 89) at year two, and above (N = 136) or below (N = 139) the median of 62.1 (range 23 – 87) at year four on need for cognition (N = 275). A MANCOVA showed no significant difference between the overall year two mean of 60.46 and the year four mean of 59.39 in need for cognition for these participants. There were also no significant differences between the year two and year four means within each group: the high need cog group mean at year two was 71.42 and at year four was 70.30 ; the low need cog group mean at year two was 49.74 and at year four was 48.70. Thus, reference to those higher or lower in need for cognition explains those who consistently scored in the higher as compared with the lower half of the distribution continuum at each of the two time measurement points. This procedure of group dichotomization ensured strong test-retest validity (r = .90) for the construct, and minimized the chances of spurious confounds for better interpretation of results.

All data in this study were gathered as part of a longitudinal research project (2005-2009) on the transition to retirement. Inclusion criteria limited participants to those who had

retired within one to three years prior to the study start. MANCOVAs (multivariate analyses of covariance) were chosen as the best way to test for precise group comparisons with multiple predictors and more than one outcome measure, with ANCOVAs (analysis of covariance) being used in instances of a single dependent variable. The first MANCOVA provided a baseline reading of participants' reasons for retirement as reported in the initial year of testing, with the two need for cognition groups among independent variables predicting three different reasons for retirement. The second analysis used a repeated measures ANCOVA to test for differences between the higher and lower need for cognition groups in their average frequency of activity engagement at years two and four. Then, to test for specific activities which might differ between need for cognition groups, two separate MANCOVAs were run with data reported at years two and four.

Thirdly, a repeated measures MANCOVA with need for cognition groups predicting average levels of problem-focused coping and goal re-engagement between years two and four was planned. The measure of goal re-engagement was available in years one and three of the study, but retained for comparative use with other variables at years two and four in these analyses due to its purported stable dispositional nature (Wrosch et al., 2003). Finally, using a repeated measures MANCOVA, the two need for cognition groups were used to predict average levels of subjective well-being across two years in recent retirement, using the three dependent variables of positive affect, negative affect, and life satisfaction.

Results

Demographic and lifestyle covariates which might potentially influence the dependent variables were first considered. Table 1 lists correlations, means and standard deviations for all major variables of interest and contextual characteristics at years two and

Study 1, Table 1

Standardized means, standard deviations (SDs), and correlations among variables at Year 2, left diagonal and Year 4, right diagonal (N =275)

		1	2	3	4	**5**	6	7	8	9	10	11	12	13	14	15	Means	*SD*s
1	Age	—	-.060	.115	-.239**	.126*	.062	.078	.027	-.062	-.061	-.038	-.003	-.098	.065	-.165**	62.32	4.61
2	Gender	-.058	—	.136*	-.268**	-.092	-.036	.046	.219**	-.040	.077	.061	.154*	.146*	.102	-.111		
3	Illness	.119*	.122*	—	-.238**	-.091	-.010	.024	.326**	-.071	.103	-.089	.103	-.027	.222*	-.214**	4.35	3.67
4	Income	-.280**	-.279**	-.220**	—	.290**	.278**	-.068	-.176**	.126*	-.015	.053	.077	.065	-.084	.143*	7.71	3.80
5	Prior occupation	.123*	-.092	-.047	.204**	—	.484**	-.193**	-.069	.216**	.046	.010	.192**	.071	-.114	.059	54.02	8.41
6	Education	.063	-.036	.019	.266**	.484**	—	-.097	-.091	.309**	.032	.039	.184**	.123	-.078	.054	15.26	2.68
7	Cognitive ability[a]	.246**	-.077	.121*	-.171**	-.095	-.109	—	.223**	-.066	.015	-.117	-.058	-.075	.265**	-.216**	36.09	49.02
8	Stress	.103	.186**	.267**	-.199**	-.014	-.133*	.168**	—	-.096	.037	-.168**	-.054	-.221**	.523**	-.495**	4.00	1.58
9	Need for cognition	-.064	-.040	-.001	.138*	225**	.287**	-.064	-.059	—	.281**	.148**	.203**	.247**	-.045	.152	59.39	13.02
10	Coping	-.028	.122*	-.007	-.034	.001	.020	.035	.004	.314**	—	.171**	.136*	.379**	.046	.148*	9.37	1.47
11	Goal re-adjustment	-.093	.001	-.112	.096	.095	.083	-.107	-.202**	.286**	.171**	—	.181**	.263**	-.244**	.180**	3.83	.58
12	Activities	.038	.117	.095	-.041	.192**	.164**	-.012	-.030	.233**	.083	.230**	—	.206**	-.002	.087	53.58	7.06
13	Positive affect	-.012	.113	-.154*	.017	.036	.057	-.100	-.227**	.317**	.394**	.446**	.270**	—	-.212**	.462**	36.663	5.96
14	Negative affect	.091	.086	.224**	-.132*	-.074	-.121*	.209**	.209**	-.055	-.024	-.211**	-.045	-.271**	—	-.412**	16.31	5.94
15	Life satisfaction	.039	-.078	-.292**	.090	.093	.030	.017	-.439**	.109	.238**	.239**	.070	.508**	-.377**	—	4.21	.73
	Means	60.25		3.77		54.02	15.26	34.50	3.9	60.46	9.34	3.93	54.17	37.30	15.72	4.19		
	SDs	4.61		3.38		8.41	2.68	24.10	1.6	12.83	1.49	.52	6.85	6.47	5.47	.75		

Note. a. higher numbers reflect longer cognitive processing time in seconds derived from Trails B-A difference scores. *$p < .05$, **$p < .01$.

four of this study. For each analysis, variables which correlated significantly ($p < .01$) with the dependent variable were entered as covariates. Unlike in regression-type analyses where the object is to account for as much variance as possible, only statistically eligible demographic variables are entered in group comparison analyses (Tabachnick & Fidell, 2001). The dichotomous variable of gender was treated as a covariate in all analyses.

Results for hypothesis 1: need for cognition and reasons to retire

The first hypothesis predicting differences in the relative importance of reasons for retirement at baseline between those higher vs. lower in need for cognition was tested with a MANCOVA. Three reasons for retirement correlated significantly ($p < .05$) with need for cognition and thus were included in the analysis: freedom to pursue own interests ($r = .136$); poor health ($r = -.135$); and difficulty handling physical demands of the job ($r = -.139$). Table 2 shows the means for these variables separately for the higher and lower need for cognition groups. Covariates correlating with these dependent variables and thus also included in the analysis were age and illness. Although stress also correlated with the dependent variables, it did not produce a significant multivariate effect in previous iterations and was removed from the model for parsimony.

Main effects in the MANCOVA emerged for need for cognition ($F = 4.43$, $df = 4$, 266, $p < .01$, $\eta^2 = .062$), as well as for the covariates of illness ($F = 8.06$, $df = 4$, 266, $p < .001$, $\eta^2 = .108$) and age ($F = 3.28$, $df = 4$, 266, $p < .05$, $\eta^2 = .047$). There were no significant main effects of gender on reasons for retirement. Adjusted mean comparisons showed that those higher in need for cognition reported higher mean levels of having retired because they wanted more time to pursue their own interests than those lower in need for cognition ($F = 4.76$, $df = 1$, 269, $p < .05$, $\eta^2 = .02$; mean higher group = 4.5, $SD = 1.4$; mean lower

Study 1, Table 2

Means and standard deviations (SD) for reasons for retirement with multivariate significance to need for cognition

	Higher need for cognition	Lower need for cognition
Health	1.63 (1.3)	2.00 (1.5)
Pursue own interests	4.54 (1.4)	4.12 (1.6)
Job too physical demanding	1.55 (1.1)	1.94 (1.4)

group = 4.1, *SD* = 1.6). By contrast, those lower in need for cognition attributed greater importance to having retired either because of *poor health* ($F = 6.14$, $df = 1, 269$, $p < .05$, $\eta^2 = .02$; mean higher group =1.6, *SD* = 1.3; mean lower group = 2.0, *SD* = 1.5) or due to the *physical demands of the job* ($F = 8.8$, $df = 1, 269$, $p < .05$, $\eta^2 = .03$; mean higher group = 1.5, *SD* = 1.1; mean lower group = 1.9, *SD* = 1.4) to a greater extent than those higher in need for cognition. Illness was a significant independent predictor of both a) retiring due to poor health ($F = 6.14$, $df = 1, 269$, $p < .05$, $\eta^2 = .02$), and b) difficulty handling the physical demands of a job ($F = 6.14$, $df = 1, 269$, $p < .05$, $\eta^2 = .02$), while increased age also independently predicted the desire to pursue own interests as a reason for retirement ($F = 6.14$, $df = 1, 269$, $p < .05$, $\eta^2 = .02$). These results are fully supportive of the first hypothesis regarding differential reasons for retirement between those higher and lower in need for cognition, and also show the independent effects of illness and age on associated reasons for retirement.

Results for hypotheses 2a and 2b: activity frequency and types

To test hypothesis 2a predicting higher overall average frequency scores for reported activities as a function of need for cognition across time, a repeated measures (years two and four) ANCOVA was used. Covariates correlating significantly with frequency of activities, and thus included in the analysis, were prior occupation, education, and goal re-engagement. Main effects emerged for gender ($F = 8.83$, $df = 1, 263$, $p < .01$, $\eta^2 = .032$), and need for cognition ($F = 11.29$, $df = 1, 263$, $p < .01$, $\eta^2 = .041$), with no significant change due to time itself. Adjusted mean comparisons showed that women consistently reported higher frequency of activity engagement than men (see Table 3), and those higher in need for cognition consistently reported higher frequency of activity engagement than those lower in

Study 1, Table 3

Means and standard deviations (SDs) for men's and women's frequency of activity engagement in higher and lower levels of need for cognition at years two and four of recent retirement

	Need for cognition	
	Year two means (*SD*)	Year four means (*SD*)
Men's frequency of activities	Higher 55.00 (7.2) Lower 51.81 (7.2)	Higher 54.1 (6.8) Lower 51.1 (6.9)
Women's frequency of activities	Higher 56.24 (6.0) Lower 53.80 (6.2)	Higher 56.31 (6.4) Lower 53.31 (7.1)

need for cognition, but there was no interaction between gender and need for cognition. Only the covariate representing status of previous occupation had a significant lasting effect on frequency of activities ($F = 10.54$, $df = 1, 263$, $p < .01$, $\eta^2 = .038$), indicating an on-going socioeconomic prestige effect related to prior occupational status.

In summary, the hypothesis (2a) that those higher in need for cognition would report higher frequency levels of overall activity engagement across time in retirement was supported. Additionally, i) women but not men, and ii) people whose prior occupations were higher on the socioeconomic ladder, also independently reported higher overall frequency of activity.

To determine specific activities that differed in frequency as a result of need for cognition (hypothesis 2b) during these early years of recent retirement, the frequencies of 16 different activities from the Everyday Activity Questionnaire (EAQ) were tested separately at years two and four for men and women higher and lower in need for cognition. Patterns of specific activities are likely to be somewhat variable during the early years of retirement as individuals experiment with new life parameters. The repeated measurement design involves averaging each time points' linear combination of dependent variables and might obscure findings in this instance, so separate MANCOVAs were used to allow the emergence of any change patterns in specified activities between years two and four. Dependent variables were the specific activity types, while need for cognition groups and gender were the independent variables. Table 4 lists correlations among the 16 specified activities and need for cognition, illustrating patterns of activity frequencies among all participants.

Study 1, Table 4

Correlations among frequency of activity types and need for cognition at Year 2 (left diagonal) and Year 4 (right diagonal), N =275

		1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*
1	Social visiting	--	.27**	.37**	.13*	.06	.15*	.11	.15*	.08	.15*	.10	.01	.26**	.09	.11	.12*	.12*
2	Correspondence	.40**	--	.19**	.06	.08	.04	.10	.10	.02	.09	.15*	.02	.18**	.15*	.18**	.13*	.00
3	Helping others	.28**	.17**	--	.27**	.02	.07	.11	-.01	-.06	.16**	.08	-.14*	.06	.11	.21**	.10	.05
4	Receiving help	.05	.04	.17**	--	.08	.11	.04	.05	.08	.05	.00	.08	.07	.09	.08	.20**	.01
5	Physical activity	.04	.13*	-.01	-.08	--	.12*	.03	.10	.04	.05	-.02	.00	.09	.01	-.03	.09	-.03
6	Cultural activity	.16**	.18**	.04	.11	.14*	--	.06	.07	.04	.16**	.01	-.03	.07	-.01	.14*	.19**	.12*
7	Performing music	-.04	.07	.15*	.02	.03	.05	--	.22**	.04	.08	.15*	-.08	.12*	.23**	.22**	.06	.11
8	Taking courses	.13*	.05	-.05	.03	.10	.10	.18**	--	.10	.03	.15*	-.07	.04	.15*	.11	.11	.06
9	Reading	.16**	.30**	.06	.05	.21**	.19**	-.12*	.00	--	.09	.07	.24**	.10	-.02	-.02	.03	.00
10	Playing games	.11	.09	.08	.09	.00	.09	.06	.04	.06	--	.15*	.08	.09	-.05	.16	.09	.06
11	Creative activity	.16**	.14*	.17**	.12*	.02	.02	.02	.11	.06	.12*	--	.03	.07	.05	.10	.06	.16**
12	TV/radio use	.14*	.33**	-.09	.03	.14*	.16**	-.07	.00	.32**	.08	.13*	--	.14*	-.02	-.04	-.04	.04
13	Internet use	.13*	.17**	.04	-.02	.03	-.01	.04	.14*	.09	.06	.18**	.12*	--	-.02	.15*	.04	.22**
14	Religious activity	.12*	.09	.05	.06	-.08	.02	.20**	.07	-.04	-.04	.11	.04	-.04	--	.21**	.02	.08
15	Volunteer work	.14*	.10	.10	-.04	-.04	.03	.10	-.03	.03	.04	.08	-.07	.07	.14*	--	.04	.16**
16	Travelling	.18**	.07	.12*	.05	-.02	.07	.03	.01	.01	.14*	.16**	.01	.05	.08	.14*	--	-.07
17	Need for cognition	.11	-.02	.16**	.09	.00	.09	.03	.07	.03	.09	.28**	.05	.22**	.00	.10	.13*	--

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

MANCOVA results for activity choices at year two as a function of need for cognition levels revealed a main effect for need for cognition ($F = 9.22$, $df = 3, 269$, $p < .001$, $\eta^2 = .093$) but no main effect for gender. Univariate tests revealed a significant association between need for cognition and frequency of three activities: *creative activities* ($F = 16.78$, $df = 1, 271$, $p < .001$, $\eta^2 = .058$, mean higher group =3.2, $SD = 1.6$; mean lower group = 2.4, $SD = 1.5$); *internet use* ($F = 10.25$, $df = 1, 271$ $p < .01$, $\eta^2 = .036$, mean higher group = 4.2, $SD = 1.3$; mean lower group = 3.6, $SD = 1.7$); and *giving help to family or friends* ($F = 6.52$, $df = 1, 271$, $p < .05$, $\eta^2 = .024$, mean higher group = 3.3, $SD = 1$; mean lower group = 2.9, $SD = 1.3$). At year two, those higher in need for cognition reported greater frequency of involvement with creative activities, internet use, and giving help to family or friends.

The year four MANCOVA analyzing activity choices again revealed a main effect of need for cognition ($F = 8.97$, $df = 3, 269$, $p < .001$, $\eta^2 = .091$), but no main effect for gender. Frequencies of three activities were significantly related to need for cognition at the univariate level: *creative activities* ($F = 9.91$, $df = 1, 271$ $p < .01$, $\eta^2 = .035$ mean higher group = 2.9, $SD = 1.5$; mean lower group = 2.3, $SD = 1.5$); *internet use* ($F = 12.89$, df = 1, 271, $p < .001$, $\eta^2 = .045$ mean higher group = 4.4, $SD = 1.1$; mean lower group = 3.7, $SD = 1.7$); and *volunteering* ($F = 4.34$, $df = 1, 271$, $p < .01$, $\eta^2 = .029$ mean higher group = 2.7, $SD = 1.4$; mean lower group = 2.2, $SD = 1.3$). At year four, those higher in need for cognition reported greater frequency of involvement with creative activities, internet use, and volunteering. Thus, the hypothesis (2b) that level of need for cognition would differentially predict activity choice at both time points was supported.

Results for hypothesis 3: coping and goal re-engagement strategies

To test hypothesis 3, problem-focused coping and goal re-engagement as a function of need for cognition group membership averaged between years two and four of the retirement study were analyzed using a repeated measures MANCOVA. Because stress correlated significantly with the dependent variable of goal adjustment ($p < .01$) at both years two and four, it was included as a covariate in the repeated measures MANCOVA to account for any potential effects it might have on the analysis. A multivariate main effect for need for cognition emerged ($F = 20.11$, $df = 2, 269$, $p < .001$, $\eta^2 = .13$). Neither time nor gender produced significant main effects. There was also a main effect of stress ($F = 9.99$, $df = 2, 269$, $p < .001$, $\eta^2 = .069$).

At the univariate level, tests of between-subjects effects confirmed that those higher in need for cognition reported a significantly higher use of the behavioral strategies of both problem-focused coping ($F = 31.05$, $df = 1, 270$, $\eta^2 = .10$) and goal re-engagement ($F = 14.83$, $df = 1, 270$, $\eta^2 = .05$) than those lower in need for cognition, in full support of the third hypothesis. Additionally the analysis revealed that stress had a significant negative effect on goal re-engagement over time ($F = 19.11$, $df = 1, 270$, $\eta^2 = .07$), but did not affect problem-focused coping. Means (as reported in Table 5) indicate higher stress in the lower need for cognition group at year four than at year two.

Results for hypotheses 4a, 4b and 4c: need for cognition and subjective well-being

To examine the fourth set of hypotheses regarding the comparative subjective well-being of men and women higher and lower in need for cognition over time, a repeated measures MANCOVA tested for significant differences between the need for cognition group means on the dependent variables of positive affect, negative affect and life

Study 1, Table 5

Means and standard deviations (SDs) for men's and women's coping, goal re-engagement, and stress in higher and lower levels of need for cognition at years two and four of recent retirement

	Need for cognition	
	Year two means (*SD*)	Year four means (*SD*)
Problem focus coping	Higher 9.78 (1.3) Lower 8.91 (1.5)	Higher 9.78 (1.3) Lower 8.96 (1.5)
Goal re-engagement	Higher 4.05 (.49) Lower 3.82 (.52)	Higher 3.94 (.59) Lower 3.73 (.56)
Stress	Higher 3.86 (1.6) Lower 3.94 (1.6)	Higher 3.88 (1.5) Lower 4.12 (1.6)

satisfaction at years two and four of recent retirement. Again, demographic variables which correlated with the dependent variables were treated as covariates in the analysis: in this case stress, cognitive ability, and illness correlated significantly with one or more of the three outcome measures of subjective well-being. Illness had no significant effect and was subsequently trimmed from the model. Significant main effects were produced for gender ($F = 5.04$, $df = 3, 257$, $p < .01$, $\eta^2 = .056$), need for cognition ($F = 7.19$, $df = 3, 257$, $p < .001$, $\eta^2 = .077$), cognitive ability ($F = 4.31$, $df = 3, 257$, $p < .01$, $\eta^2 = .048$) and stress ($F = 39.33$, $df = 3, 257$, $p < .001$, $\eta^2 = .315$). There was no interaction between need for cognition and gender, and no main effect for time, indicating stability in the dependent variables during this two year period.

Tests of between-subjects effects summarized in Table 6 show how each of the three component variables of subjective well-being were affected independently by each predictor variable over time. Gender produced a significant effect on positive affect only, with women in our sample reporting higher mean levels of positive affect than men over time (women = 37.96 and 37.51, men = 36.65 and 35.77 at years two and four respectively). With regard to need for cognition, there were no differences between groups in mean levels of negative affect across time (supporting hypothesis 4a). Participants higher in need for cognition reported higher means of positive affect at both time points (year two = 39.02, year four = 38.14) than those lower in need for cognition (year two = 35.68, year four = 35.26) confirming hypothesis 4b. Need for cognition failed to predict differences between groups in mean levels of life satisfaction at either time point (contrary to hypothesis 4c). Stress had a significant independent effect on all three measures of subjective well-being at both time points, negatively related to both positive affect and life satisfaction, and

Study 1, Table 6

Univariate results for variables which significantly predict aspects of subjective well-being between years two and four in recent retirement.

Source Variable	Dependent Variable	F	Partial Eta^2
Gender	positive affect	12.29**	.045
	negative affect	.07	.000
	life satisfaction	.08	.000
Need for cognition	positive affect	20.20**	.072
	negative affect	.53	.002
	life satisfaction	1.91	.007
Stress	positive affect	20.16**	.067
	negative affect	102.60**	.283
	life satisfaction	76.29**	.227
Cognitive ability[a]	positive affect	.69	.003
	negative affect	10.34**	.038
	life satisfaction	4.43*	.017

Note. a. higher numbers reflect longer cognitive processing time in seconds derived from Trails B-A difference scores. Results for age, income, education, previous occupation, illness, and the interaction term for gender by need for cognition were non-significant and are not listed here. $df = 1, 259$, *$p < .05$, **$p < .01$.

positively related to negative affect. Cognitive ability had no effect on positive affect, but those participants showing with lower cognitive ability reported higher levels of negative affect and lower levels of life satisfaction.

Incidental post-hoc findings

Although initial recruitment for this longitudinal study was done through print media and word of mouth, e-mail was subsequently used where possible to contact participants for appointment times. We noted that at year two, 65% of the full sample of participants (282/*N*=433) provided e-mail addresses, while by year four, 86% of remaining full sample of participants (294/*N*=341) reported having e-mail addresses. Cross-tabulations showed that at year two, 82% of the higher need for cognition subgroup and 60% in the lower need for cognition subgroup provided personal e-mail addresses; by year four, 95% of the higher subgroup and 80% of the lower subgroup were now available via e-mail. Logistic regression showed that, after accounting for variance due to gender, age, illness, income, education, stress, prior occupation and cognitive ability, need for cognition remained a significant predictor ($p < .01$); those higher in need for cognition were 2.55 times more likely to have an e-mail address than those lower in need for cognition The same analysis repeated at year four showed that those higher in need for cognition were 3.21 times more likely ($p < .05$) to have an e-mail address than those in the lower need for cognition group. Age was the only other significant predictor of having an e-mail address at year four ($p < .01$), with younger retirees more likely than older to provide one. Retirees higher in need for cognition accessed e-mail usage both sooner and in greater proportion than those lower in need for cognition, consistent with other findings which link need for cognition to a pro-active approach to

information gathering via the internet (Erickson & Johnson, 2011; Kaynar & Amichai-Hamburger, 2008; Shi, Chen & Tian, 2011).

Discussion

These successive analyses comparing recently retired people higher and lower in need for cognition have confirmed significant differences between the two groups not only in their original reasons for retirement, but also in their chosen activity frequency patterns, their coping and goal re-engagement strategies, and their levels of positive affect over a two year period in early post-retirement. These core findings extend previous related research in three main ways: 1) by providing longitudinal evidence of activity engagement which supports the applied value of need for cognition; 2) by associating need for cognition with complementary adaptive behavioral goals and goal strategies in a representative cohort of recently retired older adults, as shown not only by their most prioritized reason for retirement, but also by their higher levels of problem-focused coping and goal re-engagement; and 3) by clarifying that need for cognition maintains well-being over time through higher levels of positive affect while remaining unrelated to either negative affect or global life satisfaction. The results converge to suggest the usefulness of need for cognition, the stable motivational disposition to enjoy effortful cognitive activity, as a predictor of positive affect in older adults at this stage in life.

Engagement in activities of personal interest requiring cognitive effort

Consistent with their own stated goals for retiring, those higher in need for cognition reported greater overall frequency of personally meaningful activities across two years of their recent retirement. Healthy aging has been linked with continued engagement with life, with activities requiring effort, concentration, and skill providing most benefit to subjective

well-being (Brown, McGuire & Voelkl, 2008; Payne et al., 2011; Rowe & Kahn, 1998). Likewise, in this study recent retirees higher in need for cognition reported higher activity frequency levels and more positive affect. The dispositional motivation to tackle new tasks requiring cognitive effort leads to sustained activity engagement over time, maintaining higher levels of positive affect.

Previous occupation independently influenced overall frequency of activity involvement. Those who had worked in more cognitively complex jobs with higher attached prestige reported higher frequency of activities during early post-employment. This result highlights the difficulty in isolating personality indicators of activity patterns from socioeconomic predictors in older adults, since those higher in need for cognition have been shown to gravitate toward and retain professional occupations (Nair & Ramnarayan, 2000). Subsequently, the socioeconomic prestige of a former occupation continues to affect quality of life after retirement (Mein et al., 2003). With mounting evidence connecting relevant beneficial activities with the preservation and enhancement of both physical and cognitive functioning in older adults (Hertzog et al., 2009), individual differences in sociodemographic factors and personality tendencies working jointly or severally to endorse engagement in activities are important in the study of adult development in the years following retirement. The present finding of separate main effects for need for cognition, gender, and previous occupation on overall activity frequency suggests that despite their potential reciprocal overlap, replicable patterns for each predictor are sustained over time, providing direction for specific policy interventions as well as hypotheses for future tests of interactions.

Waddell and Jacobs-Lawson (2010) found that specific types of activities predicted positive well-being differentially for men and women age 55 and over, with volunteer activity contributing for women but not men. However, our results show that frequency of specific activity types was predicted only by need for cognition, and not by gender, at both years two and four of recent retirement. Those higher in need for cognition, regardless of gender, reported significantly greater frequency of engagement in 1) creative activities (defined as crafts and hobbies involving a regular routine or pattern or creative activities such as writing, painting, composing, or designing), 2) surfing the internet to read or chat or participate in a listserv, and 3a) giving help to family or friends (for example, by babysitting, helping with shopping, giving lifts), subsequently replaced at year four by 3b) volunteer work (i.e. through a recognized organization such as a professional, political, or community association).

Volunteer work

Consistent with a psychological needs-based motivational approach, examining potential goal fulfillment of volunteers helps explain this transfer of personal resource expenditure away from helping family/friends toward supporting organizations over time in our sample's recent retirement. Moen and Fields' (2001) sample of American retirees with active affiliations in community volunteer organizations reported high levels of mastery, self-esteem, general life satisfaction and energy level; this was not true, however, for those informally "helping out" friends or neighbors, or holding social club memberships. Likewise, Michelson's (2010) time-use analysis of a large 2005 Statistics Canada sample showed that formal volunteering outranked care provision in both frequency and intrinsic enjoyment, suggesting that formal volunteering may be experienced as more personally

fulfilling than caring for family/friends. Shye (2010) found that those higher in education and income were more likely to volunteer in a recent Israeli cohort, which partially relates to our study's distinction between those higher vs. lower in need for cognition. But demographic antecedents to volunteering themselves, though necessary, are not sufficient in explaining the motivation to participate in formal volunteer work. Of top motivational importance to Shye's large adult sample of volunteers were opportunities to maintain institutional and organizational contacts, friendships and social webs, and opportunities to express personality and beliefs. Such a profile is commensurate with that of our higher need for cognition group whose members, after sampling available choices, have gravitated away from helping family/friends toward the challenge and commitment of formal organized volunteering. This shift from one to another related activity may also be seen as a behavioral example of goal re-engagement.

Internet use

Personal internet use is a relatively new phenomenon for those of current retirement age. Its introduction and rapid growth have provided a unique opportunity to observe and measure exactly how older adults embrace novelty requiring cognitive effort. That the participants in this study who were higher in need for cognition used the internet sooner and in greater numbers than those lower in need for cognition is supportive of the hypothesized finding that those higher in need for cognition engaged in internet-related activities with more frequency than those lower in need for cognition. Market saturation and ubiquitous use of personal computers may make these exact results non-replicable; however, there will be parallel opportunities with ever-changing technologies for future studies on the relation between need for cognition and novel tool usage.

These findings regarding greater internet use by those higher in need for cognition have several notable implications. Nimrod and colleagues (2009) have demonstrated that there is a greater tendency for recent retirees to actually reduce rather than increase levels of activity despite the assumed greater free time available to them; however, those who are able to develop new activities report the highest life satisfaction. Our higher need for cognition group shares the behavioral characteristics of Nimrod's innovative "expanders", whose post-retirement well-being is improved through the addition of new types and greater frequencies of leisure activities.

Erickson and Johnson (2011) examined relations between internet use and psychological wellness in Canadian adults over 60 years of age and found that, after controlling for demographics, self-efficacy was the only significant predictor of frequency of internet use among other variables including loneliness, life satisfaction, social support, and depression. They also report that older adults use the internet more for e-mail and information seeking purposes than for leisure activities. Likewise, Kaymar and Amichai-Hamburger (2008) found a correlation between need for cognition and use of the internet to access professional services in an adult sample (mean age = 27.72 years). They had previously found that those higher in need for cognition tend to see information as an important factor in creating a persuasive on-line site, while those lower in need for cognition are more likely to be influenced by peripheral cues in an interactive site (Amichai-Hamburger, Kaymar & Fine, 2007), in line with Petty and Cacioppo's (1984) elaboration likelihood model which examines how need for cognition and persuasion techniques interact in argument interpretation.

Internet usage is a natural draw for those high in need for cognition because they are often information junkies, craving challenging new ideas and complex matrices to navigate in the satisfaction of their need to know. Such activities stimulate neural circuits controlling decision making and complex reasoning (Small, Moody, Siddarth & Bookheimer, 2009). Leung (2010) reports a critical distinction between internet connectedness and information technology literacy: having access to the internet does not by itself improve quality of life, whereas having developed problem-solving skills and critical thinking about the information accessed does improve quality of life. Similarly, Shi and colleagues (2011) report that individuals higher in need for cognition are significantly more likely to use the internet in a healthy constructive way rather than because of a problematic dependency on leisure entertainment. That our study participants higher in need for cognition would access the internet sooner and use it more frequently over a two year period in recent retirement is both empirically and theoretically consistent with other current research, as well as with the motivational model linking need for cognition to positive affect through cognitively challenging activities in older adults (Bye & Pushkar, 2009).

Shared variance of adaptive personality traits in recent retirees

Both men and women higher in need for cognition reported a correspondingly greater use of problem-focused coping and goal re-engagement in response to life challenges over time, which quantitatively differentiates their strategic approach to life challenges in retirement from that of those lower in need for cognition. Problem-focused coping adds a regulatory task-oriented dimension to strategies chosen by effortfully-informed cognitive decision-making, while the motivational accomplice of goal re-engagement provides energy and direction in the fulfillment of planned activity. Goal re-

engagement, or alternative goal-seeking when prior goals become unattainable, appears to be more vulnerable to situation-specific factors. Of the descriptive lifestyle variables included in this study, self-reported stress had a significant negative effect on goal re-engagement. Although our multivariate analysis establishes a reciprocal rather than causal association between stress and goal re-engagement over time, it is consistent with Wrosch et al.'s (2003) interpretation that higher levels of goal re-engagement provide a compensatory alleviation of perceived stress in university undergraduates. We can infer that goal re-engagement may not only be sensitive to, but may also be useful in mitigating the effects of, stress for recent retirees. This would be consistent with other studies on stress resistance which show goal-directed problem-focused coping leading to positive emotions which in turn facilitate adaptation to stress (Ong, Bergeman, Bisconti & Wallace, 2006). Combined with need for cognition and problem-focused coping, goal re-engagement helps form a beneficial cluster of adaptive behavioral approach characteristics for retired individuals.

How need for cognition influences subjective well-being

The main effect of need for cognition on subjective well-being over time was driven specifically by higher levels of positive affect reported by those who were higher in need for cognition. As expected, there was no difference in negative affect between the higher and lower need for cognition groups. This study confirms that need for cognition sustains higher positive affect over time for those who enjoy cognitive activity, but does not act directly as a mitigating factor in undefined emotionally adverse situations. Lawton and colleagues (2002) have also reported that older adults' personal projects representing cognitive, affective and behavioral goal motivations are associated with positive, but not negative, affect. Such findings are consistent with evidence supporting the structural independence of

positive and negative affect (Schimmack, 2008). Need for cognition's strength lies in its augmentation of positive affect; it predisposes people to equip themselves with empowering information about their environment which allows better decision-making for conditions within their control and accommodation to life conditions outside their control. A partial alternative explanation for the positivity bias may be due to findings that individuals higher in need for cognition are reportedly lower in neuroticism, external locus of control, and social anxiety (Cacioppo et al., 1996). However, Cacioppo and colleagues also warn against assigning any global dispositional labels relating pessimism or optimism to individuals as a function of their need for cognition. Positive affect emerges as a by-product of the motivational impetus toward prolonged problem-solving and activity engagement through the on-going fulfillment of an intrinsic need for cognitive challenge, consistent with outcomes predicted through need fulfillment of autonomy and competence in self-determination theory (Deci & Ryan, 2000; Sheldon & Elliot, 1999).

Need for cognition, the enjoyment of effortful cognitive activity, stimulates a dynamic process similar to the *flow* experience in which self-chosen action, focused awareness, and optimal challenge merge to produce "high-activation" positive affect typically characterized by terms such as excitement, elation, or enthusiasm (Csikszentmihalyi, Abuhamdeh & Nakamura, 2005; Tellegen, Watson & Clark, 1999). Likewise, Vallerand's harmonious passion toward activities produces positive affect during task engagement (Amiot, Vallerand & Blanchard, 2006; Vallerand et al., 2003). Satisfaction of need for cognition may be compared with both mechanisms of flow and harmonious passion, where a strong commitment of time and energy to a valued self-chosen activity leads to cognitive concentration, task absorption, and positive affect. For each of these

three motivational constructs, the phenomenological "sweet spot" is optimally balanced on the fulcrum of competence and task difficulty. This motivational dynamic has been shown in other studies with older adults: Mannell (1993) linked high-investment activities with flow and life satisfaction; Payne and colleagues (2011) demonstrated how flow varies as a function of how well the older person's cognitive ability matches the cognitive demands of an activity. In keeping with these findings, we have found higher levels of positive affect in those who are higher in need for cognition as they engage in activities involving higher demand cognitive tasks.

Contrary to expectation, the life satisfaction ranking measured by a single reflective question in our study failed to produce an effect between the need for cognition groups, possibly representing a weakness in the single-question measure itself (Diener, Lucas, Schimmack & Helliwell, 2009). Different components of subjective well-being have different correlates (Kahneman & Deaton, 2010). Initially, it may seem paradoxical that levels of need for cognition produce an affective, but not a cognitive, appraisal of well-being, however this finding is consistent with Stone and colleagues' (2010) proposition that hedonic (affective) and global (life satisfaction) well-being measures index different aspects of psychological health at different times over the lifespan. In this study of recent retirees, need for cognition motivates a process resulting in an affective rather than a global well-being outcome.

Being higher in need for cognition means having a propensity to find effortful cognitive activity pleasurable; those who are lower in need for cognition do not derive the same enjoyment from doing so. They may have alternative needs which are sufficiently satisfied in other ways, resulting in an overall evaluation of current life satisfaction which

does not differ significantly from those higher in need for cognition. It may be that extraversion, social support, or other factors not measured in this study are better predictors of the life satisfaction index.

Further indication of the respective functional dynamics of the three separate components of subjective well-being in this study can be found by examining how the main effect of stress influences each. Life stressors exert added pressure on negative affect (.24) and global life satisfaction (.20) to a greater degree than they diminish positive affect (.07). Individuals higher in need for cognition, experiencing higher levels of positive affect, theoretically have greater reserves of emotional resilience with which to counteract, or more quickly recover from, the effects of stress in their environment.

Although there was no relation between cognitive ability and positive affect, lower cognitive ability was associated with higher negative affect and lower overall life satisfaction. Individuals showing longer response times and slower ability in cognitive tasks would be more likely in general to experience frustration with some life challenges. Cognitive ability remains, however, unrelated to either positive affect or need for cognition. The enjoyment inherent in the performance of effortful cognitive exercises for those higher in need for cognition does not appear to be a function of the absolute difficulty of the task nor the ranked cognitive ability of the person, but rather a respective individualized optimal balance between the two, consistent with theories of flow or harmonious passion.

Contextual variables

It is a methodological imperative to either control for or explain the effects of demographic variables in analyses of retirement samples, given the heterogeneity within groups of older adults. In this study, eight demographic or lifestyle factors were included to

elucidate their potential effects on or apart from need for cognition. For example, we found that having more time to pursue their own interests was of greater importance as a reason for retiring for those higher in need for cognition than it was for those lower, but retiring because of poor health or not being able to meet the physical demands of the job were more important as reasons for retiring among those lower in need for cognition. Retiring to pursue own interests was also independently predicted by increased age, and difficulty handling the physical demands of a job and retiring due to poor health were predicted not only by lower need for cognition, but also by higher illness scores.

Gender was included as a covariate in all analyses to control for any potential effects it might have through other study variables on this cohort of retirees, even though our main variable of interest, need for cognition, has repeatedly been shown as gender neutral (Cacioppo et al., 1996; Petty et al., 2009). Also, traditional patterns of gender differences in the domain of retirement may be undergoing change in accordance with on-going shifts in women's occupational roles and the widespread availability of information technology tools to both genders. In our sample, there was no main effect of gender on the endorsement of particular reasons for retirement, meaning that men and women did not place differing emphases on why they retired. Likewise, there was no difference between men and women in coping or goal re-engagement tendencies. Women did consistently report higher overall activity frequency than men, but the effect size of that result ($\eta^2 = .032$) was slightly weaker than that for level of need for cognition ($\eta^2 = .041$). Greater frequency in activity levels over time in our female participants may reflect the documented finding that women place higher importance on socially interactive activities with family and friends (Waddell and Jacobs-Lawson, 2010). Women and men did not differ in the frequency of their specific

involvement with creative activities, internet use, volunteering, or giving help to family or friends. With regard to measures of subjective well-being, there were no gender differences in negative affect or life satisfaction, but women did report higher levels of positive affect over time than men, consistent with previous findings that women consistently express, display, and report more everyday positive emotions than do men (Noel-Hoeksema & Rusting, 1999).

In this sample, as shown in Table 1, stress was associated with more illness, less income, less education, and lower cognitive ability, confirming our decision to control for stress along with its contextual correlates rather than use it as an outcome variable of need for cognition. Rather than having created a suppressor effect on the outcome variables, having controlled for stress can be seen as a rigorous methodological choice allowing the effects of need for cognition on affect and life satisfaction to emerge once individuals' full contextual context has been accounted for.

Limitations

This study's sample did not include part-time workers or those in encore careers because the study's inclusion criteria were by necessity dictated by a stringent retirement definition. Although our large and diverse sample was drawn from a wide population of recently retired individuals, the possibility of self-selection for initiative or previous education remains when data is collected from participants who agree to come in to university labs. With the exception of cognitive tests administered, we relied on self-report measures. Finally, although stable meaningful group differences over time between those higher and lower in need for cognition were found, the effect sizes (reported as eta squares) accounted for smaller proportions of variance than might be found using other statistical

methods (Prentice & Miller, 1998). Future replications with other samples might benefit from using more finely operationalized measures of activity, or treating need for cognition as a continuous rather than dichotomous measure.

Conclusion

Through its association with other adaptive strategies such as effective problem-focused coping and goal re-engagement, as well as by predisposing individuals to persistently engage in personally rewarding activities leading to enhanced positive affect, need for cognition is a reliable motivational resource of lasting value to individuals in the early years of retirement. This study makes empirical links not previously reported, such as connecting reasons for retirement with subsequent activity choices, and showing how older adults higher in need for cognition embraced the use of new technology sooner and in greater numbers than those lower in need for cognition. For recently retired individuals, higher and lower levels of need for cognition are differentially associated with behavioral and affective outcomes over time, with those who are dispositionally inclined to enjoy active cognitive engagement more likely to experience higher levels of sustained positive affect.

Chapter 3: Study 2

Need for Cognition and Purpose: A "What" and "Why" of Positive Affect in Retirement

To be submitted to: Motivation and Emotion

3.1 Abstract

This longitudinal study examined whether need for cognition, the dispositional enjoyment of cognitive challenge, predicts sustained positive affect over time in retirement. Need for cognition, competence, purpose, age, gender, prior occupation, education, income, illness, stress, cognitive ability and positive affect were measured at baseline in 369 adults (mean age 60 years), with positive affect subsequently followed for two years. HLM analyses revealed that people higher in either need for cognition, competence, or purpose reported higher levels of positive affect at baseline; however, those initially higher in either need for cognition or purpose showed a significantly sharper drop in positive affect over time in retirement than their peers. Only retirees reporting higher levels of both need for cognition and purpose reported stable continuing positive affect over time. The findings are

interpreted through self-determination motivation theory: it's not just *what* we do in retirement; *why* we do it also matters.

Keywords: retirement, older adults, need for cognition, self-perceived competence, purpose in life, self-determination motivational theory

3.2 Introduction

The transition to retirement produces varying levels of adjustment in well-being, resulting from interactions among older adults' socioeconomic or psychological resources, and their contextual environments. Recent research supports Atchley's (2003) assertion that most people cope well with retirement, experiencing minimal changes in psychological well-being (Ekerdt, 2010). However, roughly a quarter of retirees report at least initial declines in life satisfaction (Pinquart & Schindler, 2007; Wang et al., 2011), raising empirical questions about how best to identify and encourage positive retirement adjustment outcomes. The potential of personality and motivation variables to influence morale in retirement has been a relatively untapped area of study (Wang & Shultz, 2010), even though these individual differences have been shown to have important effects on coping and behavioral choices during other transitions across the lifespan.

Converging evidence from both the motivational and retirement literatures suggests that the functional role of intrinsic needs, chosen goals, and their coherence through meaningful individual effort is important to the well-being of older adults in the developmental stage of adjustment to retirement. Motivation for engagement with

purposefully chosen activities combined with positive feedback from a social context to reinforce individual effort can lead to full flourishing (Deci & Ryan, 1985; Ekerdt, 2010).

Need for cognition, the dispositional tendency to enjoy effortful cognitive activity, has been proposed as a basic need which uniquely predicts criterion measures of subjective well-being for those who are in a transitional stage of retirement (Bye & Pushkar, 2009). As a trait desire for proactive cognitive engagement, need for cognition is representative of the organismic approach to human motivation which attributes greatest learning, engagement, and well-being to self-chosen, or self-determined, activities. Activities chosen to satisfy the need for cognition would have an internally perceived locus of control and support a sense of efficacy within an environmental context, consistent with Deci and Ryan's (2002) cognitive evaluation theory. Need for cognition shares variance with openness to experience and conscientiousness (Bye & Pushkar, 2009; Cacioppo et al., 1996) as well as with the self-regulation strategies of problem-focused coping and goal re-engagement (as shown in Study 1).

This study, based on aspects of self-determination theory (Deci & Ryan, 2002; Sheldon, 2002a; Vallerand, 1997), explores the degree to which need for cognition captures the process and content of motivated behavior leading to sustained positive affect in recently retired individuals. If a stable motivational resource like need for cognition can reliably predict sustained positive affect in retirees as they adjust to post-retirement, then this will provide organizational psychologists and social policy makers with a useful tool for advising future retirees. Need for cognition may require supplemental measures such as self-perceived competence in fulfilling cognitive activity-based goals, as well as a general

sense of purpose in life, to strengthen its ability to usefully predict individual differences in well-being in the early stages of retirement.

3.2.1 Need for cognition and competence

Autonomy, competence, and relatedness are the three invariant macro needs forming the structural ribbing of the self-determination theory of universal human lifespan motivation (Deci & Ryan, 2002). Need for cognition can be considered a micro need which varies in intensity at the between-person level. It can be compatibly positioned under the umbrella of self-determination theory since autonomy, or self-determination, is fully implied in the process of fulfilling the need for enjoyment of self-chosen cognitive activity. Additionally, it has been shown that individuals who are high, as opposed to low, in need for cognition also work better in groups with others (Cacioppo et al., 1996), which connects need for cognition with the global need for relatedness. However, competence, or a sense of efficacy, though implicit to the construct of need for cognition as an instrument of intrinsic motivation, has not been explicitly explored in conjunction with need for cognition.

Intrinsic motivation is rooted in White's (1959) effectance motivation, where competence is defined as one's capacity to interact effectively with one's environment through persistence in learning-directed behaviors. This classic concept has been absorbed into the foundation of Ryan and Deci's (1985) cognitive evaluation theory, and subsequently developed into the full self-determination paradigm as an innate psychological need essential to human health and development (Deci & Ryan, 2000). Competence is not a goal in itself, as achievement often is, but rather competence develops as a by-product of engagement in an activity of interest; enjoyment emerges from attempts to master and understand challenges in the environment (Deci & Moller, 2005), much like need for

cognition, or Vallerand's (1997) description of the need for knowledge. In cognitive evaluation theory, intrinsic motivation is maintained through satisfaction of the needs for competence and autonomy; both needs must be tended to promote and preserve well-being at all ages. Similarly, Cacioppo and colleagues (1996) refer to curiosity and desire for mastery as inherent to need for cognition.

There has been substantial empirical support for hypotheses linking the satisfaction of the needs for autonomy and competence with greater well-being in undergraduates (Reis, Sheldon, Gable, Roscoe & Ryan, 2000; Sheldon et al., 1996). For example, Vallerand and Reid (1984) found that self-perceived competence mediated the effects between both positive and negative verbal feedback and intrinsic motivation in a motor task assigned to male physical education students. Reeve & Deci (1996) also found that perceived competence as a result of winning in a competitive situation led to increased intrinsic motivation in solving a spatial-relations puzzle among university students. There is less empirical literature available about intrinsic motivation in the domain of retirement behaviors; however, a study by Stephan and colleagues (2008) used the Global Motivation self-determination scale with retired individuals engaged in organized university-based activities who reported higher levels of intrinsic motivation for knowledge, stimulation and accomplishment than extrinsic motivation. Further, it was shown that intrinsic motivation for stimulation and accomplishment related positively to satisfaction with retirement, after controlling for a series of lifestyle factors which could potentially influence the outcome measure. Stephan and colleagues propose that retirement is an ideal life stage for individuals to pursue fulfillment of the intrinsically motivated needs for autonomy and competence, and that self-determined motivation could be considered a strength or resource for retirees. This

is compatible with the rationale of this study, which proposes that competence is an integral part of the organismic motivation tradition and thus would be expected to enhance the intrinsic reward value of activities pursued by those recently retired individuals who are high in the autonomous need for cognition.

The need for cognition scale measures effort and enjoyment in response to cognitive challenge without specifically including questions regarding self-perceived competence in related tasks. As a result, need for cognition does not necessarily equate to any cognitive or other ability, whether self-perceived or objectively measured, beyond the self-professed ability to enjoy cognitive challenge in life. It may be that competence is already sufficiently embedded in need for cognition, emerging from the process of flow which comes from optimal levels of cognitive challenge in a task in which an individual's competence is well-matched to the task at hand (Csikszentmihalyi, 1990). It could simply be that competence is more likely to have developed over time in individuals who have consistently gravitated toward effortful cognitive challenge, as Cacioppo and colleagues (1996) have predicted. However, it is also possible that a pre- or co-existing sense of being particularly good at a specific cognitive activity may independently increase the satisfaction involved in its pursuit. In the longitudinal model presented here, we examine whether or not self-perceived competence in cognitive activities of choice, measured at baseline, contributes variance over and above that of need for cognition to the long-term outcome of positive affect in recently retired people, and whether or not competence moderates the effects of need for cognition on retirees' well-being.

3.2.2 Need for cognition and purpose in valued goals

In addition to needs - such as need for cognition - and the sense of efficacy that arises from feeling competent to fulfill needs, motivation includes goals and their appropriateness to individuals and their social contexts. It has already been shown in a cross-sectional study that socio-cognitive activities mediate between the intrinsic need for cognition and positive affect for recent retirees (Bye & Pushkar, 2009). However, is need for cognition measured at a baseline point strong enough by itself to predict stable positive affect over time, or will it be necessary to also demonstrate congruence between people's need satisfaction and the meaningfulness or purpose of their proximate goal-directed activities?

Ryan and Deci (2000b) have situated intrinsic motivation "in the nexus between a person and a task" (p.56), linking needs and their related activity goals through motivational process. Enjoyment will arise from the activity if it is interest-driven by an autonomous need, as is conceptually implied in the need for cognition construct. This describes the *process*, or the "why" of goal pursuits, which has been well-developed in the self-determination research literature. On the other hand, the *type* of goal content, or the "what" of aspirations, has not been as fully explored. As was shown in Study 1, need-satisfying activity engagement mediates needs and subjective well-being for retired individuals who are higher in need for cognition, informing us about the process, or the "why". However, it may also be useful, even necessary, to evaluate the distinct but mutually dependent component of goal content, or the "what" (Sheldon et al., 2004). Sheldon and Kasser (1998) describe the recommended value-congruence between needs and goals as "vertical coherence". In further exploration of this coherence concept, this study examines whether or

not value or purpose in the targeted activities of recent retirees moderates the effect of need for cognition on well-being.

This research question is important because there is a cultural assumption among some that in retirement people are less occupied with what Kasser and Ryan (1993; 1996) have indexed as extrinsic goals - attainment of wealth, fame, or image – and more likely to be free to pursue intrinsic goals such as affiliation, personal growth, and community contribution. Motivation researchers suggest that the pursuit and attainment of intrinsic goals will lead to higher subjective well-being than the pursuit and attainment of extrinsic goals (Ryan, Sheldon, Kasser, and Deci, 1996; Ryan & Deci, 2001). An alternative viewpoint is offered by Ekerdt's (1986) description of the "busy ethic", retirement's version of the work ethic, whereby highly active and inevitably cheerful retirees are held as the exemplary moral norm in literature on aging and activities. Defending retirement as a time of fully occupied commitment analogous to work serves to legitimize the leisure status of retirement, helps define a role within an unstructured life stage, attempts to dispel stereotypes of aging as decline, and synchronizes work and retirement values for both retired persons and society at large (Ekerdt, 1986). However, social expectations accompanying the "busy ethic" may bring inherent extrinsic values to the choice of retirement goals, affecting the "what" of goal pursuit.

In motivational terms, need for cognition bridges the gap between needs and goals by including the need type, the goal orientation, and the outcome in its definition - the dispositional tendency to enjoy effortful cognitive activity - which assumes full organismic congruence in the process of need fulfillment. Hagger, Chatzisarantis and Harris (2006) assign a temporal sequence to the relation between needs and goals by saying that needs

will determine the strength of identification with, pursuit of, and persistence in goal-directed behavior, which is consistent with how need for cognition operates. When a need reflects the embodiment of a stable trait, and leads to an extended series of personally salient activities, there must also be meaning in the activity engagement for positive outcomes to result (Little, 1998). Challenging cognitive activities can be either trivial or important; their level of difficulty alone does not determine their ultimate significance. Additionally, a dispositional commitment to cognitively challenging activity may not by itself necessarily guarantee stable positive emotional outcomes, as Vallerand and colleagues (2003) have suggested by differentiating between harmonious and obsessive passion.

Three factor analyses of the need for cognition scale (Lord & Putrevu, 2006) have produced four consistent dimensions within it: enjoyment of cognitive stimulation, preference for complexity, commitment of cognitive effort, and desire for understanding. Each of these composites of the instrument is relevant to motivational process, but none of them evaluate the personal salience of the targeted task contents. Little and colleagues (1998; 2002) maintain that need satisfaction and meaning must be linked, requiring not only a balance between the person and his or her idiosyncratic needs and goals, but also a state of compatibility between the individual and the larger sociocultural context in which he or she operates. Vallerand's (1997) hierarchical model of motivation accommodates stable personality traits at a global level, domain-specific social factors at a contextual level, and personal meaning at the situational level, all within the self-determination meta-theoretical framework based on the needs for autonomy, competence, and relatedness. Sheldon and Elliot's (1999) self-concordance model likewise emphasizes inseparability between need satisfaction and personally-valued goal pursuit. Given this consensus among motivation

researchers regarding the importance of a role for personal purpose in basic motivational need fulfillment, this study has been designed to test whether the prediction of positive affect in recently retired individuals can be sufficiently achieved by need for cognition alone with purpose assumed in its measurement, or whether an explicit measurement of the personal meaning, the "what" of goal content, must be added to the process or "why" individuals high in need for cognition enjoy the context of retirement more.

3.2.3 Contextual characteristics

Since interindividual variability increases with age, retirement studies of middle-aged and young-older adults typically consider any variables of potential direct or indirect influence on activity capacities and well-being throughout the life course to date. Comprehensive categories of age-sensitive socioeconomic and situational variables are prominent in conceptual models showing precursors to quality of life outcomes in the retirement process (Ekerdt, 2010; Shultz & Wang, 2011). The most obvious of these are cognitive functioning and health, which in turn may have been influenced by education, income, and stress-inducing environmental constraints (Fernandez-Ballesteros, 2006). Both prior occupation and gender have been associated with adjustment to retirement (Kim & Moen, 2002). This examination of the effects of dispositional motivation on subjective well-being in the recently retired has been designed to control for age, gender, illness, income, prior occupation, education, cognitive speed, and self-reported stress, so that potential variance in the outcome measure of positive affect can be clearly attributed to the psychological variables under study.

3.2.4 The Present Research

This 2-year longitudinal study examined the associations among recently retired peoples' need for cognition, perceived competence for engagement in cognitive-related activities, sense of personal purpose, and positive affect. Based on the previous research described, we expected to find that higher as compared with lower levels of need for cognition (H1a), self-perceived competence for engagement in cognitive-related activities (H1b), and personal purpose (H1c), would each relate to higher as compared with lower respective levels of positive affect at baseline. We further hypothesized that baseline differences in levels of need for cognition (H2a), perceived competence for engagement in cognitive-related activities (H2b), and sense of personal purpose (H2c) would differentially predict positive affect in the slope across time in recent retirement, with higher levels of the predictor variables resulting in higher stable or upward trajectories of positive affect across time and lower levels predicting lower or downward slopes.

While need for cognition was hypothesized to be the strongest positive predictor of positive affect, competence and purpose were expected to moderate this association. More specifically, we expected to find that individuals with higher levels of need for cognition would experience further higher levels of positive affect, enhanced by higher levels of perceived competence, with the highest levels of positive affect predicted by the combined highest levels of need for cognition and competence (H3a). Likewise, it was hypothesized that individuals with higher levels of need for cognition would experience further higher levels of positive affect, reinforced by higher levels of purpose, with the highest levels of positive affect predicted by the combined highest levels of need for cognition and purpose (H3b).

3.3 Method

Participants and procedure

This longitudinal study investigating motivational predictors of positive affect in retirement began with a total of 369 adults (mean age at start of this study analysis = 60 years, *SD* = 4.98, range 44 to 77 years) who completed three consecutive annual waves of testing in groups of 2-6 at our university laboratories. Forty-three participants were excluded from the analysis because of missing data, with a final *N* = 326. Women represented 53% of the tested sample. Initial recruitment of participants was through retiree associations, a large corporation, and newspaper advertisements. Inclusion criteria included a) recent cessation from at least 20 years of full-time employment, b) no current paid employment over 10 hours per week, and c) language fluency. This resulted in participants having previously worked fulltime for an average of 34.10 years (*SD* = 6.57), and having been retired an average of 2.85 years (*SD* = 1.77) at the study's baseline time point (2006-2007). Participants reported fairly high education overall (mean years of education = 14.9, *SD* = 2.5, range = 7 to 22 years), and rated themselves on average to be slightly better off than most others of the same age according to a 7-point financial status scale. Mean family income for our participants was $68,428 Cdn. (*SD* = $38, 890), comparable to $69,033, the mean family income in Montreal during this data collection period (Binet, 2010). Correlations, means and standard deviations among all study variables are in Table 1.

Measures

Education. Level of education as reported in the demographic questionnaire (see Appendix A) was measured by the number of years enrolled in formal educational institutions, and did not include extra-curricular, adult education or job training programs.

Former occupation. We used the Standard International Occupational Prestige Scale (SIOPS) (Ganzaboom & Treiman, 1996) to code participants' reported former occupations. The SIOPS is a widely used measure of socioeconomic classification which reflects the effect of education on income through occupation based on a weighted sum of sociodemographic variables. The resulting stratification assumes a hierarchy of job complexity placing professionals, senior officials, and large-scale managers at the top, and semi-skilled manual laborers at the bottom. This study's sample produced an employment distribution of: 111 higher service professionals, large enterprise employers or high managers with more than 10 subordinates; 129 lower service associate professionals, lower managers with less than 10 subordinates, or higher sales; 102 routine clerical or sales; 11 skilled manual craft workers or skilled machine operators; 3 semi-unskilled manual labour individuals including machine operators or elementary sales and services. Additional participants who failed to provide sufficient information to allow coding were among those excluded from the analysis due to missing data.

Illness. Self-reported total number of illnesses recently experienced were elicited at baseline testing through an abridged version of the Seriousness of Illness Rating Scale (SIRS) (Wyler et al., 1971), with $M = 3.75$ illnesses, range 0 – 22, $SD = 3.36$. Test-retest for this study's sample over two years was $r = .69$.

Stress Measure. In response to the question "Where would you put yourself on this scale?" participants chose a location on a 9-point line ("not at all stressed" at the bottom, "extremely stressed" at the top, and "average Canadian" rated as 5 in the middle) This test is based on a measurement approach originally developed by Schonfield (1973). Test-retest reliability for this study's sample was $r = .60$ over two years.

Cognitive Ability (Trails A and B). The Trail Making Test (Reitan, 1958) is used to derive B-A scores reflecting differences between seconds of time to completion of part A and the more complex part B, with higher scores indicating a longer response time and slower task switching ability. In Part A, participants connect 25 numbered circles in ascending order while in Part B the same number of circles contain either numbers or letters to be alternately connected in ascending order. This widely-used neuropsychological tool is considered to be a sensitive measure of visual perceptual ability, motor speed, working memory, and aspects of executive functioning (Stuss et al., 2001). There were no significant differences in overall trails B-A mean scores between the three time points measured (baseline $M = 34.13$, $SD = 23.8$; time two $M = 33.68$, $SD = 19.56$; time three $M = 36.15$, $SD = 49.18$).

The Need for Cognition Scale (Cacioppo et al., 1996) is a gender-neutral scale which measures preference for effortful cognitive processing of complex material. The 18-item short form includes transparent self-descriptive statements such as "*I prefer my life to be filled with puzzles that I must solve*" or *"Learning new ways to think doesn't excite me very much*" arranged on a 5-point scale from "*extremely uncharacteristic of me*" to "*extremely characteristic of me*". Half the items are worded positively and half negatively. Higher scores on the scale indicate a dispositional tendency toward greater need for cognition. The mean for this study's full sample ($N = 369$) at baseline was 61 ($SD = 11.8$); range = 26-89. Test-retest reliability over two years was $r = .80$, reflecting the high stability of this individual difference variable.

Self-perceived competence, a subscale of *The Everyday Activities Questionnaire* (Pushkar et al., 1997), was measured in answer to the question "How good are you generally

at doing this?" regarding specific activities involving cognitive engagement (see Appendix K). Responses were indicated on a 5-point scale ranging from a choice between 1 (*not good*), 2 (*somewhat good*), 3 (*moderately good*), 4 (*very good*), to 5 (*extremely good*). This indicates self-rated ability in performing nine specific items assessing voluntary developmental activities requiring active maintenance of cognitive and social engagement in cultural activities, music performance, taking courses, reading, playing games, creative activities, TV/radio use, internet use, and travel. The test-retest reliability for this sample over two years was $r = .69$.

The Life Engagement Test: Assessing Purpose in Life (Scheier et al., 2006) was used to measure the degree to which people personally value their activity engagement (see Appendix L). Each of six items is presented with a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Sample items include "*Most of what I do seems trivial and unimportant to me*", and "*To me, the things I do are all worthwhile*". After reversing the negative statement responses, scores are summed to provide a total single factor outcome response. The test-retest reliability for this sample over two years was $r = .65$.

Positive Affect. Ten positively valenced descriptive terms from *The Positive and Negative Affect Schedule* (PANAS) (Watson et al., 1988) were used to measure positive affect (*interested, excited, strong, enthusiastic, proud, alert, determined, inspired, attentive, active*). Participants were asked to indicate to what extent they had experienced each of these particular emotions during the past few weeks on a 5-point scale ranging from "*very slightly or not at all*" to "*extremely*". For this study's sample, test-retest reliability between baseline, time two, and time three averaged $r = 70$ ($p < .01$). Although negative affect and

measures of life satisfaction are often included with emotional positivity to create composite measures of subjective well-being, positive affect is usually the primary component of such indices (Deci & Moller, 2005; Sheldon et al., 2004). Here we have used positive affect as a single outcome measure because both need for cognition and meaningful personal projects have previously been shown to associate differentially to positive but not negative affect (Bye & Pushkar, 2009; Lawton et al., 2002).

Plan of analysis

The purpose of this study was to use motivation variables measured at baseline to predict levels of positive affect over two subsequent consecutive annual time-points in post-retirement. It was hypothesized that higher baseline levels of need for cognition, perceived competence with cognitive activities, and purpose in life would be related to higher baseline levels of positive affect along with increases or higher stable trajectories of positive affect across time. It was also hypothesized that perceived competence and purpose in life would moderate the association between need for cognition and positive affect over time. Gender, age, prior occupation, education, income, illness, stress, and cognitiveability were included in the analysis as covariates.

Hierarchical linear modeling (HLM), a form of multilevel modeling ideal for use with longitudinal data, was used to assess these hypotheses. HLM is a preferred method of analysis because it accounts for correlations among the multiple assessments of level 1 observations by estimating random effects (Bauer, Preacher, & Gil, 2006). Hierarchy in this model refers to units (i.e. time) embedded within other units (i.e. persons). To assess our first hypothesis, a two level model was created using HLM 6.0 (Raudenbush, Bryk, Cheong & Congdon, 2004). At Level 1 (the within person model) positive affect was estimated by

positive affect at study entry (β_{0i}), time since entry (β_{1i}), and a residual term (R_{ij}). This component of the model estimates the covariance between change over time and change in positive affect within people:

$$Positive\ Affect_{ij} = \beta_{0i} + \beta_{1i}\ (Time) + R_{ij}$$

At Level 2 (the between person model), β_{0i} and β_{1i} was estimated for each subject as a function of the covariates (e.g., age, gender, prior occupation, education, income, illness, stress, cognitiveability), the variables of interest (e.g., need for cognition, competence, purpose) and finally product terms reflecting interactions between variables of interest (e.g., need for cognition X competence and need for cognition X purpose). The first Level 2 component of the model provided the abovementioned variables as a predictor of average positive affect across the three waves:

$$\beta_{0i} = \gamma_{00} + \gamma_{01}\ (age) + \ldots + \gamma_{013}(need\ for\ cognition\ X\ purpose) + U_{0j}.$$

The second Level 2 component of the model allowed positive affect to vary as a function of time:

$$\beta_{1i} = \gamma_{10} + \gamma_{11}\ (age) + \ldots + \gamma_{113}(need\ for\ cognition\ X\ purpose) + U_{1j}.$$

The gamma weights in this model are analogous to unstandardized beta weights and will be reported along with their corresponding *t* statistics.

3.4 Results

Descriptive analyses

Means, standard deviations, and correlations among all study variables are presented in Table 1. Eight demographic and lifestyle covariates relevant to the retirement and aging literature were included not only for control purposes, but also to provide a fully informed descriptive profile of participant characteristics. Correlations show this study's population

sample to be representative of the cohort who retired in the middle of the first decade of 2000, with income producing significant correlations with gender (men having more income than women), age (younger recent retirees having more income than older), illness (less illness associated with greater income), and cognitive speed (slower speed correlating with lower income). Higher stress correlated with lower education, higher illness, lower purpose, and gender, with women ($M = 4.19$, $SD = 1.6$) reporting higher levels of stress than men ($M = 3.6$, $SD = 1.5$). Higher education correlated with higher income, previous occupation and need for cognition. The correlation table shows that each of the three main motivational variables of interest are significantly associated with positive affect, whereas of the demographic variables, only gender, illness, and self-reported stress correlate significantly

Study 2, Table 1

Bivariate means, standard deviations (SDs), and correlations among lifestyle covariates, motivation variables and waves 1-3 positive affect

		1	2	3	4	**5**	6	7	8	9	10	11	12	13	14
1	Gender	__													
2	Age	-.023	__												
3	Prior occupation	-.120*	.081	__											
4	Education	-.041	.090	.474**	__										
5	Income	-.233**	-.290**	.224**	.240**	__									
6	Illness	.156**	.050	-.066	-.002	-.198**	__								
7	Stress	.158**	.059	.002	-.106*	-.097	.261**	__							
8	Cognitive ability[a]	-.098	.252**	-.087	-.072	-.166**	.089	.098	__						
9	Need for cognition	-.051	-.056	.227**	.272**	.111*	.015	-.047	-.033	__					
10	Competence	.104*	-.085	.088	.179**	.068	.022	-.087	-.096	.329**	__				
11	Purpose	.005	-.022	.056	.011	.005	-.141**	-.285**	-.027	.125*	.206**	__			
12	Positive affect W1	.125*	-.001	.026	.037	.040	-.139**	-.186**	-.091	.272**	.305**	.574**	__		
13	Positive affect W2	.144**	.008	.066	.049	.011	-.100	-.192**	-.055	.274**	.231**	.525**	.711**	__	
14	Positive affect W3	.152**	-.099	.031	.089	.069	-.109*	-176**	-.030	.211**	.273**	.485**	.673**	.715**	__
	Means		60	53.88	15.19	7.37	3.75	3.94	34.20	60.83	3.93	26.18	37.65	37.45	37.10
	SDs		4.98	8.14	2.58	3.76	3.36	1.62	22.70	11.84	.57	3.24	6.37	6.31	6.13

Note. a. higher numbers reflect longer cognitive processing time in seconds derived from Trails B-A difference scores. *$p < .05$, **$p < .01$.

with the well-being measure in this sample. Need for cognition correlates positively with education, prior occupation, income, competence and purpose. Self-perceived competence in cognitive activities correlates positively with education, need for cognition, purpose, and gender, with women (M = 3.98, SD = .57) reporting higher competence levels than men (M = 3.87, SD = .49). The purpose in life variable correlates negatively with both illness and stress. Significant positive correlations between need for cognition, competence, purpose and positive affect justify use of an HLM model to further explore the relations between these predictors and their outcome.

Preliminary HLM analyses

All Level 2 predictors including covariates in this study were standardized before their entry into the HLM analysis. The first step in the analysis consisted of an unconditional or null model that included no predictors. It provided estimates of between-person (tau) and within-person (sigma) variance needed to compute an intraclass correlation (ICC) for the dependent variable of positive affect (tau divided by sigma plus tau). The observed values were 26.598 for tau, 11.805 for sigma squared, resulting in .69 for the ICC. This indicated that 69 % of the variance to be explained in positive affect was between subjects and 31% in positive affect was within subjects. Time was added as a Level 1 predictor and reduced the within person variance by 11%. The value for the intercept (β_{0i}) was 37.53 (SE = .31), T ratio = 122.81, $p < 0.001$, and for the slope (β_{1i}) was - 0.30 (SE = .14), T ratio = - 2.16, $p < 0.05$. Since positive affect varied significantly both between (χ^2 = 1431.64, p = 0.000) and within persons (χ^2 = 402.66, p = 0.002), further examination of predictor variables at both baseline and across time was warranted.

The second step of the analysis was to enter in demographic variables at Level 2 to predict both the intercept (β_0) and slope (β_1) of positive affect. This step determined whether differences between people on the covariates of age, gender, prior occupation, education, income, illness, and stress cognitive ability led to differences in baseline levels of positive affect (i.e. intercept) or changes in levels of positive affect over time (i.e. slope). As shown in Table 2, the only two covariates which significantly predicted positive affect at baseline were gender and stress. Gender was related to positive affect such that women had higher average levels of positive affect at baseline than men (*coefficient* = 1.05, *SE* = 0.36, *T*- ratio = 2.83, $p < 0.01$), and higher stress predicted significantly lower levels of positive affect at baseline (*coefficient* = - 0.92, *SE* = 0.36, *T*- ratio = - 2.55, $p < 0.05$). Cognitive ability significantly predicted change in positive affect at the slope level, such that those with slower ability reported increases in positive affect over time (*coefficient* = 0.31, *SE* = 0.14, *T*- ratio = 2.15, $p < 0.05$. Altogether the covariates reduced the between subjects variance in positive affect by 5.76%. A total of 63% of the between subjects variance in positive affect remained unaccounted for.

Need for cognition, perceived competence, and purpose predicting positive affect

The third step of the analysis was to enter motivational variables at Level 2 to predict both the intercept (β_0) and slope (β_1) of positive affect. This step determined whether differences between people on baseline levels of need for cognition, competence and purpose led to differences in baseline levels of positive affect (intercept, β_0) or changes in levels of positive affect over time (slope, β_1). As shown in Table 2, all motivational variables led to differences in baseline levels of positive affect at intercept (β_0). As expected, higher levels of need for cognition, competence and purpose were related to

Study 2, Table 2

Predicting positive affect at baseline and across two additional annual waves with 3-way HLM

		Baseline levels (Intercept)		Change across waves (Slope)	
		Coefficient (SE)	*T-Ratio*	*Coefficient (SE)*	*T- ratio*
Level 1					
	Intercept	37.83 (0.34)	110.29**	-0.304 (0.14)	-2.16*
Level 2					
	Gender	1.05 (037)	2.83**	0.11 (0.15)	0.75
	Age	0.12 (0.42)	0.30	-0.30 (0.16)	1.83
	Prior occupation	-0.19 (0.42)	0.46	0.08 (0.16)	0.49
	Education	0.13 (0.37)	0.34	0.11 (0.15)	0.72
	Income	0.06 (0.38)	0.15	0.09 (0.15)	0.57
	Illness	-0.78 (0.43)	-1.82	0.09 (0.20)	0.48
	Stress	-0.92 (0.36)	-2.55*	-0.03 (0.14)	-0.24
	Cognitive ability [a]	-0.32 (0.37)	-0.88	0.31 (0.14)	2.15*
	Need for cognition	1.53 (0.29)	5.27**	-0.34 (0.15)	-2.20*
	Perceived competence	0.73 (0.29)	2.48*	-0.12 (0.16)	-0.70
	Purpose	3.28 (0.29)	11.28**	-0.37 (0.15)	-2.40*
	Need cog x competence	-0.08 (0.31)	-0.27	-0.26 (0.12)	-2.19*
	Need cog x purpose	-0.65 (0.28)	-2.31*	0.39 (0.14)	2.81**

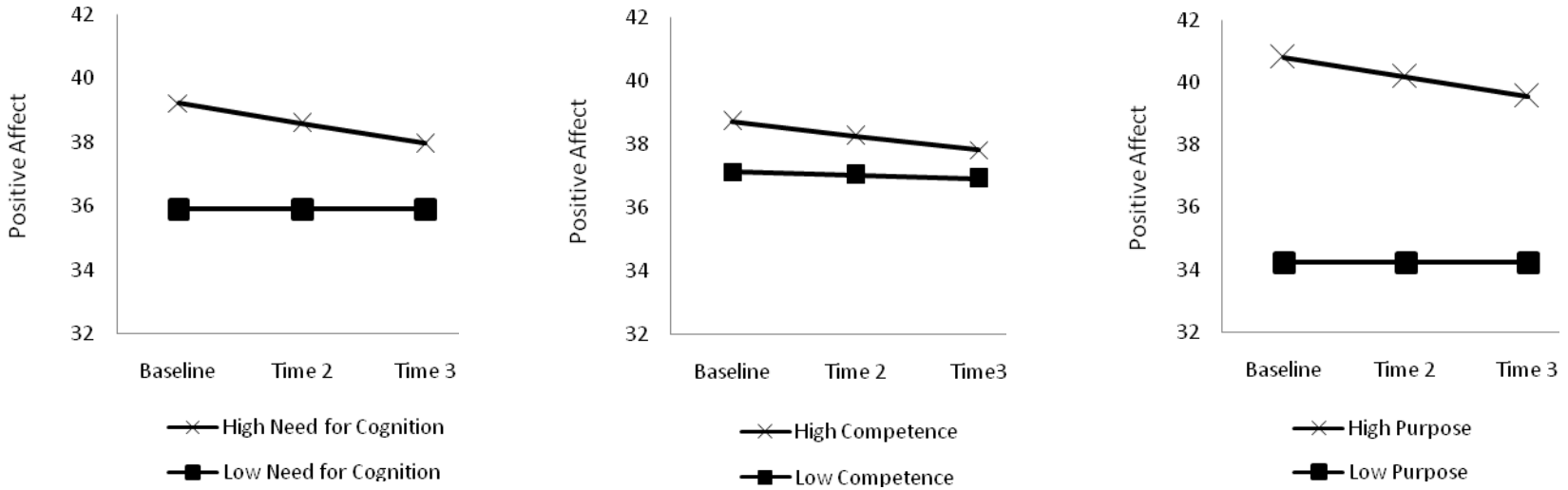
* $p < .05$; ** $p < .01$; $df = 312$

Note. a. higher numbers reflect longer cognitive processing time in seconds derived from Trails B-A difference scores.

higher levels of positive affect at baseline (need for cognition *coefficient* = 1.53, *SE* = 0.29, *T* ratio = 5.27; competence *coefficient* = 0.73, *SE* = 0.29, *T* ratio = 2.48; and purpose *coefficient* = 3.28, *SE* = 0.29, *T* ratio =11.28; all $p < 0.05$).

Two of the motivational variables predicted changes in positive affect over time (slope, β_1), however, contrary to expectations, higher levels of need for cognition (*coefficient* = - 0.34, *SE* = 0.15, *T*- ratio = - 2.20, $p < 0.05$) and purpose (*coefficient* = - 0.37, *SE* = 0.15, *T*- ratio = - 2.40, $p < 0.05$) were each related to significant decreases in positive affect over time. Perceived competence by itself was unrelated to change in positive affect over time in this HLM analysis (*coefficient* = - 0.12, *SE* = 0.16, *T*- ratio = - 0.70, *ns*). The three motivational variables in combination reduced the available between subjects variance in positive affect by 49%, leaving 48% unaccounted for.

Visual representations of the individual associations between high and low levels of each predictor variable and their respective changes in positive affect over time are shown in Figure 1. These graphs were calculated by transferring data from the completed HLM model into the online program for two-way HLM interactions provided by Preacher, Curran and Bauer (2006). Note that these graphs indicate how individuals who exhibited higher levels of need for cognition, purpose and perceived competence experienced significant declines in positive affect over time, while those lower in these variables showed no change. However, as described above and reported in Table 2, when all three motivational variables are simultaneously accounted for in the HLM model, perceived competence is not a significant moderator of the association between positive affect and change over time.



Study 2, Figure 1. Need for cognition, competence, and purpose predicting changes in positive affect over time in recent retirees. β coefficients indicate degree of change in slope over time. $*p < .05$, $**p < .001$

Interaction Results

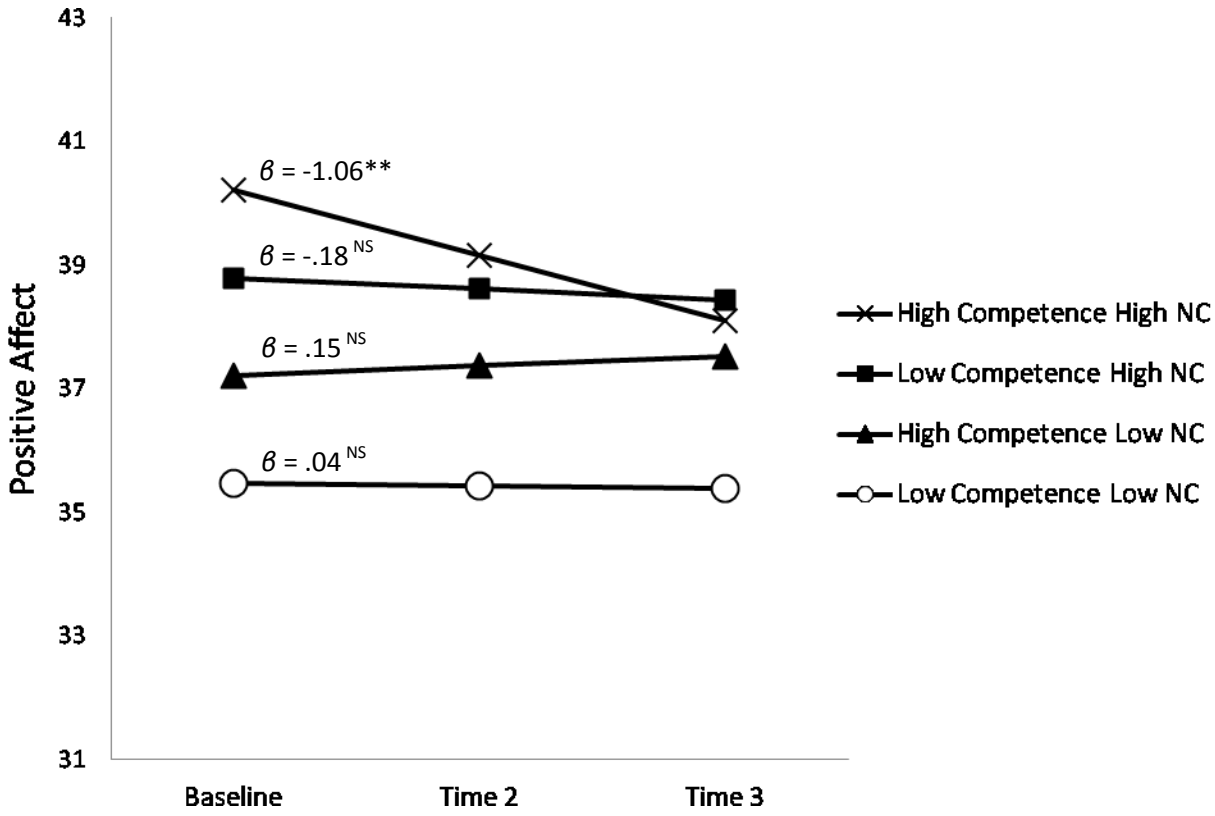
One of the many strengths of HLM is its ability to estimate how multiple predictors can have moderating effects on each other over time. This multilevel modeling allows comparisons of inter-individual developmental trajectories and testing of the dynamics of underlying hypothesized processes. In this model, the planned interactions are particularly necessary to the interpretations of the main effects. Need for cognition by competence, and need for cognition by purpose are both revealing. Thus the fourth and final step of the analysis was to enter in the two interactions at Level 2 to predict both the intercept (β_0) and slope (β_1) of positive affect. Competence by purpose was non-significant, implying no moderating relation between self-perceived ability to engage in cognitive activities and having an overall purpose in life; this interaction was dropped from the model for parsimony.

As shown in Table 2, the two interactions were entered to estimate the intercept (β_0) and slope (β_1). Need for cognition by competence did not predict differences in baseline levels of positive affect (*coefficient* = - 0.08, *SE* = 0.31, *T* ratio = - 0.27, *ns*), but it did estimate change in positive affect over time (*coefficient* = - 0.26, *SE* = 0.12, *T* ratio = - 2.19, $p < 0.05$). Comparatively, need for cognition by purpose predicted differences in both baseline levels of positive affect (*coefficient* = -0.65, *SE* = 0.28, *T* ratio = - 2.31, $p < 0.05$) and estimated change in positive affect over time (*coefficient* = 0.39, *SE* = 0.14, *T* ratio = - 2.81, $p < 0.05$). These interactions accounted for an additional 1% of variance in positive affect between people.

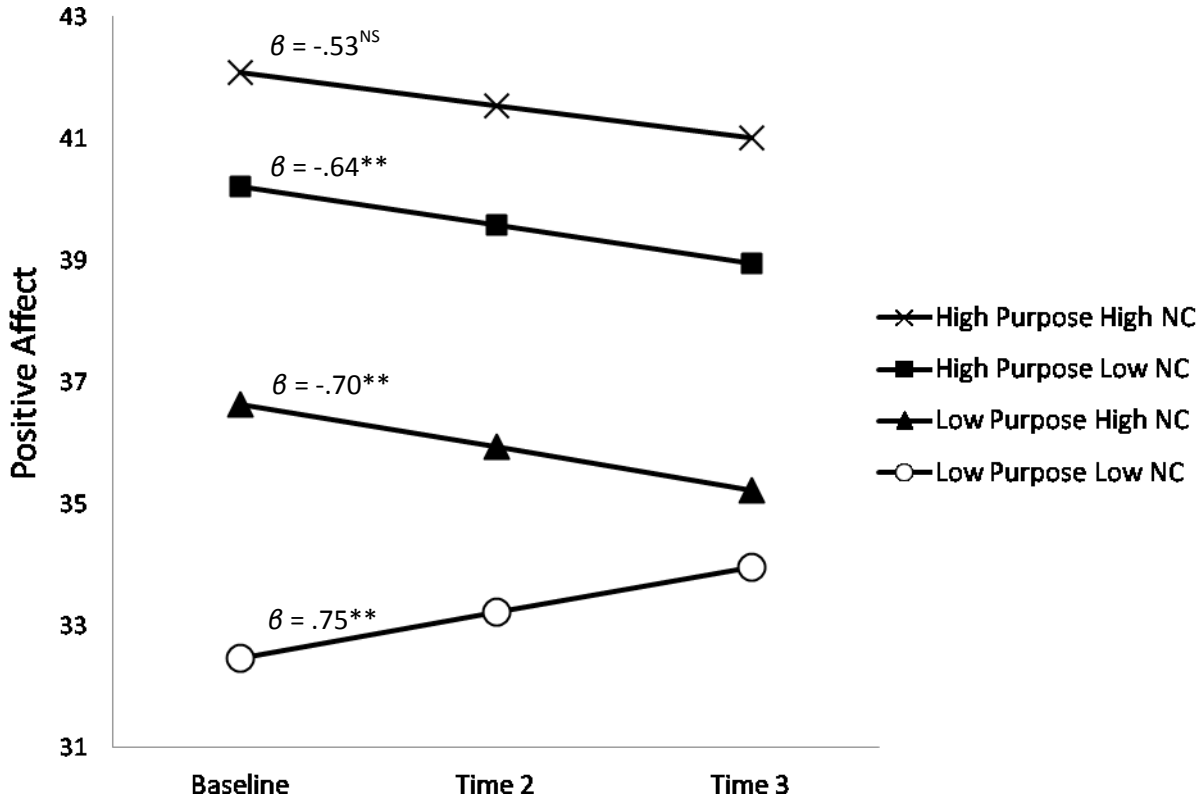
In order to fully understand how both competence and purpose interacted with need for cognition to predict positive affect, simple slopes and simple intercepts for the

interactions were estimated using the statistical procedure developed by Preacher and colleagues (2006). In the competence by need for cognition estimate (see Figure 2), individuals who exhibited high levels of both competence and need for cognition experienced a significant decline in positive affect over time (β = - 1.06, t = 4.48, $p < 0.01$), while the three other groups did not change.

Estimation of simple slopes within the second interaction examining purpose by need for cognition (see Figure 3) indicated that three of the four groups experienced significant changes in positive affect. Individuals who exhibited low levels of purpose as well as low levels of need for cognition experienced a significant increase in positive affect over time (β = 0.75, t = 2.79, $p < 0.01$). Conversely, individuals with high need for cognition and low purpose as well individuals with low need for cognition and high purpose experienced a significant decrease in positive affect over time (β = -0.70, t = 2.26, $p < 0.05$; β = -0.64, t = 2.26, $p < 0.05$). Finally, those individuals with both high levels of purpose and high need for cognition did not experience changes in positive affect over time, remaining relatively stable at the highest level of positive affect (β = -0.53, t = 1.83, *ns*).



Study 2, Figure 2. Interaction between need for cognition and competence predicting change in positive affect over time. ***p*<.001



Study 2, Figure 3. Interaction between need for cognition and purpose predicting change in positive affect over time. **p<.001

3.5 Discussion

This study was designed to show how measureable individual differences in motivation can be used to predict positive affect across time for recently retired people. We expected to find that: a) need for cognition, the dispositional tendency to enjoy cognitive challenge; b) competence, the perception of capacity to interact effectively with one's environment, and; c) purpose, a reflection of congruence between idiosyncratic need and goal-directed activities, would each have a sustained or increasingly upward effect on well-being over time. First, after accounting for demographic covariates, we found the expected associations between each of the three motivation variables and outcome at baseline, with those higher, as compared with lower, in need for cognition, competence, or purpose reporting higher levels of positive affect. Regarding change across the next two annual waves of testing, however, we found that while almost half of the remaining variance in positive affect over time was explained by these three motivation variables, the direction of the results was not as hypothesized. Even though those higher as compared with lower in each of these variables did report comparably higher levels of positive affect at the outset of the study, being high in either need for cognition or a sense of purpose in life alone did not predict increased well-being over the two year period tracked; in fact, both need for cognition and purpose predicted a small but significant decline in positive affect in these early years of full retirement. Perceived competence in socio-cognitive activities measured at baseline had no significant overall effect on change in positive affect over time: even though the slope of higher competence taken alone showed a modest drop, it was not significantly different from the relatively unchanging trajectory in positive affect over time

of those lower in perceived competence. This shows that a sense of efficacy in one's environment relates to initial, but not increasing, levels of positive affect in retirement.

However, interactions across time revealed that individuals reporting combined higher levels of need for cognition and purpose in life were protected from a drop in positive affect, showing that the process of need fulfillment in the service of personally meaningful goals does lead to the maintenance of subjective well-being in retirement. These findings are consistent with the differentiation made in self-determination theory between the "what" (content) and the "why" (process) of motivated life engagement (Deci & Ryan, 2000), and provide an empirical example of how individual differences in differing aspects of motivation work together within a specific social context to usefully predict a psychological outcome. The integrated functioning of needs and goals found here is also illustrative of Sheldon and Elliot's (1999) self-concordance concept, where people's needs are appropriately matched or balanced by their activity choices.

This study's most unexpected finding was that although higher levels of need for cognition related to significantly higher levels of positive affect at the first measurement in recent retirement, individuals most highly motivated by need for cognition at baseline experienced the sharpest drop in positive affect over the next two years. The same pattern emerged for those reporting higher levels of purpose in life, with higher purpose associated with higher baseline levels of positive affect, but then predicting a significantly sharper drop in this well-being outcome over time. High levels of either motivational component alone are insufficient in sustaining positive affect across time in retirement; their significant interaction shows that both are necessary in combination to maintain that initial state of flourishing.

3.5.1 Competence and need for cognition

Competence, or the self-reported ability to perform well on socio-cognitive tasks, explained a small significant amount of variance in positive affect at the initial testing point in recent retirement, but did not by itself as a whole predict a significant amount of change over time in the outcome measure. The interaction between competence and need for cognition did predict lowering positive affect over the two years subsequent to initial testing: those high in both competence and need for cognition at baseline reported a downward trajectory of positive affect over time. However, this association between the motivation variables and positive affect appears to have been driven primarily by the stronger predictive value of need for cognition in that the significant drop in positive affect occurred only for those higher in both need for cognition and competence. Overall, being higher in need for cognition produced higher positive affect levels both at baseline and across time for those either higher or lower in perceived competence, while those lower in need for cognition reported lower levels of positive affect at both baseline and across time regardless of their perceived competence levels. These results indicate that self-perceived competence in cognitive activities does not further moderate the relation between need for cognition and positive affect, supporting the perception of need for cognition as an organismic motivational construct already representing both the needs for autonomy and competence.

The significant drop in positive affect over two years occurring for those people higher in need for cognition in the earliest stage of recent retirement can be interpreted with reference to aspects of self-determination theory. The transition to retirement necessitates moving away from contexts controlled by extrinsically motivated factors and toward

contexts where a reliance on intrinsic motivation is of particular benefit. A post-retirement context implies that the individual must adjust by shifting away from external loci of control to a more internal locus of control over time, with a greater reliance on social circumstances and task characteristics that enhance intrinsic rather than extrinsic motivation. Deci and Moller's (2005) description of social conditions necessary for the promotion and maintenance of intrinsic motivation specifies positive feedback as a necessary support to the needs for competence and autonomy. While positive emotional satisfaction is derived from the innate pleasure of engaging in optimally challenging activities, positive feedback of an "informational" rather than "controlling" nature is necessary to preserve existing intrinsic motivation and help maintain fulfillment of the needs for autonomy and competence. Recently retired individuals who are high, relative to low, in need for cognition are more likely to have backgrounds rich in education and workplace challenges filled with opportunities for varied feedback support, as shown in Study 1, and may now be adjusting to the absence of these competence-supportive environments. Self-determination theory predicts that removal, or an absence of, supportive contextual factors produces negative consequences through the thwarting of the basic psychological need for competence. Needs themselves are not content specific, but related activity goals are (Deci & Ryan, 2000). Without relevant supportive positive feedback in activities chosen to satisfy intrinsically motivated activity engagement and an ensuing sense of competence, the retired person would experience a reduction in interest and positive affect over time.

Vallerand's (1997) hierarchical model of intrinsic and extrinsic motivation is also useful to the interpretation of this study's finding that recent retirees higher in both need for cognition and competence experienced a sharper drop in positive affect than those lower in

need for cognition and competence. Vallerand's model includes the global, contextual, and situational motivational levels within which a person experiences the affective, cognitive, and behavioral consequences of his or her basic need satisfaction. As applied to this study, the global level encompasses dispositional differences in need for cognition, the activity sphere or social context is retirement, and the situational level refers to the phenomenological experience of current specific task involvement. One of the propositions in Vallerand's model is that there is a spill-over effect of motivation from one level to the next. However, the top-down effect applies most strongly to the more proximate level, such that the global dispositional benefits of strong need for cognition and competence may produce positive affect at the contextual level of retirement, but weaken by the time they filter through to the more distal level of specific situational activities. Links between the hierarchical motivation levels can be primed either by enjoyment of the situational tasks themselves or by the perception that others value the tasks as related to the life context. Environmental factors can either augment or thwart spill-over effects between levels. In terms of this study's findings, we can suppose that those who have a higher stable need for cognition and higher self-perceived competence may find that this serves them differently in the context of retirement than it did in the context of full-time employment. The context of retirement may not supply the necessary amount of need fulfillment over time required by those with higher need for cognition and higher self-perceived competence, regardless of the specific situational activities pursued. Alternatively, it may take longer than the two year period measured in this study for some individuals to find ways for goal fulfillment in retirement.

The bidirectional relation between satisfaction of need for cognition and competence through specific self-chosen cognitively-challenging activities may be insufficient to create a bottom-up generalized effect from the immediate task to the contextual level. The expected recursive bottom-up impact of intrinsic motivation benefits may be blocked by a vacuum of positive social feedback at the contextual level, possibly creating frustration for previous high achievers. Being able to say "I'm good at retirement" does not carry the same social value as "I'm good at school" or "I'm good at the work I do". Young-old recently retired individuals are more likely to profess being "very busy in retirement", defining themselves as earnestly active and committed, thus maintaining moral continuity by transforming their work ethic into retirement "busy-ness" to deflect social criticism of full-time leisure states (Ekerdt, 1986). This would not be felt as necessary if retirees were receiving sufficient meaningful positive feedback in valued activities which support their self-perceived competence. Higher competence by itself in a retirement environment absent of competence-outcome contingencies or contextual scaffolding cannot sustain long term positive affect.

3.5.2 Pursuit of valued goals and need for cognition: A "what" and "why" of positive affect in retirement

The results of this study show that both purpose and need for cognition are required for the stable maintenance of high positive affect over time in retirement. The absence of significant change in higher positive affect over a two year period in recent retirement for those reporting higher levels of both factors indicate their combined protective importance. Being higher in purpose but lower in need for cognition at baseline predicted a significant drop in positive affect over time, as did being higher in need for cognition but lower in

purpose at baseline. Although the highest sustained level of positive affect over time was predicted by baseline reports of being high in both need for cognition and purpose, and although the high/high, high/low, and low/high groups did not differ significantly from one another in their downward trajectories over time despite the high/low and low/high groups being significantly different from zero in their slopes, each of these three groups remained higher in positive affect over time than the low need for cognition and low purpose group. However, and importantly, the only significant increase in relative level of positive affect over time in recent retirement was achieved by those lowest in both need for cognition and purpose in life. Those in this low/low group presumably have alternative needs and goals which are met differently during this time of transition, and the difference between their rise in positive affect levels compared with the other three groups' lowering of positive affect appears to have driven the overall significance of the interaction.

Needs arise from within to provide the motives and energy for behavior; behavior, in turn, is goal-directed in the environment: both needs and goals involve affective outcomes through their nourishment or neglect. Chosen goal-directed activities must have purpose or meaning at both the personal and contextual levels to prevent boredom and anxiety over time which can result in a lapse into "amotivation" (Deci & Ryan, 1985; Vallerand, 1997). Whether referred to as authentic vs. inauthentic life projects (Csikszentmihalyi, 1990), serious vs. casual leisure (Stebbins (1998), or high- vs. low-investment activities (Mannell, 1993), meaningful goal pursuit appears to be a critical mechanism for behavioral engagement and psychological well-being, as suggested by Scheier and colleagues (2006).

This study's finding that, in addition to the organismic motivation provided by need for cognition, the higher order value of purpose is necessary to the long-term maintenance

of highest levels of positive affect in retirees, is consistent with other self-determination theories. For example, Sheldon and Elliot (1999) define self-concordance as a form of integrated functioning where people's goal-systems are in harmony with enduring interests and values, with valued goal pursuit being in the service of intrinsic need satisfaction. Those retirees higher in need for cognition are engaged in a need-fulfillment process which predicts positive affect over time only when the process is moderated by a sense of value and importance in the accompanying behavioral choices. Motivational needs which trigger the behavioral energy must coalesce with suitably purposeful goals. For example, aimless on-line surfing is not as rewarding as a directed information search of purposeful significance to the retiree who is higher in need for cognition, but may be sufficient or irrelevant to someone lower in need for cognition or purpose. A curious individual of any age requires the compass of purpose for cognitive navigation (Kashdan & Steger, 2007); those high in need for cognition require a channeling of their energy toward meaningful activity venues. Need satisfaction cannot occur unless retirees' goals are self-concordant, reflecting what Sheldon and Kasser (1998) have described as the organismic congruence between a) goals that are pursued for autonomous reasons, and b) motives of intrinsic origin that interact over time to predict high sustained positive affect. Altogether, our findings are consistent with Sheldon and colleagues' (2004; 2006) conclusion that although goals and meaningful goal content make significant independent contributions to psychological well-being, their integration is necessary for full psychological need satisfaction and its ensuing positive affect.

Little (1998) and Deci and Ryan (2000) have also emphasized the motivational importance of meaning, purpose, or the degree of autonomy reflected in one's reasons for

striving within any given domain. The finding that need for cognition requires an interaction with purpose to predict highest levels of stable long-term positive affect means that the construct of need for cognition by itself may not encapsulate autonomy sufficiently, or that autonomous (self-chosen) goals do not necessarily contain purpose. Need for cognition provides the impetus or zest for challenging cognitive activities, but personally worthwhile action goals are a necessary supplement to the sustenance of positive affect in retirement over time. Need for cognition subsumes the competence component of cognitive evaluation theory, while a measure of purpose reflecting additional autonomy, or self-determination, is needed to complete a set of motivational tools that can predict positive affect in the early years of retirement. Thus, the meaningfulness of goals equates to the "what" (or content), and the process of fulfilling an intrinsic need for cognitive challenge equates to the "why" (or intent), of self-determined behavior in recently retired people, leading to the conclusion that need for cognition and goals reflecting individual purpose provide a "what" and "why" heuristic for positive affect in retirement.

3.5.3 Summary, limitations, future directions

Without activity goals containing authentic purpose in the early stages of retirement, those higher, as compared with lower, in need for cognition will experience a significant drop in positive affect, as will those who rate themselves as being higher in the ability to engage in activities involving cognitive challenge. For those who are by disposition intrinsically motivated to engage in cognitive challenge optimally related to their abilities, the change in life domain away from structured work commitments and into a less well-defined socio-cognitive arena may not provide sufficient opportunities or feedback to endorse ongoing interest. Only those recently retired people who report both high need for

cognition and high purpose in life are able to sustain their levels of positive affect, which are the highest at both beginning of retirement and across time. Those with low levels of need for cognition and high purpose report significantly improved positive affect over time in retirement, but at levels which begin and remain lower than those reported by people who are more highly motivated.

A tenet of self-determination theory is that understanding basic needs provides us with direction in adjusting the social environment to support rather than undermine well-being at different developmental periods. Motivational studies have focused heavily on conditions which nurture achievement and productivity in school and workplace settings as well as health recovery in medical settings, but lifespan psychology has neglected the study of healthy older adults living outside any of these institutional contexts, who are actively present within our society. High functioning at every stage in life is reflected in vitality, and vitality is nurtured in environments that provide autonomy and competence support, optimal structure, and interpersonal involvement (Deci & Ryan, 2000). Further research targeted toward how healthy older adults can continue to fulfill either basic motivational needs, or motive dispositions (Sheldon, 2011), within the social context of retirement would beneficially inform social policies.

3.5.4 Conclusion

Consistent with self-determination motivation theory, these empirical results demonstrate that highest subjective well-being in retirement is maintained through intrinsically motivated engagement with personally meaningful goals. The pursuit of valued goals, energized by the process of need fulfillment, is an example of the "what" (content) and the "why" (process) of motivated behavior in recently retired people. Specifically, need

for cognition, the dispositional tendency to enjoy cognitive challenge, is an idiosyncratic motivational orientation that can be used to predict higher levels of positive affect both at the start of retirement and across time if it is accompanied by goals which are valued and reinforced in the new life domain.

Older adults who are higher in need for cognition and purpose are more likely to be able to enjoy the challenge of deciphering and navigating the cognitive components of their current life. These recent retirees are more likely to be motivated by feelings of competence, autonomy and purpose: they will be able to say, "I'm good enough at what I do in my daily life, I enjoy what I am doing, and there is meaning to how I spend my time each day", and they will be best able to sustain positive affect over time by fulfilling their need for cognition.

Chapter 4: General Discussion

4.1 Summary and interpretation of major findings

The overall goal of this body of research on need for cognition was to create a motivational profile of individuals more likely to experience high subjective well-being during the early adjustment years of retirement. The first study extended previous cross-sectional findings by demonstrating that recent retirees higher in need for cognition do, as hypothesized, report higher levels of positive affect, but no differences in either negative affect or life satisfaction, over time than those lower in need for cognition. These findings support the proposal that an intrinsic motivation to enjoy fulfillment of the need for knowledge is a useful predictor of long-term psychological health for older adults. The second study used hierarchical linear modelling to confirm that higher levels of need for cognition at baseline predicted highest levels of positive affect longitudinally in retirement, but unexpectedly, those higher in need for cognition experienced a significant drop in positive affect over the two years measured, while those with lower levels of need for cognition experienced no change in their lower levels of positive affect. The same pattern occurred independently for those reporting higher relative to lower scores on purpose in life. Only those recent retirees who reported a baseline combination of both higher need for cognition and higher purpose were able to maintain stable higher levels of positive affect across time. Thus, optimal well-being in the context of retirement requires that high levels of intrinsic motivation for cognitive involvement, as one example of a motive disposition, must be accompanied by personally meaningful goal opportunities. This is an applied case of Sheldon and Elliot's (1999) self-concordance model of self-determination theory, where

autonomy-driven needs and self-chosen goals must be appropriately matched for positive well-being to result.

Higher levels of self-perceived competence in the performance of cognitive activities uniquely predicted higher stable levels of positive affect over time, indicating that competence can sustain well-being independently of need for cognition. However, adding competence to the HLM model in Study 2 did not explain any additional significant variance in positive affect outcome over time beyond that already explained by need for cognition. This can be interpreted as evidence that self-perceived competence in cognitive activities and need for cognition are covalent but not additive in their prediction of engagement in and enjoyment of cognitive activity leading to positive affect. Studies on older adults in particular have shown that competence leads to the phenomenological state of flow (Csikszentmihalyi, 1990) when ability and task demands are well-matched (Mannell, 1993; Payne et al., 2011). Self-determination researchers have also described the experience of flow-like motivational processes as resulting from fulfillment of the needs for autonomy and competence through goal-appropriate activity involvement (Reis et al., 2000; Sheldon et al., 1996), a dynamic consistent with those retirees higher in need for cognition engaging in sufficiently challenging activities.

Self-perceived ability as measured in Study 2 is similar to Bandura's (1997) definition of *self-efficacy* as the belief in one's ability to perform a given task, although Bandura's larger social cognitive theory expands greatly on White's effectance motivation. Self-efficacy or self-perceived competence has been tied specifically to need for cognition in a number of fields. For example, Dickhauser and Reinhard (2009) found that levels of need for cognition mediated the competence-related performance expectancies and the

actual performance outcomes of high school students. In health psychology, need for cognition has been found to independently predict both smoking cessation and smoking cessation self-efficacy (Haug, Meyer, Ulbricht, Gross & Rumpf, 2010). Day, Espejo, Kowollok, Boatman and McEntire (2007) developed a model of complex skill acquisition where learning orientation and self-efficacy were links between need for cognition and video game performance in male undergraduate volunteers. Also, computer-related self-efficacy has been found to be an important predictor of general use of technology (Czaja et al., 2006), with self-efficacy being a significant correlate of internet use in adults over 60 years of age (Erickson & Johnson, 2011). However, as Haidt and Rodin (1999) conclude, the adaptive synergy resulting from motivated behavior (such as need for cognition) in synch with self-efficacy or self-perceived competence also requires a tandem fit between individuals and supportive social systems. This will be further explored in section 4.3.2.

4.1.1 Need for cognition and purpose in life

Need for cognition alone was not enough to guarantee a stable level of high positive affect over time in recent retirement. This body of research indicates that for those higher in need for cognition to sustain positive affect in retirement, a self-chosen cognitively effortful task must not be just any generic thinking activity, but one of personal relevance and meaning to the individual, representing idiosyncratic purpose in life. In their 1982 article describing the development and validation of the need for cognition scale, Cacioppo and Petty credited its original conceptualization to previous scholars by citing Cohen, Stotland, and Wolfe's (1955, p. 291) definition of need for cognition as "a need to structure relevant situations in meaningful, integrated ways. It is a need to understand and make reasonable the experiential world". This early description of need for cognition is very much like that

of the innate need for competence as a need "to engage optimal challenges and experience mastery or effectance in the physical and social worlds" (Deci & Ryan, 2000, p. 252). However, in the early 1980's during the height of the cognitive revolution in psychology, when the need for cognition scale was operationalized and first tested, it was professed to primarily tap into "individuals' tendency to organize, abstract, and evaluate information" (Cacioppo & Petty, 1982, p.124). The eighteen items in the short form of the need for cognition scale were designed to load onto a single phenomenon intended to be predictive of how people deal with tasks and information (Cacioppo et al., 1984). This took the measurement tool in a direction away from its conceptual roots as a need for meaning-making. It has subsequently been used effectively and often in management and occupational psychology journals to show, for example, how a cognitive disposition interacts favourably with socio-cultural work environments to facilitate knowledge transfer (Ringberg & Reihlen, 2008) or in tests on forming judgements from cues in persuasion situations, deliberative vs. intuitive thinking, reliance on effortful analysis vs. low-effort processes, and many other aspects of social cognition and decision making of interest to marketing researchers (Petty et al., 2009). To be used as a measure of intrinsic motivation for knowledge in a more general context, for which it is also well suited, need for cognition is best paired with a purpose in life scale. Purpose-filled goals are essential to the maintenance of positive affect in retirement, while need for cognition is one effective mechanism for achieving and nurturing them.

For recently retired individuals higher in need for cognition who are experiencing a domain shift away from a work environment dominated by extrinsic demands into an unstructured daily environment where an intrinsic motivation for activity engagement is

needed, congruence between the needs for autonomy and competence (as embodied in need for cognition) and personally meaningful goals must either already exist or be newly developed. This is a time when the capacities for goal re-engagement and problem-focused coping become advantageous in conjunction with a dispositional tendency to enjoy cognitive challenge, as suggested by the results of Study 1. In the adjustment to retirement it may be necessary to consciously rebalance or recalibrate need satisfaction and appropriate activity goal choices, connecting the objects of goal pursuits with their personal meaning or purpose (Sheldon et al., 2004).

4.1.2 Need for cognition in social context

These overall results can also be interpreted using Vallerand's (1997) hierarchical model of intrinsic and extrinsic motivation which is anchored in self-determination theory. Both need for cognition and competence are representative of the "need for knowledge", one of three basic types of intrinsic motivation Vallerand defines. As a stable, trait-like tendency to engage in activities with an intrinsic orientation, need for cognition suitably reflects Vallerand's description of the global hierarchical level of generality. According to Vallerand's theory, the strength or effectiveness of a motivational disposition like need for cognition on outcome is influenced by the person's social or contextual domain, such that a shift from a work environment to a retirement life context can disrupt the top-down reach between global or trait level to the situational or immediate everyday level. There can also be recursive bottom-up influences, where accumulations of small daily need-satisfying experiences work up through the intermediary social context to either reinforce or hinder global well-being (Sheldon, 2002a; Vallerand & Ratelle, 2002), somewhat resonant with the

ancient Greek view of happiness as reflecting the totality of one's hedonic moments (Ryan & Deci, 2001).

When a life context prevents people from fulfilling their fundamental needs, amotivation with accompanying reduced well-being occurs (Vallerand, 1997). Thus, recent retirees higher in need for cognition who are more likely to have experienced previous contextual success in environments requiring effortful cognitive activity, as shown in Study 1, will face lowered positive affect if the context of retirement does not provide sufficient cognitive challenge with accompanying imbued meaning. Deci and Ryan (1985) examined what happens to intrinsic motivation in the complete absence of external pressure – as might occur in recent retirement - and they concluded that extrinsic motivation would have to be replaced by a different kind of purpose that feeds a person's energy and direction. In general, impoverished social circumstances leading to a lack of need fulfillment at any point in the lifespan results in ill-being, and research should focus on aspects of social environments that facilitate or impede the fulfillment of basic psychological needs (Ryan, 1998). How this impacts future retirement studies will be discussed in greater depth below.

4.1.3 Why low need for cognition levels predict increased positive affect in recent retirement

The research described in this thesis also shows that only retirees lower in both need for cognition and purpose at baseline showed a significant increase in positive affect over time, even though those scores remained significantly lower than their peers. This finding can be interpreted in the retirement context from several theoretical angles. First, it is helpful to recall Vallerand's distinctions between three types of intrinsic motivations as the tendencies 1) to know, 2) to experience stimulation, and 3) to achieve accomplishments.

Need for cognition is most obviously associated with the intrinsic tendency to know, but the intrinsic tendencies for stimulation and achievement are also relevant here. Cacioppo and colleagues (1996) report that need for cognition does correlate with the experience seeking ($r = .41$, $p < .05$) and thrill and adventure seeking ($r =. 31$, $p < .05$) subscales in a measure of curiosity (Olson, Camp & Fuller, 1984). Individuals who are lower in need for cognition are more likely, therefore, to be content without such challenges in recent retirement.

Another interpretation of the significant increase in positive affect over time for those lower in need for cognition is that such individuals have been shown as more likely to report stress or anxiety when faced with cognitively effortful or complex tasks (Cacioppo et al., 1996), and thus more likely to be relieved when free of job-related lifestyle demands. Preferring the simple to the complex, those lower in need for cognition are likely to report higher positive affect when involved with activities unrelated to cognitive effort. Need for cognition does not correlate with intrinsic motivation for interests and activities in non-cognitive domains such as the outdoors, animals, or sociability, for instance (Cacioppo et al., 1996). Retirees lower in need for cognition may have fewer achievement-related expectations, and have alternative motivational needs which are more readily met, leading them to report increasing levels of positive affect over time in retirement.

Yet another interpretation can be made through the optics of Ryan and Deci (2001)'s differentiation between the hedonic and eudaimonic perspectives of well-being. The eudaimonic orientation reflects well-being achieved through both happiness and meaningfulness, arising from self-actualization through the integration of the basic motivational needs for autonomy, competence and relatedness with goals pursued. A hedonic orientation more simply ensues from the pursuit of pleasure and the avoidance of

pain, representing positive affect as an accumulation of pleasant experiences. Although high purpose in life was necessary to sustain positive affect for those highest in need for cognition, this was not true for those lowest in need for cognition who report increasing positive affect over time in a context of low demand, few constraints, and sufficient access to hedonic pursuits. But for retirees who are higher in need for cognition, meeting goals in the service of personal pleasure alone may not provide sufficient satisfaction over time. For them, long term positive affect is best sustained by a combination of preferred activities and a strong sense of purpose in life, which represents a eudaimonic orientation. These results support the theoretical position that both hedonic pleasure arising from preferred activity pursuit, and eudaimonic well-being arising from pursuit of valued outcomes (through cognitive strategies and purpose in life), contribute to individual well-being differentially.

In distinguishing between hedonic and eudaimonic well-being, Ryan and Deci (2001) suggest that not only the nature of the motivational roots of chosen activity engagement be identified, but also that the operational definition of the outcome measure(s) of subjective well-being be examined along with consideration of relevant contextual, cultural and development factors. For an outcome measure in this longitudinal research, we found positive affect most strongly reflected the effects of need for cognition and other motivational variables. Previous path analyses showed that need for cognition does not directly relate to negative affect but rather to the presence or absence of positive affect (Bye & Pushkar, 2009), consistent with the metaphor provided by Cacioppo et al (1996) of low need for cognition being the relative absence of high need for cognition, just as cold is the relative absence of heat, or darkness the relative absence of brightness. Positive affectivity has been the most central element in composite indices of subjective well-being (Sheldon et

al., 2004; Lawton et al., 2002), and is often used as a primary component in the study of individual differences in psychological well-being (Deci & Moller, 2005). Positive affect itself does not differentiate between hedonic and eudaimonic forms of happiness, and it probably reflects a mixture of both. However, its time duration could be considered one indicator of its hedonic or eudaimonic origins, with short-term levels representing more immediate or proximate sources of pleasure and sustained long term levels representing a more distal and enduring sense of well-being.

In terms of the ability of the specific predictors we used in these studies to infer hedonic or eudaimonic causal states, purpose in life as an expression of self-perceived value in chosen activities is a eudaimonic orientation. Need for cognition reflects the dispositional components of conscientiousness and openness, and involves both enjoyment and effortful challenge combined, reflecting not only a hedonic orientation toward some chosen activities, but also the view that positive affect is a by-product of eudaimonic living rather than an end in itself (Ryan & Deci, 2001). However, for those low in need for cognition and purpose, alternative motive dispositions or basic need satisfaction maintain and increase subjective well-being over in recent retirement. Exploring a wider range of motive dispositions during this life transition requires further study.

4.2 Summary and interpretation of additional findings

Each of the two manuscripts in this thesis produced additional findings. The first study found that while those lower in need for cognition reported having retired primarily because of poor health or the physical demands of their previous job, those higher in need for cognition chose freedom to pursue personal interests as their most important reason for retirement. Such an intention is consistent with being strongly motivated by the intrinsic

needs for autonomy (self-determination) and competence (effectance-direction) in life decisions. Further comparisons showed that, over time, the high need for cognition group reported greater overall frequency of activity engagement, as would be expected of those who enjoy effortful cognitive interactions. These findings are consistent with other research showing high correlations between frequency and number of activities in older adults (Rousseau et al., 2005), as well as continuity in choice of activities over time (Pushkar et al., 2010).

An analysis of which specific activities were differentially performed by those higher and lower in need for cognition at time points two years apart revealed that the lower need for cognition group, consistent with their lower reported overall frequency of engagement, did not report differentially higher engagement levels in any specific activity. However, retirees higher in need for cognition reported greater frequency of involvement with creative activities and internet use at both test times, and greater frequency of giving help to family and friends at year two, replaced with greater frequency of formal volunteering at year four.

An alternative explanation for these relations between activity engagement and high need for cognition could be income, but the lack of significant correlations between cognitive activity frequency and income at either Year 2 or Year 4 suggests that this was not the case. However, there were correlations between prior occupation and frequency of cognitive activities ($r = .192$, $p < .01$ at both time points), leading to the inclusion of prior occupation as a covariate in the Study 1 analysis, where prior occupation did emerge as independently associated with frequency of cognitive activities over time. Considered in combination with the significant relation between higher need for cognition and more

cognitively demanding prior occupations, a continuous effect of high need for cognition on individuals' attraction toward effortful cognitive processing is supported, since those previously in more demanding professions are more cognitively active in recent retirement. Lifespan continuity theory (Kim & Moen, 2002) also predicts a spillover effect from an individual's past educational and work history to retirement life, reflecting the necessity for ongoing person-environmental fit. Additional theoretical support for this interpretation comes from the concept of "the long arm of the job" which was first introduced in the late 1920's to describe how skills and empowerment experienced at work will transfer advantageously to active community involvement through volunteering (Wilson & Musick, 1997). By re-directing the original concept's reach from concurrent extra-employment activities of choice to sequential post-employment activities, a case can be made for individuals' motivation to find fulfillment in retirement for some of the same needs previously met in the workplace. Those higher in need for cognition are more likely to volunteer within a structured context providing greater opportunities to engage in activities requiring initiative, thought, and competence. Since the 1950's, researchers have consistently reported that those from higher prestige status jobs are more likely to hold formal volunteer positions than those from lower status jobs (Wilson & Musick, 1997). Those whose previous employment has provided task complexity, self-directedness, autonomy, and leadership (like many who are higher in need for cognition) will seek to find similar characteristics in their retirement activities, rendering volunteering with organizations more attractive than unrecognized and restricted informal helping of others. Further study and policy development regarding the effective use and distribution of retired

individuals' high social and personal capital are needed to examine how workplace dynamics affect not only life *outside* work, but also life *after* work.

The correlations reported in Study 1 between higher need for cognition, higher levels of education, higher levels of prior social occupational prestige and higher frequency of cognitive activities in retirement form a coherent cluster of characteristics with implications for further study. Combined with the results of Study 2, they suggest that this profile of the recent retiree who is higher in need for cognition, purpose in life, and positive affect is an example of someone positioned on the self-determination continuum as "integrated". Integrated regulation describes the most autonomous form of extrinsically motivated behavior, where intrinsic and extrinsic motivations co-mingle in the person who has been able to harmonize external social values with internal needs and goals (Ryan & Deci, 2002). In those demonstrating integrated regulation, behavior is autonomous or volitional, consistent with intrinsic motivation, but performed for personally valued outcomes in addition to, or separate from, the flow emergent from basic competence need satisfaction. Recent retirees who are strong in the "organismic tendency toward actualization" could be seen as continuing to adapt well in the "dialectical interface" with the post-employment environment, to borrow terms from Ryan and Deci (2002, p. 8). These individuals appear to have educational and occupational histories demonstrating their ability to achieve congruence between needs and goals in varied environments; unless social or health restrictions to their meaningful need fulfillment block them, continuity theory predicts they will continue to thrive in retirement.

Consistent with this developing profile of recent retirees, Study 1 found that the higher need for cognition group also scored higher in two associated adaptive behavioral

strategies of problem-focused coping and goal re-engagement over time. Sheldon (2002a) discusses the necessity for pro-active implementation of skills similar to problem-focused coping and goal re-engagement when selecting self-concordant goals which are congruent with a person's internally perceived locus of causality. Pro-active coping requires effortful cognitive information gathering and planning (Carver et al., 1989) and goal re-engagement implies acceptance of novel ideas: both constructs represent aspects of those higher in need for cognition who are more likely to give their judgments wide and open-minded consideration before making decisions about future actions (Petty et al., 2009). Again, aspects of both the need for cognition and the self-determination literatures converge in this description of individuals most likely to report higher positive affect over time in recent retirement. Such individuals are examples of those who actively shape their experience in retirement through dynamic involvement in longitudinal developmental processes (Shultz & Wang, 2011). They successfully use adaptive behavioral strategies to position themselves authentically in a new role: Sheldon (2002b) calls this "role internalization" and specifies that it is mutually influenced by a) the person's autonomy orientation (i.e. need for cognition), and b) the level of support in the social environment. Establishing role internalization, or "finding oneself", in the context of recent retirement may also involve a variation on Caplan's (1987) person-environment fit, as suggested by Wang and Shultz (2010). Person-environment fit has been empirically tested under the banner of self-determination theory with other populations such as nursing home residents (O'Connor & Vallerand, 1994) and adolescent/young adult hockey players (Amiot et al., 2006). These studies have confirmed the importance of autonomy and competence-supportive social scaffolding to the positive affect of intrinsically motivated individuals.

4.3 Clinical and Social Policy Applications

4.3.1 Implications for Individual Counselling

Lowered subjective well-being in recent retirement can occur when the needs for autonomy and competence are not being sufficiently met. To address this circumstance, theory can inform practice to provide suggestions of specific applications to both individuals and professionals who are interested in the potential challenges unique to the early years of retirement.

The drop in positive affect emerging among retirees higher in need for cognition in Study 2 shows they are vulnerable in recent retirement, but at the same time they are by disposition more likely to be receptive to, and benefit from, interventions since they are most likely to exert effort in response to learning opportunities. Sheldon (2002b) administered self-regulatory tools to undergraduates hoping to raise their levels of self-concordance and goal attainment. It was found that only those who were already strong in self-concordance benefitted from interventions in the controlled experiment. Well-being is predicted by both a history of accumulated goal attainment (bottom-up) and the predisposition to pursue self-concordant goals (top-down) (Sheldon, 2002a), consistent with our findings that those higher in need for cognition reported higher socioeconomic prestige levels in previous employment as well as greater frequency and type of activity engagement in retirement. Such influences on subjective well-being outcome are similarly described in Vallerand's (1997) hierarchical model of motivation, where the contextual domain (i.e. life in recent retirement) is sandwiched between the global (dispositional) and situational (daily experience) levels of influence on individual motivation levels. Thus, building on recursive effects from other past and present life domains nurtures current motivational needs and

would be most likely to occur in those higher in need for cognition. In fact, the search to find motivationally rewarding activities in retirement to replace lost need satisfaction previously provided by employment conditions could be seen as an example of motivational compensation from one occupational domain to another (Vallerand & Ratelle, 2002), as when a former accountant takes on responsibility for handling the books for a charity organization, for example.

Knowing that we can capitalize on the notion that "the strong get stronger" indicates that an ideal target population would be those exemplified by the twenty percent of our sample excluded from Study 1 because they did not remain consistently high or low in their reported need for cognition over time. These apparently motivationally-ambivalent individuals would benefit most from a nudge toward repeated or prolonged episodes of effortful problem-solving to build a sense of competence and autonomy. Cacioppo and colleagues (1996) conceptualized need for cognition as reflecting a form of intrinsic motivation that could be developed or changed, primarily through the promotion of enjoyment emerging from effortful cognitive activity independent of intellectual ability. "It was interesting. It really got me thinking!" is the ideal response to an activity or event to be elicited from a retiree at any position on the need for cognition continuum, but especially for those at the higher end. Petty and colleagues (2009) report that individuals lower in need for cognition can be motivated toward greater cognitive effort when the situational circumstances are of sufficient personal relevance, consistent with our finding that purpose must accompany need for cognition for maximum benefit to well-being. It has also been found that the higher levels of effortful cognitive processing typical of individuals higher in need for cognition can be undermined by presenting them with information or messages

designed for people who do not like to think (Wheeler, Petty & Bizer, 2005). Thus, if need for cognition can be hampered or repressed, it can be encouraged and cultivated.

White (1959) described strategies for developing competence or sustaining effectance motivation which have not only opened many subsequent scholarly avenues, but also continue to apply in any context involving the interaction of an organism with its environment. The exploratory approach behaviors driven by curiosity, and the repeated playful encounters in the environment prescribed by White are much like Mannell's (1993) "high investment activities", Stebbins' (1998) "serious leisure", Vallerand and colleagues' (2003) "harmonious passion", or Csikszentmihalyi's (1990) "flow", all of which have received empirical support as predictors of psychological health benefits. Elements common to all are the directedness and persistence which lead to learning outcomes, active manipulation of the environment involving some degree of motor skill, a sense of industry, and optimal cognitive stimulation (White, 1959). Stimulus conditions which involve mild risk-taking, just the right amount of variability and novelty, and outcomes that have a real and meaningful effect on the environment are required. Interest and motivation will decrease when a situation has been explored to the point where it no longer offers new cognitive possibilities. With a potential decrease in social contacts from the loss of previous work friends and without an enforced daily structure, stimulus deprivation can become a problem in retirement. Targeting and pursuing appropriate idiographic goals in the early stages of retirement is not necessarily an automatic or easy process, and some recently retired people may benefit from motivational coaching.

Sheldon (2002a) offers practical suggestions in choosing goals concordant with one's sense of self or level and type of basic motivational need. To develop skill in selecting

concordant goals, he encourages people to follow these steps: 1) consciously identify a personal theme or purpose in life, a "why"; 2) distinguish between self- and other-generated interests and values, and; 3) select goals consistent with basic needs. With confidence that people can learn to perceive and integrate congruence between their chosen goals and personal purpose in life, begin by asking what is most important to the retired person's self, what is and has been "personologically valid" (p. 65) over the lifespan, then gather trait-like information about past and current interests, and then guide the search for complementary future long-term projects. Longitudinal increases in psychosocial well-being should follow from the establishment and pursuit of pro-active goals with intrinsic content. Similarly, Little's (1998) counseling modules have provided guidelines for enhancing well-being through the identification and development of meaningful personal projects in a number of ways. These modules have been used as a tool for easing a variety of developmental transitions people face, in such fields as occupational therapy and rehabilitation medicine, in organizational psychology, and in social policy planning. Giving or receiving help in prioritizing goals leading to personal projects helps confirm or re-direct the search for personal meaning as well as self-perceived competence in goal attainment.

From the influential body of research on "flow", the pleasurable experience which occurs as a function of an optimal relationship between challenges and skill, several pointers on finding flow activities are offered (Csikszentmihalyi, 1997). Consistent with the results of Study 2, activity circumstances permitting flow are characterized by harmony between their intrinsic motivational value and their meaningfulness to the person. To increase subjective well-being, Csikszentmihalyi suggests setting goals with clear objectives and rules for action, which include a forum for immediate and relevant feedback, and involve

activities of sufficient challenge. Both positive affect and increased developmental complexity and growth will emerge from learning new skills or honing expertise in existing ones, but only if personal meaning is embedded in the activity. People seldom report flow in passive leisure activities such as simply reading or watching television or videos for entertainment, consistent with the findings reported here in Study 1. As also emphasized in self-determination theory, integration of self with chosen goals is more important than specific goal content: it's the opportunity to satisfy basic motivational needs consonant with self which is paramount (Csikszentmihalyi, 1990; Omodei & Wearing, 1990). Further relevant practical techniques for enhancing personal creativity, a major component of need for cognition, can be found in Csikszentmihalyi's (1996) treatise on creativity.

After the important caveat about interindividual variability being the norm in retirement lifestyles, Weiss (2005) offers pragmatic suggestions for activity engagement in retirement. He encourages an equal mix of time spent in effortful engagement and freedom, optimized as a prescription for spending slightly less than half the week filled with obligations. From his qualitative observations, he has found that two days a week of part-time work, volunteering, organized activities, or informal caretaking provides best outcomes for most people in retirement. Consistent with Atchley's (2003) continuity theory, Weiss reports that activities which have proven self-fulfilling earlier in life will continue to be so, but one should not limit oneself to those alone. Weis also offers two warnings about retirement which are consistent with the motivation literature. First, a sense of purposelessness is to be actively guarded against, as is also indicated by the results of Study 2 herewith. Second, social isolation should be carefully avoided. Commitment to serious leisure, or appropriate levels of self-chosen activity engagement, helps resolve both

conditions of vulnerability. Whatever new activities are chosen, they should provide opportunities for feedback from others so that self-perceived competence is reinforced and contributions are acknowledged as meaningful. These suggestions imply a mix of intrinsic need fulfillment and extrinsic reinforcements, much like Deci & Ryan's (2000) fully self-determined "integrated" extrinsic motivation which shares an internal locus of control with intrinsic motivation but reflects the incorporation of social values over time. This leads to the importance of the cultural context within which individuals retire.

4.3.2 Social Policy Implications

Retirement is affected by the problem of structural lag (Riley & Riley, 1994), whereby out-dated cultural roles and norms institutionalized in social structures fail to keep pace in providing appropriate and meaningful opportunities. Employing the terminology of cognitive evaluation theory, current social attitudes toward retirement may not extrinsically *control* behavior to undermine intrinsic motivation, but they may not necessarily *support* or reinforce autonomy and competence. In accordance with cognitive evaluation theory, intrinsically motivated behaviors arising from need for cognition may suffer when controlling or instrumental events undermine competence. Whether competence feedback is self- or other-administered, it will decrease intrinsic motivation if it dictates specific expected outcomes rather than accepting a broad range of efficacy-affirming activities (Deci & Ryan, 1985). The imposition of goals which do not support basic motivational need satisfaction can lead to the pursuit of compensatory goals concomitant with risks to the individual's well-being (Ryan & Deci, 2002). Undue performance pressure toward inauthentic goals, or socially prescribed roles such as "this is what people in retirement should (or should not) be doing with their time" can contribute to reduced subjective well-

being. Freely chosen activity choices can't be mandated, but they should be readily available (i.e. Internet access with technical support, meaningful volunteer positions, mentoring and leadership roles). Likewise, either too much or too little competition or cognitive challenge would be detrimental to those higher in need for cognition. Social implications of incompetence can lead to a state of amotivation and reduced positive affect for retirees higher in need for cognition. Either the absence or the excess of performance-contingent rewards may create amotivation and lowered positive affect in retirement.

A complete lack of contingency between personal behavior and outcomes in the social environment also erodes healthy functioning (Deci & Ryan, 1985). Positive reinforcement from the social environment is necessary to the maintenance of competence motivation (Elliot & Dweck, 2005), intrinsic motivation (Deci & Ryan, 1985), the "integrated" person (Sheldon & Kasser, 1995), purpose in life (Little et al., 2002), and balanced fulfillment of the needs for autonomy, competence and relatedness (Sheldon & Niemiec, 2006), all of which are integral to positive affect. Verbal rewards and praise enhance intrinsic motivation, as does any effectance-relevant feedback that maintains retirees' experience of competent engagement through events or communications. Platforms allowing freedom and accessibility of choice in meaningful activity engagement of social as well as personal value will maximize the well-being of recently retired individuals.

The challenge is to provide societal scaffolding sufficient to allow opportunities for competence without constraining autonomy through over-controlling limits. Additionally, while structural policies are designed for categorical groups, it is the psychological meaning for the individual that affects motivation and affect. Any policies should be designed to protect freedoms rather than to impose implicit values or judgments. A classic example of

the difficulty implementing this is the dilemma faced by a naive 18-year-old cashier at the pharmacy who must establish whether or not an older adult customer is potentially eligible to benefit from the seniors' discount, and in doing so risks receiving either a pleased or indignant response depending on the customer's self-perception of aging.

To encourage conditions conducive to the enhancement of personal motivation in retirement, there must be widely-regarded social respect for the potential human capital of retirees. This support can be promoted in the same ways it is recommended at other stages in life: through assurances of freedom from rejection by others, freedom from indicators of incompetence, and freedom from excessive or unnecessary pressures (Deci & Ryan, 2000). The public perception of older adults in retirement must include their recognition as potentially valuable contributors to the Canadian Index of Wellbeing (2011), as they are participants in each of the major areas measured: leisure and culture, community vitality, living standards, environment, democratic engagement, education, healthy populations, and time use.

4.4 Strengths and Limitations

This longitudinal body of research was designed to extend previous cross-sectional findings that need for cognition plays an influential role in the subjective well-being of older adults through cognitive activity frequency and adaptive coping strategies (Bye & Pushkar, 2009). Study 1 used a high/low need for cognition median split to generate precise measureable differences between the two groups. This arbitrary method of creating dichotomous groups is often viewed as a clumsy practice because it incurs substantial measurement error; there can be losses of between one-fifth to two-thirds of the variance to be accounted for, and a concomitant loss of power when a continuous or graduated variable

is categorized into two discrete variables (Aiken & West, 1991; Cohen, 1983). Also, such a coarse categorization does not address within-group variability itself beyond the basic assumptions of normality; for example, it must be kept in mind that not everyone in the higher need for cognition group was equally high, nor was everyone in the lower group equally low. However, these points also indicate that when significant results do emerge from dichotomizing a continuous variable, they can be seen as reliable, and are probably under-powered. Regression analyses are often recommended as more powerful tests of continuous variables, but the research questions in Study 1 concerned differences between people as a function of their group membership rather than seeking how much variance in outcome was accounted for by need for cognition. In terms of producing a general profile of recent retirees who remain happier over time in retirement, it sufficed to allow meaningful group comparisons of multiple variables, and empirical support for differences between the groups emerged with sufficient clarity to provide directions for further study.

The structural design weakness of Study 1 may be offset by its descriptive contributions toward profiling a current cohort of recently retired individuals. It does not claim to be representative of all retirement cohorts, especially given unstable economic conditions and shifting institutional and organizational commitments to employees both pre- and post-retirement. Cohort effects really do represent a moving target due to the dynamics of social and historical change. The advantage of following any single cohort is that it yields a perfect correlation between time of measurement and age. However, Zelinski, Kennison, Watts and Lewis (2009) used a panel study to find long-term cohort effects in both mental and physical leisure activities participation, which would be expected due to shifting roles for older adults and changing economic conditions. To have been able to find such effects,

we would have had to extend our limited longitudinal study and introduce new age-matched cohorts at intervals, employing Schaie's (1996) suggested design of preference, a systematically layered combination of cross-sectional and longitudinal sequences. Instead, Study 1 simply offers clearly defined and reliable measures with data sufficient for replication and comparative use or inclusion in relevant meta-analyses.

Study 2 used a more sophisticated design to model trajectories of change in positive affect as a function of baseline levels of need for cognition, self-perceived competence and purpose in life. With hierarchical linear modeling (using HLM 6.0 software), it was possible to identify the effects of predictors at both the between- and within-person levels on positive affect over time, providing more finely tuned results than were possible when limited to the more static repeated measures design of Study 1. While the first study, without any cross-lag built into its structure, was only able to demonstrate correlational comparisons which inferred possible causal relations based on temporal sequencing, the second study was able to directly address causality, with individual differences in need for cognition, competence, and purpose at baseline predicting differential levels of positive affect across time.

The two studies share the same sampling limitations of selection and attrition issues which may have impacted the results despite our efforts to control for these issues. While the sample was representative of the available population of recently retired individuals, and met all assumptions for normal distribution in each demographic category, the results may not necessarily generalize to other recently retired populations. Sources of recruitment limited our sample to active retirees capable of travelling to our university labs, thus individual participants may be self-selected for higher physical and cognitive functioning which would influence their responses to the adaptive measures tested here. People with

higher levels of previous education or cognitively challenging former employment are more likely to feel comfortable entering the university environment of their own volition. Inclusion criteria for the study were restricted to control for definition of the term "retirement", therefore our results do not reflect people who were currently working part-time for more than ten hours a week, or who had not previously worked fulltime for at least twenty years in the same occupation until a short time prior to the study commencement. To control for attrition, these two studies used only data collected from those who remained with the larger study from Years Two to Four of its full four-year duration. Neither study includes data from the approximately 17% of original participants who dropped out along the way. Among the many reasons for attrition, it is possible that the very highest in need for cognition returned to work, disqualifying them from inclusion in these studies, or that the very lowest in need for cognition lost interest. Identifying reasons for attrition, and tracking study drop-outs would be an avenue for further study with future cohorts.

Careful consideration was given to the measures used in these studies. First, there are always concerns about the implicit bias of self-report measures, which, except for the test of cognitive ability (Trails A and B), were relied on in these studies. Despite the proven extensive psychometric reliability of the measures chosen, we cannot be certain that each participant's response contributes to the anticipated internal validity of a given measure. Second, although need for cognition has been shown to vary independently of demographic and lifestyle variables (Cacioppo et al., 1996), this research on a homogeneous population included age, gender, education, prior occupation, income, illness, stress, and cognitive ability to either control for or clarify their potential direct or indirect effects on the variables of theoretical interest. How these demographic and contextual variables were subsequently

used in each of the analyses was determined by the exigencies of the statistical methodologies employed. Study 1 used group comparison analyses, where the dichotomous variable of gender was controlled for by including it as a covariate in all analyses, while personal or contextual lifestyle continuous variables were included as covariates if they correlated significantly with either need for cognition or the outcome measure in each analysis. In Study 2, all demographic and contextual variables were entered into the model for control purposes such that resulting amounts of variance explained by need for cognition, self-perceived competence, or purpose in life would occur over and above any of those personal characteristics. As a result, while this research lacks detailed theoretical justification for the initial inclusion of each specific demographic variable, it provides a broad and thorough empirical description of the lifestyles of this sample of recent retirees. Perhaps such descriptive rigor should be mandatory in all studies which observe and explain an ever-shifting boundary between work and retirement to facilitate comparative meta-analyses across cohorts (Ekerdt, 2010).

4.5 Future Directions

These studies, showing how need for cognition produces positive affect in older adults, especially when accompanied by personally meaningful goal opportunities, are informed by two research traditions that converge in this novel application to recently retired individuals, those of need for cognition and the self-determination theory of motivation. To test the viability of combining these independently developed theoretical perspectives, future studies could be designed which administer both the need for cognition scale and a basic psychological need satisfaction in life scale to confirm that need for cognition does, in fact, share psychometric properties with the needs for autonomy and

competence as operationalized by self-determination researchers. Then need for cognition could be seen not just as theoretically associated with, but also as empirically representative of aspects of, Deci and Ryan's (1985) cognitive evaluation theory. It may be that need for cognition picks up on complementary facets of competence or autonomy that the more general self-determination measures do not, or that it can be shown to be more specifically appropriate or useful in the current context of the information technology age. Likewise, measuring flow or harmonious passion in conjunction with need for cognition, activities and affective outcome longitudinally might further inform the process leading to well-being in recently and/or not-so-recently retired older adults.

Additionally, self-determination theory posits relatedness as the other basic need accompanying autonomy and competence, and these three needs are best experienced in equally balanced fulfillment, according to Sheldon & Niemiec (2006). This assertion should be challenged in a community-based older adult sample, using need for cognition in conjunction with various social interaction measures. Need for cognition itself would not be expected to share variance with measures of relatedness; however, it is possible that the testing battery for a comprehensive psychological profile of maximal subjective well-being in healthy retirement would need to include a social motivation component to fully represent all needs. Deci & Ryan (2008) have said that relatedness plays a more distal role in the promotion of intrinsic motivation than autonomy and competence, but at the same time it has been less well studied. Fulfillment of the three needs for autonomy, competence and relatedness could be the motivational recipe for the prescribed triumvirate of physical mobility, cognitive activity, and social well-being in older adulthood, but to what degree and in what ratios will this vary from person to person? Are there indicators embedded in

motivational orientations that allow us to predict how to better understand and recommend circumstances for optimal individual person-environment fit? These questions could provide the rationale for field studies of retired individuals, especially those involving the development of congruent need-goal opportunities following baseline evaluations which identify target needs. Such studies might alternatively consider the relation between short term activity goals and more distal goals which involve purpose in life. If balanced satisfaction of basic needs is a requirement for psychological well-being across the lifespan, then building a standard battery of motivational measures with prognostic value for use at any developmental transition would provide a reusable tool capable of reflecting both intra- and interindividual growth across time. Further studies are needed to either disentangle or associate motivational needs and trait tendencies. This direction is implied by Sheldon's (2004) treatise outlining an integrated multi-level perspective on optimal human being, as well as by his proposed two-process model (Sheldon, 2011) which distinguishes between needs as motives (i.e. need for cognition) and needs as requirements (i.e. autonomy, competence and relatedness).

Further studies would be useful in determining the degree to which levels of need for cognition and purpose in life can be manipulated, and whether such interventions would have short-term or long-term effects on well-being. Follow-up studies might also test the effectiveness of interventions to help individuals move along the self-determination continuum from extrinsic to more intrinsic need satisfactions, or from an external to an internal locus of control uniquely expressed in the context of the adjustment to retirement.

The incidental findings from Study 1 regarding internet use by those higher in need for cognition suggest one possible structural contribution toward what Heckhausen (2005,

p. 241) has called a weakness in the "societal scaffolding of intellectual and vocational capacities" for retired individuals. Internet advice sites staffed part-time by recent retirees screened for various occupational skills could be designed to answer questions submitted by currently employed younger workers in a safe, anonymous, quality-controlled on-line venue. Such a volunteer project ("ask a retired -----") would attract those retirees higher in need for cognition willing to capitalize on their knowledge and expertise acquired during previous working decades in a given field. They would, in turn, receive feedback through interactive messaging, maintain a sense of effectance and purpose without undue pressure, and experience the performance-contingent reward of seeing their "advice" or response presented in a respected structured context. Similar meaning-directed internet activities can provide some of the social conditions which support the fulfillment of basic needs in a responsive environment without controlling tones, as Erickson and Johnson (2011) found in their community-based sample of adults over 60 years of age. This would provide optimal challenge and positive feedback in a social context which would enhance intrinsic motivation by promoting perceived competence. Properly marketed as a structured knowledge transfer opportunity, it would encourage mutually beneficial inter-generational support and provide basic need fulfillment.

4.6 Conclusion

The larger goal of this body of research was to test a hypothesized profile of older adults more likely to be happy in the early years of retirement. Both Study 1 and Study 2 demonstrated how need for cognition predicts positive affect longitudinally in recent retirees by helping to fulfill a basic dispositional need in older adults who enjoy effortful cognitive activities. Study 1 found that those who are higher in need for cognition report

freedom to pursue their own interests as a primary reason for retirement; are subsequently more active in a variety of cognitively challenging activity pursuits compatible with their strong need for cognition (especially those involving creative pursuits, internet use, and volunteering); and tend toward higher accompanying levels of the adaptive behavioral strategies of problem-focused coping and goal re-engagement. Study 2 revealed that recent retirees higher in either need for cognition, self-perceived competence, or purpose in life reported higher levels of positive affect at baseline; however, those initially higher in either need for cognition or purpose showed a significantly sharper drop in positive affect than their retirement peers over the next two years, possibly indicating the absence of sufficient social and occupational scaffolding within the context of retirement. Recently retired individuals reporting higher levels of both need for cognition and purpose reported highest stable continuing positive affect over time. With need for cognition providing the energizing of behavior, and purpose in life providing the direction of behavior, together they demonstrate the classic definition of human motivation. Interpreting these results through self-determination theory, we can say that such older adults are examples of people with well-integrated self-regulatory styles.

To experience sustained well-being, retired individuals who are higher in need for cognition need to have purpose in life as well as support for their basic human needs for autonomy and competence through cognitive challenge. Thus, when using the need for cognition scale as an assessment tool for predictive purposes in a wider social domain such as the context of retirement, it would be beneficial to pair it with a meaning or purpose in life measure, as congruence between innate needs and appropriate idiosyncratic goal pursuit appears to enhance the motivational process leading to positive affect.

References

Aiken, L.S. & West, S.G. (1991). *Multiple regression: Testing and interpreting interactions.* Thousand Oaks, CA: Sage Publications.

Amichai-Hamburger, Y., Kaynar, O., & Fine, A. (2007). The effects of need for cognition on internet use. Computers in Human Behavior, 23, 880-891. DOI: 10.1016/j.chb.2006.03.002

Amiot, C.E., Vallerand, R.J., & Blanchard, C.M. (2006). Passion and psychological adjustment: A test of the person-environment fit hypothesis. *Personality and Social Psychology Bulletin, 32,* 220-229. DOI:10.1177/0146167205280250

Anderson, M.H. (2007). Social networks and the cognitive motivation to realize network opportunities: A study of managers' information gathering behaviors. *Journal of Organizational Behavior, 29, 51*-78. DOI: 10.1002/job.459

Atchley, R. C. (2003). Why most people cope well with retirement. In J.L. Ronch & J.A. Goldfield (Eds.), *Mental wellness in aging: Strengths-based approaches* (pp. 123-138). Baltimore: Health Professions.

Bandura, A. (1997). Self efficacy: The exercise of control. New York: Freeman.

Bauer, D. J., Preacher, K.J., & Gil, K.M. (2006). Conceptualizing and testing random indirect effects and moderated mediation in multilevel models: New procedures and recommendations. *Psychological Methods, 11,* 142-263. DOI:10.1037/1082-989X.11.2.142

Binet, A (2010). Want to boost your networth? Live in a mid-sized city. *Globe and Mail, Globe Investor, Report on Business,* July 14th. Copyright 2010 CTVglobemedia Publishing Inc.

Brown, C. A., McGuire, F. A., & Voelkl, J. (2008). The link between successful aging and serious leisure. *International Journal of Aging and Human Development, 66,* 73-95. DOI:10.2190/AG.66.1.d

Bye, D. & Pushkar, D. (2009). How need for cognition and perceived control are differentially linked to emotional outcomes in the transition to retirement. *Motivation and Emotion, 33,* 320-332. DOI:10.1007/s11031-009-9135-3

Cacioppo, J. T. & Petty, R. E. (1982). The need for cognition. *Journal of Personality and Social Psychology, 42*, 116-131. DOI:10.1037/0022-3514.42.1.116

Cacioppo, J. T., Petty, R. E., Feinstein, J. A. & Jarvis, W. B. G. (1996). Dispositional differences in cognitive motivation: The life and times of individuals varying in need for cognition. *Psychological Bulletin, 119*, 197-253. DOI:10.1037/0033-2909.119.2.197

Cacioppo, J. T., Petty, R. E., & Kao, C. F. (1984). The efficient assessment of need for cognition. *Journal of Personality Assessment, 48,* 306-307. DOI:10.1207/s15327752jpa4803_13

Canadian Index of Wellbeing (2011). Retrieved January 6, 2012. http://ciw.ca/en/

Caplan, R.D. (1987). Person-environment fit theory and organizations: Commensurate dimensions, times perspectives, and mechanisms. *Journal of Vocational Behavior, 31,* 248-267.

Carnevale, J.J., Inbar, Y., & Lerner, J.S. (2011). Individual differences in need for cognition and decision-making competence among leaders. *Personality and Individual Differences, 51,* 274-278. DOI:10.1016/j.paid.2010.07.002

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology, 56,* 267-283. DOI:10.1037/0022-3514.56.2.267

Cohen, J. (1983). The cost of dichotomization. *Applied Psychological Measurement* 1983 7(3): 249-253. DOI: 10.1177/014662168300700301

Cohen, A.R., Stotland, E., & Wolfe, D.M. (1955). An experimental investigation of need for cognition. *Journal of Abnormal and Social Psychology, 51(2),* 291-294.

Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience.* NY: Harper and Row.

Csikszentmihalyi, M. (1996). *Creativity: Flow and the psychology of discovery and invention.* New York: Harper Collins.

Csikszentmihalyi, M. (1997). *Finding flow: The psychology of engagement with everyday life.* New York: Basic Books.

Csikszentmihalyi, M., Abuhamdeh, S., & Nakamura, J. (2005). Flow. In A.J. Elliot & C.S. Dweck (Eds.), *Handbook of competence and motivation* (pp.598-608). New York: Guilford.

Czaja, S., Charness, N., Fisk, A., Hertzog, C., Nair, S., Rogers, W., et al. (2006). Factors predicting the use of technology: Findings from the Center for Research and Education on Aging and Technology Enhancement (CREATE). *Psychology and Aging, 21(2),* 333-352. DOI: 10.1037/0882-7974.21.2.333

Day, E.A., Espejo, J., Kowollik, V., Boatman, P.R., & McEntire, L.E. (2007). Modeling the links between need for cognition and the acquisition of a complex skill. *Personality and Individual Differences, 42,* 201-212. DOI: 10.1016/j.paid.2006.06.012

Deci, E. L., & Moller, A. C. (2005). The concept of competence: A starting place for understanding intrinsic motivation and self-determined extrinsic motivation. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp.579-597). New York: Guilford.

Deci, E.L., & Ryan, R.M. (1985). *Intrinsic motivation and self-determination in human behavior.* New York: Plenum Press.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11,* 227-268. DOI:10.1207/S15327965PLI1104_01

Deci, E. L. & Ryan, R. M. (2002). Handbook of self-determination research. NY: University of Rochester Press.

Deci, E.L., & Ryan, R.M. (2008). Facilitating optimal motivation and psychological well-being across life's domains. *Canadian Psychology, 49 (1),* 14-23. DOI:10.1037/0708-5591.49.1.14

Dickhauser, O., & Reinhard, M.-A. (2009). How need for cognition affects the formation of performance expectancies at school. Social Psychology Education, 12, 385-395. DOI: 10.1007/s11218-008-9084-9

Diener, E., Lucas, R. & Scollon, C.N. (2006). Beyond the hedonic treadmill: Revising the adaptation theory of well-being. *American Psychologist, 61(4),* 305-314. DOI: 10.1037/0003-066X.61.4.305

Diener, E., Lucas, R., Schimmack, U., & Helliwell, J. (2009). *Well-being for public policy.* New York: Oxford University Press. DOI:10.1093/acprof:oso/9780195334074.001.0001

Ekerdt, D.J. (1986). The busy ethic: Moral continuity between work and retirement. *The Gerontological Society of America, 26(3),* 239-244.

Ekerdt, D. J. (2010). Frontiers of research on work and retirement. *Journal of Gerontology: Social Sciences, 65B,* 69-80. DOI:10.1093/geronb/gbp109

Elliot, A.J., & Dweck, C.S. (Eds.) (2005). *Handbook of competence and motivation.* New York: Guilford Press.

Elliot, A.J., McGregor, H.A., & Thrash, T.M. (2002). The need for competence. In E.L. Deci & R.M. Ryan (Eds.), *Handbook of self-determination research* (pp. 361-387). Rochester, NY: University of Rochester Press.

Erickson, J., & Johnson, G.M. (2011). Internet use and psychological wellness during later adulthood. *Canadian Journal on Aging/La Revue canadienne du vieillissement, 30(2),* 197-209. DOI: 10.1017/S0714980811000109

Fernandez-Ballesteros, R. (2006). GeroPsychology: An applied field for the 21st century. *European Psychologist, 11(4),* 312-323. doi:10.1027/1016-9040.11.4.312

Fleischauer, M., Enge, S., Brocke, B., Ullrich, J., Strobel, A., & Strobel, A. (2010). Same or different? Clarifying the relationship of need for cognition to personality and intelligence. *Personality and Social Psychology Bulletin 36(1),* 82-96. DOI:10.1177/0146167209351886

Floyd, F. J., Haynes, S. N., Doll, E. R., Winemiller, D., Lemsky, C., Burgy, T.M., Werle, M., & Heilman, N. (1992). Retirement Satisfaction Inventory. *Psychology and Aging, 7*, 609-621. DOI:10.1037/0882-7974.7.4.609

Fouts, G.T. (1989). Television use by the elderly. *Canadian Psychology, 30(3),* 568-577.

Fredrickson, B. L. (1998). What good are positive emotions? *Review of General Psychology, 2,* 300-319. DOI: 10.1037/1089-2680.2.3.300

Ganzeboom, H. B. G., & Treiman, D. J. (1996). Internationally comparable measures of occupational status for the 1988 international standard classification of occupations. *Social Science Research, 25*, 201-239. DOI:10.1006/ssre.1996.0010

Hagger, M.S., Chatzisarantis, N.L.D., & Harris, J. (2006). From psychological need satisfaction to intentional behavior: Testing a motivational sequence in two behavioral contexts. *Personality and Social Psychology Bulletin, 32,* 131-148. DOI: 10.1177/014616720579905

Haidt, J., & Rodin, J. (1999). Control and efficacy as interdisciplinary bridges. *Review of General Psychology, 3(4),* 317-337. DOI:10.1037/1089-2680.3.4.317

Haug, S., Meyer, C., Ulbricht, S., Gross, B., & Rumpf, H.-J. (2010). Need for cognition as a predictor and a moderator of outcome in a tailored letters smoking cessation intervention. *Health Psychology, 29(4),* 367-373. DOI: 10.1037/a0019450

Hebb, D.O. (1949). *The organization of behavior.* New York: Wiley.

Heckhausen, J. (2005). Competence and motivation in adulthood and old age: Making the most of changing capacities and resources. In A.J. Elliot & C.S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 240-256). New York: Guilford.

Heckhausen, J., & Schulz, R. (1995). A life-span theory of control. *Psychological Review, 102 (2),* 284-304.

Heckhausen, J. Wrosch, C., & Schulz, R. (2010). A motivational theory of life-span development. *Psychological Review, 117(1),* 32-60. DOI: 10.1037/a0017668

Hertzog, C., Kramer, A. F., Wilson, R. S., & Lindenberger, U. (2009). Enrichment effects on adult cognitive development: Can the functional capacity of older adults be preserved and enhanced? *Psychological Science in the Public Interest, 9,* 1-65.

Hobfoll, S.E. (2002). Social and psychological resources and adaptation. *Review of General Psychology, 6(4),* 307-324. DOI: 10.1037//1089-2680.6.4.307

Izard, C. E. (1977). *Human emotions.* New York: Plenum.

Kahneman, D., & Deaton, A. (2010). High income improves evaluation of life but not emotional well-being. *Proceedings of the National Academy of Sciences, 107,* 16489-16493. DOI:10.1073/pnas.1011492107

Kashdan, T. B. & Steger, M. F. (2007). Curiosity and pathways to well-being and meaning in life: Traits, states, and everyday behaviors. *Motivation and Emotion, 31,* 159-173. DOI: 10.1007/s11031-007-9068-7

Kasser, T. & Ryan, R.M. (1993). A dark side of the American dream: Correlates of financial success as a central life aspiration. *Journal of Personality and Social Psychology, 65(2),* 410-422.

Kasser, T. & Ryan, R.M. (1996). Further examining the American dream: Differential correlates of intrinsic and extrinsic goals. *Personality and Social Psychology Bulletin, 22(3),* 280-287. DOI: 10.1177/0146167296223006

Kaynar, O., & Amichai-Hamburger, Y. (2008). The effect of need for cognition on internet use revisited. *Computers in Human Behavior, 24,* 361-371. DOI: 10.1016/j.chb.2007.01.033

Kim, J.E., & Moen, P. (2002). Retirement transitions, gender, and psychological well-being: A life-course, ecological model. *Journal of Gerontology: Psychological Sciences, 57B (3),* 212-222.

Kirkland, R.A., Karlin, N.J., Stellino, M.B., & Pulos, S. (2011). Basic psychological needs satisfaction, motivation, and exercise in older adults. *Activities, Adaptation & Aging, 35,* 181-196. DOI: 10.1080/01924788.2011.596764

Kruglanski, A. W., Bélanger, J. J., Chen, X., Köpetz, C., Pierro, A., Mannetti, L. (2012). The energetics of motivated cognition: A force-field analysis. *Psychological Review, 119(1),* 1-20. DOI: 10.1037/a0025488

Lampinen, P., Heikkinen, R. L., Kauppinen, M., & Heikkinen, E. (2006). Activity as a predictor of mental well-being among older adults. *Aging and Mental Health, 10,* 454-466. DOI:10.1080/13607860600640962

Lawton, M. P. (1994). Personality and affective correlates of leisure activity participation by older people. *Journal of Leisure Research, 26*, 138–157.

Lawton, M. P., Moss, M. S., Winter, L., & Hoffman, C. (2002). Motivation in later life: Personal projects and well-being. *Psychology and Aging, 17,* 539-547. DOI:10.1037/0882-7974.17.4.539

Leung, L. (2010). Effects of internet connectedness and information literacy on quality of life. *Social Indicators Research, 98,* 273-290. DOI:10.1007/s11205-009-9539-1

Little, B.R. (1998). Personal project pursuit: Dimensions and dynamics of personal meaning. In P.T.P. Wong & P.S. Fry (Eds.), *The human quest for meaning: A handbook of psychological research and clinical applications* (pp. 193–212). New Jersey: Lawrence Erlbaum Associates.

Little, T.D., Hawley, P.H., Henrich, C.C., & Marsland, K.W. (2002). Three views of the agentic self: A developmental synthesis. In E.L. Deci & R.M. Ryan (Eds.), *Handbook of self-determination research* (pp. 389-404). Rochester, NY: University of Rochester Press.

Lord, K.R., & Putrevu, S. (2006). Exploring the dimensionality of the need for cognition scale. *Psychology & Marketing, 23(1):* 11-34. DOI: 10.1002/mar.20108

Mannell, R. C. (1993). High-investment activity and life satisfaction among older adults: Committed, serious leisure, and flow activities. In: Kelly JR (ed.) *Activity and aging: Staying involved in later life* Newbury Park, CA: Sage, 125-145.

Maslow, A.H. (1954). *Motivation and personality.* New York: Harper.

Mein, G., Martikainen, P., Hemingway, H., et al. (2003). Is retirement good or bad for mental and physical health functioning? Whitehall II longitudinal study of civil servants. *Journal of Epidemiology and Community Health,* 57, 46-49. DOI:10.1136/jech.57.1.46

Michelson, W. (2010). What makes an activity most enjoyable? Alternative ways of measuring subjective aspects of time-use. *Social Indicators Research* 99: Online First™, 14 August 2010.

Moen, P. & Fields, V. (2001). *Midcourse* in the United States: Does unpaid community participation replace paid work? *Ageing International, 27(3),* 21-48. DOI: 10.1007/s12126-003-1001-0

Nair, K. U., & Ramnarayan, S. (2000). Individual differences in need for cognition and complex problem solving. *Journal of Research in Personality, 34,* 305-328. DOI:10.1006/jrpe.1999.2274

Nimrod, G. (2007). Retirees' leisure: Activities, benefits, and their contribution to life satisfaction. *Leisure Studies, 26,* 65-80. DOI: 10.1080/02614360500333937

Nimrod, G., Janke, M. C., & Kleiber, D. A. (2009). Expanding, reducing, concentrating and diffusing: Activity patterns of recent retirees in the United States. *Leisure Sciences, 31,* 37-52. DOI: 10.1080/01490400802558087

Nolen-Hoeksema, S., & Rusting, C.L. (1999). Gender differences in well-being. In D. Kahneman, E. Diener, & N. Schwarz (Eds.) *Well-being: The foundations of hedonic psychology* (pp. 330-350). New York: Russell Sage Foundation.

O'Connor, B.P., & Vallerand, R.J. (1994). Motivation, self-determination, and person-environment fit as predictors of psychological adjustment among nursing home residents. *Psychology and Aging, 9 (2),* 189-194.

Olson, K., Camp, C., & Fuller, D. (1984). Curiosity and need for cognition. *Psychological Reports, 54,* 71-74.

Omodei, M.M., & Wearing, A.J. (1990). Need satisfaction and involvement in personal projects: Toward an integrative model of subjective well-being. *Journal of Personality and Social Psychology, 59(4),* 762-769.

Ong, A. D., Bergeman, C. S., Bisconti, T. L., & Wallace, K. A. (2006). Psychological resilience, positive emotions, and successful adaptation to stress in later life. *Journal of Personality and Social Psychology, 91,* 730-749. DOI:10.1037/0022-3514.91.4.730

Payne, B.R., Jackson, J.J., Noh, S.R., & Stine-Morrow, E.A.L. (2011). In the zone: Flow state and cognition in older adults. *Psychology and Aging, 26(3),* 738–743. DOI: 10.1037/a0022359

Petty, R. E., Brinol, P., Loersch, C., & McCaslin, M. J. (2009). The need for cognition. In: M. R. Leary and R. H. Hoyle (eds.) *Handbook of individual differences in social behavior* (pp. 318-329). New York: Guilford Press.

Petty, R.E., & Cacioppo, J.T. (1984). The effects of involvement on response to argument quantity and quality: Central and peripheral routes to persuasion. *Journal of Personality and Social Psychology, 46,* 69-81.

Piaget, J. (1952). *The origins of intelligence in children.* New York: International University Press.

Pinquart, M., & Schindler, I. (2007). Changes of life satisfaction in the transition to retirement: A latent-class approach. *Psychology and Aging, 22,* 442–455.

Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interaction effects in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics*, *31*, 437-448.

Prentice, D.A. & Miller, D.T. (1998). When small effects are impressive. In A.E. Kazdin (Ed.), *Methodological Issues and Strategies in Clinical Research (2nd Ed.)* (pp.163-173).Washington, DC: APA Press.

Pushkar, D., Arbuckle, T., Conway, M., Chaikelson, J., & Maag, U. (1997). Everyday activity parameters and competence in older adults. *Psychology and Aging, 12,* 600-609. DOI:10.1037/0882-7974.12.4.600

Pushkar, D., Basevitz, P., Conway, M., Mason, S., and Chaikelson, J. (2003). Emergent values and the experience of aging. *Journal of Adult Development, 10,* 249-259. DOI:10.1023/A:1026059511043

Pushkar, D., Chaikelson, J., Conway, M., Etezadi, J., Giannopoulus, C., Li, K., & Wrosch, C. (2010). Testing continuity and activity variables as predictors of positive and negative affect in retirement. *Journal of Gerontology: Psychological Sciences,65B(1)*,42-49. DOI:10.1093/geronb/gbp079.

Raudenbush, S.W., Bryk, A.S., Cheong,Y.K., & Congdon, R.T. (2004). *HLM: Version 6.* Chicago: Scientific Software International.

Reeve, J. (2008). *Understanding motivation and emotion.* Hoboken, NJ: John Wiley & Sons.

Reeve, J., & Deci, E.L. (1996). Elements of the competitive situation that affect intrinsic motivation. *Personality and Social Psychology Bulletin, 22(1),* 24-33.

Reis, H.T., Sheldon, K.M., Gable., S.L., Roscoe, J., & Ryan, R.M. (2000). Daily well-being: The role of autonomy, competence, and relatedness. *Personality and Social Psychology Bulletin, 26(4),* 419-435.

Reitan, R. M. (1958). Validity of the Trail Making Test as an indicator of organic brain damage. *Perceptual and Motor Skills, 8,* 271-276.

Renninger, K.A., Hidi, S., & Krapp, A. (Eds.) (1992). *The role of interest in learning and development.* Hillsdale, NJ: Lawrence Erlbaum.

Riley, M.W., & Riley, J.W. (1994). Structural lag: Past and future. In M.W. Riley, R.L. Kahn, & A. Foner (Eds.), *Age and structural lag* (pp. 15-36). New York: Wiley-Interscience.

Ringberg, T., & Reihlen, M. (2008). Towards a socio-cognitive approach to knowledge transfer. *Journal of Management Studies, 45(5),* 912-935. DOI: 10.1111/j.1467-6486.2007.00757.x

Rousseau, F., Pushkar, D., & Reis, M. (2005). Dimensions and predictors of activity engagement: A short-term longitudinal study. *Activities, Adaptation and Aging, 29,* 11-33. DOI:10.1300/J016v29n02_02

Rowe, J.W., & Kahn, R.L. (1998). *Successful Aging.* New York: Pantheon Books.

Ryan, R.M. (1998). Commentary: Human psychological needs and the issues of volition, control, and outcome focus. In J. Heckhausen & C.S. Dweck (Eds.), *Motivation and self-regulation across the lifespan* (pp.114-133). New York: Cambridge University Press. DOI:10.1017/CBO9780511527869.006

Ryan, R.M., & Deci, E.L. (2000a). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55 (1),* 68-78. DOI: 10.1037//0003-066X.55.1.68

Ryan, R.M., & Deci, E.L. (2000b). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25,* 54-67. DOI:10.1006/ceps.1999.1020

Ryan, R.M., & Deci, E.L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. Annual Review of Psychology, 52, 141-166. DOI:10.1146/annurev.psych.52.1.141

Ryan, R.M., & Deci, E.L. (2002). Overview of self-determination theory: An organismic dialectical perspective. In E.L. Deci & R.M. Ryan (Eds.), *Handbook of self-determination research* (pp. 3-33). Rochester, NY: University of Rochester Press.

Ryan, R.M., Sheldon, K.M., Kasser, T., & Deci, E.L. (1996). All goals are not created equal: An organismic perspective on the nature of goals and their regulation. In P.M. Gollwitzer & J.A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp.7-26). New York: Guilford.

Sánchez-Cubillo, I., Periáñez, J.A., Adrover-Roig, D., Rodríguez-Sánchez, J.M., Ríos-Lago, M., Tirapu, J. & Barceló, F. (2009). Construct validity of the Trail Making Test: Role of task-switching, working memory, inhibition/interference control, and visuomotor abilities. *Journal of the International Neuropsychological Society, 15,* 438-450. DOI:10.1017/S1355617709090626

Sansone, C., & Harackiewicz, J.M. (Eds.) (2000). *Intrinsic and extrinsic motivation: The search for optimal motivation and performance.* New York: Academic Press.

Schaie, K.W. (1996). *Intellectual development in adulthood: the Seattle Longitudinal Study*. New York: Cambridge University Press.

Scheier, M.F., Wrosch, C., Baum, A., Cohen, S., Martire, L.M., Matthews, K.A., Schulz, R., & Zdaniuk, B. (2006). The life engagement test: Assessing purpose in life. *Journal of Behavioral Medicine, 29(3),* 291- 298. DOI: 10.1007/s10865-005-9044-1

Schimmack, U. (2008). The structure of subjective well-being. In: Eid M and Larsen RJ (eds.) *The science of subjective well-being.* New York: Guilford Press, 97-123.

Schimmack, U., & Oishi, S. (2005). The influence of chronically and temporarily accessible information on life satisfaction judgments. *Journal of Personality and Social Psychology, 89 (3),* 395–406. DOI: 10.1037/0022-3514.89.3.395

Schonfield, D. (1973). Future commitments and successful aging. I. The random sample. *Journal of Gerontology, 28,*189-196.

See, Y. H. M., Petty, R. E., & Evans, L. M. (2009). The impact of perceived message complexity and need for cognition on information processing and attitudes. *Journal of Research in Personality, 43,* 880-889. DOI:10.1016/j.jrp.2009.04.006

Seligman, M.E.P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist, 55,* 5-15. DOI: 10.1037//0003-066X.55.1.5

Sevenants, A., Verschueren, N., Schaeken, W. (2011). The contribution of cognitive style, cognitive abilities and expertise to the solving of complex problems. Cogsci. Boston, July 21-23, 2011. http://palm.mindmodeling.org/cogsci2011/papers/0793/index.html

Sheldon, K. M. (2002a). The self-concordance model of healthy goal striving: When personal goals correctly represent the person. In E.L. Deci & R.M. Ryan (Eds.), *Handbook of self-determination research* (pp. 65-86). Rochester, NY: University of Rochester Press.

Sheldon, K.M. (2002b). Personal goals and psychological growth: Testing an intervention to enhance goal attainment and personality integration. *Journal of Personality*, 70(1), 5-31.

Sheldon, K.M. (2004). *Optimal human being: An integrated multi-level perspective.* Mahwah, NJ: Lawrence Erlbaum Associates.

Sheldon, K.M. (2009). Providing the scientific backbone for positive psychology: A multi-level conception of human thriving. *Psychological Topics 18(2),* 267-284.

Sheldon, K.M. (2011). Integrating behavioral-motive and experiential-requirement perspectives on psychological needs: A two-process model. *Psychological Review, 118(4),* 552-569.

Sheldon, K.M., & Elliot, A.J. (1999). Goal striving, need-satisfaction, and longitudinal well-being: The Self-Concordance Model. *Journal of Personality and Social Psychology, 76,* 482-497. DOI:10.1037/0022-3514.76.3.482

Sheldon, K. M., & Kasser, T. (1995). Coherence and congruence: Two aspects of personality integration. *Journal of Personality and Social Psychology, 68,* 531-543. DOI:10.1037/0022-3514.68.3.531

Sheldon, K.M., & Kasser, T. (1998). Pursuing personal goals: Skills enable progress, but not all progress is beneficial. *Personality and Social Psychology Bulletin, 24,* 1319-1331. DOI: 10.1177/01461672982412006

Sheldon, K.M., & Niemiec, C.P. (2006). It's not just the amount that counts: Balanced need satisfaction also affects well-being. *Journal of Personality and Social Psychology, 91(2),* 331-341. DOI: 10.1037/0022-3514.91.2.331

Sheldon, K.M., Ryan, R.M., Deci, E.L., & Kasser, T. (2004). The independent effects of goal contents and motives on well-being: It's both what you pursue and why you pursue it. *Personality and Social Psychology Bulletin, 30(4),* 475-486. DOI:10.1177/0146167203261883

Sheldon, K.M., Ryan, R.M., & Reis, H. (1996). What makes for a good day? Competence and autonomy in the day and in the person. *Personality and Social Psychology Bulletin, 22,* 1270-1279. DOI: 10.1177/01461672962212007

Shi, J., Chen, Z., & Tian, M. (2011). Internet self-efficacy, the need for cognition, and sensation seeking as predictors of problematic use of the internet. *Cyberpsychology, Behavior, and Social Networking, 14(4),* 231-234. DOI: 10.1089/cyber.2009.0462

Shultz, K.S., & Wang, M. (2011). Psychological perspectives on the changing nature of retirement. *American Psychologist, 66(3),* 170-179. DOI: 10.1037/a0022411

Shye, S. (2010). The motivation to volunteer: A systematic quality of life theory. *Social Indicators Research, 98*, 183-200. DOI:10.1007/s11205-009-9545-3

Silvia, P.J. (2006). *Exploring the psychology of interest.* New York: Oxford University Press.

Skinner, E.A. (1996). A guide to constructs of control. *Journal of Personality and Social Psychology, 71,* 549-570. DOI:10.1037/0022-3514.71.3.549

Small, G. W., Moody, T. D., Siddarth, P., & Bookheimer, S. Y. (2009). Your brain on Google: Patterns of cerebral activation during Internet searching. *American Journal of Geriatric Psychiatry, 17,* 116-126. DOI:10.1097/JGP.0b013e3181953a02

Statistics Canada. (2006). The Canadian labour market at a glance, 2005. Ottawa: Statistics Canada annual survey (Catalogue No.71-222-XIE). Retrieved April 24, 2009, from http://www.statcan.gc.ca/pub/71-222-x/71-222-x2006001-eng.pdf.

Stebbins, R.A. (1998). *After work: The search for an optimal leisure lifestyle.* Calgary, Alberta: Detselig Enterprises Ltd.

Steinhart, Y., & Wyer, R.S. (2009). Motivational correlates of need for cognition. *European Journal of Social Psychology, 39(4),* 608-621. DOI:10.1002/ejsp.565

Stephan, Y., Fouquereau, E., & Fernandez, A. (2008). The relation between self-determination and retirement satisfaction among active retired individuals. *International Journal of Aging and Human Development, 66,* 329-534. DOI:10.2190/AG.66.4.d

Stone, A. A., Schwartz, J. E., Broderick, J. E., & Deaton, A. (2010). A snapshot of the age distribution of psychological well-being in the United States. *Proceedings of the National Academy of Sciences, 107,* 9985-9990. DOI:10.1073/pnas.1003744107

Stuss, D. T., Bisschop, S. M., Alexander, M. P., Levine, B., Katz, D., & Izukawa, D. (2001). The Trail Making Test: A Study in Focal Lesion Patients. *Psychological Assessment, 13(2),* 230-239. DOI:10.1037/1040-3590.13.2.230

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics (4th ed.).* Needham Heights, MA: Allyn and Bacon.

Tellegen, A., Watson,D., & Clark, L.A. (1999). On the dimensional and hierarchical structure of affect. *Psychological Science, 10,* 297-303. DOI: 10.1111/1467-9280.00157

Tkach, C., & Lyubomirsky, S. (2006). How do people pursue happiness? Relating personality, happiness-increasing strategies, and well-being. *Journal of Happiness Studies*, *7(2)*, 183 – 225. DOI 10.1007/s10902-005-4754-1

Vallerand, R.J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In M.P. Zanna (Ed.), *Advances in experimental social psychology* (pp.271-360). New York: Academic.

Vallerand, R.J. (2000). Deci and Ryan's self-determination theory: A view from the hierarchical model of intrinsic and extrinsic motivation. *Psychological Inquiry, 11,* 312-318.

Vallerand, R.J., Blanchard, C., Mageau, G.A., Koestner, R., Ratelle, C., Léonard, M., & Gagné, M. (2003). Les passions de l'ame: On obsessive and harmonious passion. *Journal of Personality and Social Psychology, 85(4),* 756-767. DOI:10.1037/0022-3514.85.4.756

Vallerand, R.J., & O'Connor (1989). Motivation in the elderly: A theoretical framework and some promising findings. *Canadian Psychology/Psychologie Canadienne, 30(3),* 528-550.

Vallerand, R.J., & Ratelle, C.F. (2002). Intrinsic and extrinsic motivation: A hierarchical model. In E.L. Deci & R.M. Ryan (Eds.), *Handbook of self-determination research* (pp.37-64). Rochester, NY: University of Rochester Press.

Vallerand, R.J., & Reid, G. (1984). On the causal effects of perceived competence on intrinsic motivation: A test of cognitive evaluation theory. *Journal of Sport Psychology, 6,* 94-102.

Van Solinge, H., & Henkens, K. (2008). Adjustment to and satisfaction with retirement: Two of a kind? *Psychology and Aging, 23,* 422-434. DOI:10.1037/0882-7974.23.2.422

Waddell, E. L., & Jacobs-Lawson, J. M. (2010). Predicting positive well-being in older men and women. *International Journal of Aging and Human Development, 70,* 181-197. DOI:10.2190/AG.70.3.a

Wang, M., Henkens, K., & van Solinge, H. (2011). Retirement adjustment: A review of theoretical and empirical advancements. *American Psychologist, 66 (3),* 204-213. DOI:10.1037/a0022414

Wang, M., & Shultz, K.S. (2010). Employee retirement: A review and recommendations for future investigation. *Journal of Management, 36(1),* 172-206. DOI:10.1177/0149206309347957

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS Scales. *Journal of Personality and Social Psychology, 54(6)*, 1063-1070. DOI:10.1037/0022-3514.54.6.1063

Weiss, R.S. (2005). *The experience of retirement.* Ithaca, NY: Cornell University Press.

Wheeler, S.C., Petty, R.E., & Bizer, G.Y. (2005). Self-schema matching and attitude change: Situational and dispositional determinants of message elaboration. *Journal of Consumer Research, 31(4),* 787-797. DOI: 10.1086/426613

White, R.W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review, 66(5),* 297-333. DOI: 10.1037/h0040934

Wilson, J., & Musick, M. A. (1997). Work and volunteering: The long arm of the job. *Social Forces, 76,* 251-272.

Wrosch, C., Scheier, M. F., Miller, G. E., Schulz, R., & Carver, C.S. (2003). Adaptive self-regulation of unattainable goals: Goal disengagement, goal reengagement, and subjective well-being. *Personality and Social Psychology Bulletin, 29(12),* 1494-1508. DOI:10.1177/0146167203256921

Wyler, A.R., Masuda, M., & Homes, T.H. (1971). Magnitude of life events and seriousness of illness. *Psychosomatic Medicine, 33(2),* 115-122.

Zelinski, E.M., Kennison, R.F., Watts, A., & Lewis, K. L. (2009). Convergence between cross-sectional and longitudinal studies: Cohort matters. In H.B. Bosworth & C. Hertzog (Eds.), *Aging and Cognition: Research Methodologies and Empirical Advances*, (pp. 101-118).Washington, DC: APA

Appendix A
Demographic Information

Date _____

1. What is your sex? Male _____ Female _____
2. What is your date of birth? Year _____ Month _____Date _____
3. What is your age? _____
4. What is the highest level of education you have completed? (please circle that which corresponds best)

Primary School:	1	2	3	4	5	6
Secondary School:	7	8	9	10	11	12
CEGEP/College:	Diploma					
University:	Bachelor's		Master's		Doctorate	

Other (please indicate what, how many years)

_____

5. What was your occupation?

_____

6. When did you retire? Year _____ Month _____ Date _____
7. How many years were you employed?

_____

8. Do you receive a pension from your employer? Yes _____ No _____
9. At the time of your retirement, what was your annual salary?

_____

10. What is your present annual income (include all sources, e.g. RRSP's, etc.)?

_____

11. What is your total family income from all sources?

_____

12. Compared to other people of your age that you know, how would you rate your financial situation? (please circle the corresponding number)

    a. A lot worse than most
    b. Worse than most
    c. A little worse than most
    d. About the same as most
    e. A little better than most
    f. Better than most
    g. A lot better than most

13. What languages do you speak?

    French _____

    English _____

    Other (please specify): _____

14. What languages do you read and write?

    French _____

    English _____

    Other (please specify): _____

15. What is your civil status?

Married _____

Single _____

Divorced _____

Widowed _____

Common-Law _____

16. How many times have you been married? _____

17. Do you have children? Yes_____ No _____

18. If yes, how many girls? _____ How many boys? _____

19. Who do you live with?

Alone _____

Spouse _____

Brother/Sister _____

Friend _____

Child(ren) _____

Other (please specify) : _____

20. How did you find out about this study?

_____

Appendix B

CONSENT FORM

This is to state that I, _____, agree to participate in the study on retirement being conducted by Drs Pushkar, Conway, Li and Wrosch from the Centre for Research in Human Development and the Department of Psychology at Concordia University.

I have been informed that:

1. My participation in this study entails my completing a battery of questionnaires, including questionnaires about the activities I do, my physical health, as well as about various life domains including my well-being, memory, cognition and my attitudes.

2. All information about me or any other person will remain completely confidential. Results from this study will be accessible only to the researchers involved in this study. They will be able to use the information for scientific purposes, such as for publications in scientific journals or presentations at scientific conferences, as long as I cannot be identified as a participant in this study.

3. I am free to withdraw my consent and discontinue my participation at anytime without negative consequences.

4. This interview should last approximately four hours. I will receive a monetary compensation of $50 for the four hours.

5. Because this study is a longitudinal study, I may be contacted again for an annual interview in 2006, 2007 and 2008. Each annual interview will last approximately four hours. I will receive $50 for each annual interview in which I will take part.

6. I will receive a copy of the general results as they become available if I have indicated my name and address on the previous page.

7. I understand the purpose of this study; I know that there is no deception involved.

8. The person in charge of this study is Dr. Dolores Pushkar. She can be reached at (514) 848.2424, extension 7540, e-mail: retraite@alcor.concordia.ca

I HAVE CAREFULLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND VOLUNTARILY AGREE TO PARTICIPATE IN THIS STUDY.

Name (please print) _____

Signature _____

Date _____

Witness _____

If at any time you have questions about your rights as a research participant, please contact Adela Reid, Research Ethics and Compliance Officer, Concordia University, at (514) 848-2424, extension 7481 or by email at areid@alcor.concordia.ca.

Appendix C
Abridged Seriousness of Illness Rating Scale

The following questions deal with specific illnesses or conditions that people may have.

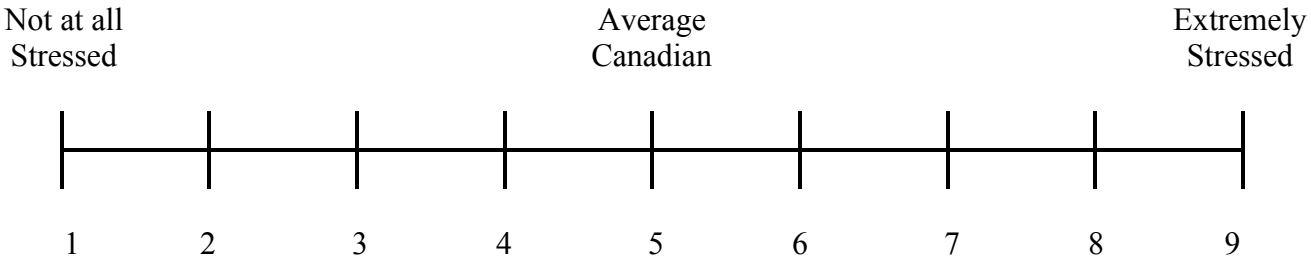
Please check those symptoms or illnesses you have experienced in the **last year**.

☐ I have NOT had any symptoms or illnesses in the last year.

☐ 1. Headache
☐ 2. Dizziness
☐ 3. Varicose veins
☐ 4. Hemorrhoids
☐ 5. Low blood pressure
☐ 6. Drug allergy
☐ 7. Bronchitis
☐ 8. Hyperventilation
☐ 9. Bursitis
☐ 10. Lumbago
☐ 11. Migraine
☐ 12. Hernia
☐ 13. Irregular heart beats
☐ 14. Overweight/Obesity
☐ 15. Anemia
☐ 16. Anxiety reaction
☐ 17. Gout
☐ 18. Pneumonia
☐ 19. Depression
☐ 20. Kidney/Urinary infection
☐ 21. Sexual intercourse difficulties
☐ 22. Thyroid Problems
☐ 23. Asthma
☐ 24. Glaucoma
☐ 25. Gallstones
☐ 26. Arthritis/Osteoarthritis
☐ 27. Slipped disk
☐ 28. Hepatitis
☐ 29. Kidney stones
☐ 30. Peptic ulcer
☐ 31. Pancreatitis
☐ 32. High blood pressure
☐ 33. Deafness
☐ 34. Collapsed lung
☐ 35. Epilepsy
☐ 36. Chest pain
☐ 37. Nervous breakdown
☐ 38. Diabetes
☐ 39. Blood clots
☐ 40. Hardening arteries
☐ 41. Emphysema
☐ 42. Tuberculosis
☐ 43. Alcoholism
☐ 44. Drug addiction
☐ 45. Cirrhosis of the liver
☐ 46. Parkinson's
☐ 47. Blindness
☐ 48. Stroke
☐ 49. Muscular dystrophy
☐ 50. Cerebral palsy
☐ 51. Heart failure
☐ 52. Heart attack
☐ 53. Brain infection
☐ 54. Multiple sclerosis
☐ 55. Bleeding brain
☐ 56. Uremia
☐ 57. Cancer
☐ 58. Leukemia
☐ 59. Cataracts
☐ 60. Difficulty with vision
☐ 61. Rheumatism
☐ 62. Uterine/Breast fibroids
☐ 63. Breast inflammation
☐ 64. Pelvic inflammation
☐ 65. Vaginal infection
☐ 66. Cyst
☐ 67. Other (please describe) ⟹
☐ 68. Colour Blindness
☐ 69. Tendonitis
☐ 70. Cardiomyopathy
☐ 71. Prostate Problems
☐ 72. Shingles
☐ 73. Degeneration of the eye
☐ 74. Chicken Pox
☐ 75. Cholesterol Problems
☐ 76. Internal Bleeding
☐ 77. Allergies/Hives
☐ 78. Osteoporosis
☐ 79. Gastric Reflux/Gastroenteritis
☐ 80. Psoriasis/Exema
☐ 81. Sleep Apnea
☐ 82. Carpal Tunnel Syndrome
☐ 83. Muscle/Ligament/Tendon tear
☐ 84. Angina
☐ 85. Lung Problems
☐ 86. Balance Problems
☐ 87. Dental Problems
☐ 88. Incontinence
☐ 89. Colon Problems
☐ 90. Skin Infections
☐ 91. Neurological Problems
☐ 92. Sciatica
☐ 93. Sinusitis/Sinus Infection
☐ 94. Manic Depression
☐ 95. Vitiligo
☐ 96. Hearing Problems
☐ 97. Persistent Backache
☐ 98. Insomnia
☐ 99. Addison's Disease
☐ 100. Fibromyalgia
☐ 101. Raynaud Disease
☐ 102. Blood Disorder
☐ 103. Hypoglycemia
☐ 104. Spinal Disc Degeneration
☐ 105. Rosacea
☐ 106. Burnout

67. Please list any OTHER symptoms or illnesses that you have experienced in the last year

Appendix D
SM



This is a stress scale.

People who have no stress in their lives are rated as **1**, that is not at all stressed.

People who experience an enormous amount of stress are rated as **9,** that is extremely stressed.

The average Canadian is rated as **5**.

Where would you put yourself on this scale?

Mark the number with an **X**.

Now think of people your own age in general. Where would you put them on this scale?

Mark the number with an **O**.

Think of the time of your life when you were the least stressed. What would your rating be then?

Mark the number with a **B**.

How old were you then? Age: _____

Appendix E
Need for Cognition

For each of the statements below, please indicate to what extent the statement is characteristic of you using the scale below.

1 Extremely Uncharacteristic	2 Somewhat Uncharacteristic	3 Uncertain / Don't Know	4 Somewhat Characteristic	5 Extremely Characteristic

1. I would prefer complex to simple problems.	1	2	3	4	5
2. I like to have the responsibility of handling a situation that requires a lot of thinking.	1	2	3	4	5
3. Thinking is not my idea of fun.	1	2	3	4	5
4. I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.	1	2	3	4	5
5. I try to anticipate and avoid situations where there is likely a chance I will have to think in depth about something.	1	2	3	4	5
6. I find satisfaction in deliberating hard and long for hours.	1	2	3	4	5
7. I only think as hard as I have to.	1	2	3	4	5
8. I prefer to think about small daily projects to long-term ones.	1	2	3	4	5
9. I like tasks that require little thought once I've learned them.	1	2	3	4	5
10. The idea of relying on thought to make my way to the top appeals to me.	1	2	3	4	5
11. I really enjoy a task that involves coming up with new solutions to problems.	1	2	3	4	5
12. Learning new ways to think doesn't excite me very much.	1	2	3	4	5
13. I prefer my life to be filled with puzzles that I must solve.	1	2	3	4	5
14. The notion of thinking abstractly is appealing to me.	1	2	3	4	5
15. I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.	1	2	3	4	5
16. I feel relief rather than satisfaction after completing a task that required a lot of mental effort.	1	2	3	4	5
17. It's enough for me that something gets the job done; I don't care how or why it works.	1	2	3	4	5
18. I usually end up deliberating about issues even when they do not affect me personally.	1	2	3	4	5

Appendix F
EAQ

We'd like to know more about the things that you do in everyday life, the activities that might be necessary or important to you, that you might enjoy doing and that you may be good at.

We'd like some more information about how you spend your time. There are certain activities that everyone does, for example, eating and so on, but we'd like to know more about the other things you do.

Please use this response key provided to answer questions:

Frequency: How often do you do this activity?
1-practically everyday (3 or more times a week)
2-weekly
3-monthly
4-less frequently than once a month
5-not at all

1. Do you **ENTERTAIN** family members or friends at your home, do you **VISIT** family members or friends, or do you **GO OUT** (e.g., have coffee) with these people?

   a. How **often**? 1 2 3 4 5

2. Do you **WRITE LETTERS, E-MAIL**, or **TALK ON THE PHONE** with family members or friends?

   a. How **often**? 1 2 3 4 5

3. Do you **HELP FAMILY MEMBERS OR FRIENDS**, for example by babysitting, helping with shopping, giving lifts?

   a. How **often**? 1 2 3 4 5

4. Do you **RECEIVE HELP FROM FAMILY MEMBERS OR FRIENDS**, for example to drive you to your appointments, to help you with spring cleaning?

   a. How **often**? 1 2 3 4 5

5. Do you do **PHYSICAL ACTIVITIES** such as exercising, walking, swimming, or gardening?

   a. How **often**? 1 2 3 4 5

6. Do you attend **CULTURAL ACTIVITIES** such as films, theatre, concerts, museums?

   a. How **often**? 1 2 3 4 5

7. Do you play a **MUSICAL INSTRUMENT OR SING**?

   a. How **often**? 1 2 3 4 5

8. What about CONTINUING EDUCATION? Have you taken any ACADEMIC OR INFORMATION **COURSES** over the **last two years**?

   a. How **often**? 1 2 3 4 5

9. Do you **READ** books, magazines, newspapers, union or association newsletters or other types of documents?

   a. How **often**? 1 2 3 4 5

10. Do you play **GAMES** such as board games or card games?

    a. How **often**? 1 2 3 4 5

11. Do you do any **CRAFTS AND HOBBIES**, such as knitting, woodworking, needle work, stamp collecting, or any other activities involving a regular routine or pattern, or do you do any **CREATIVE ACTIVITIES**, such as writing, painting, composing, or designing?

    a. How **often**? 1 2 3 4 5

12. Do you listen to the **RADIO** or watch **TV**?

    a. How **often**? 1 2 3 4 5

13. Do you **SURF THE INTERNET** to read or chat, or are you a member of a listserv?

    a. How **often**? 1 2 3 4 5

14. Do you engage in **SOLITARY PRAYER, MEDITATION**, or do you engage in any **RELIGIOUS ACTIVITIES**, such as attending religious or study groups?

    a. How **often**? 1 2 3 4 5

15. Do you do **VOLUNTEER WORK** (i.e., offering services through a recognized organization to people other than your family members or friends) or do you participate in any **ORGANIZATIONAL ACTIVITIES**, such as professional associations, political, community, self-help, service groups?

    a. How **often**? 1 2 3 4 5

16. Do you do any **TRAVELLING** such as day trips, holidays, recreational trips?

    a. How **often**? 1 2 3 4 5

Appendix G

Dispositional Coping

We are interested in how people respond when they confront difficult or stressful events in their lives. There are lots of ways to deal with stress. This questionnaire asks you to indicate what you generally do and feel, when you experience stressful events. Obviously, different events bring out somewhat different responses, but think about what you usually do when you are under a lot of stress.

Using the response choices listed just below, please circle one number for each item. Please try to respond to each item separately in your mind from each other item. Choose your answers thoughtfully, and make your answers as true FOR YOU as you can. Choose the most accurate answer for you—not what you think "most people" would say or do. Indicate what YOU usually do when YOU experience a stressful event.

1	**2**	**3**	**4**
I usually don't do this at all	**I usually do this a little bit**	**I usually do this a medium amount**	**I usually do this a lot**

1. I think about how I might best handle the problem.	1 2 3 4
2. I keep myself from getting distracted by other thoughts or activities.	1 2 3 4
3. I learn to live with it.	1 2 3 4
4. I get comfort and understanding from someone.	1 2 3 4
5. I admit to myself that I can't deal with it, and quit trying.	1 2 3 4
6. I make jokes about it.	1 2 3 4
7. I pray or meditate.	1 2 3 4
8. I refuse to believe that it has happened.	1 2 3 4
9. I concentrate my efforts on doing something about the situation I am in.	1 2 3 4
10. I turn to work or other activities to take my mind off things.	1 2 3 4
11. I look for something good in what is happening.	1 2 3 4
12. I think hard about what steps to take.	1 2 3 4

1 I usually don't do this at all	2 I usually do this a little bit	3 I usually do this a medium amount	4 I usually do this a lot

13. I focus on dealing with this problem, and if necessary let other things slide a little.	1	2	3	4
14. I get used to the idea that it happened.	1	2	3	4
15. I discuss my feelings with someone.	1	2	3	4
16. I laugh about the situation.	1	2	3	4
17. I seek God's help.	1	2	3	4
18. I act as though it hasn't even happened.	1	2	3	4
19. I take additional action to try to get rid of the problem.	1	2	3	4
20. I ask people who have had similar experiences what they did.	1	2	3	4
21. I get upset and let my emotions out.	1	2	3	4
22. I go to movies or watch TV, to think about it less.	1	2	3	4
23. I learn something from the experience.	1	2	3	4
24. I try to come up with a strategy about what to do.	1	2	3	4
25. I put aside other activities in order to concentrate on this situation.	1	2	3	4
26. I accept that this has happened and that it can't be changed.	1	2	3	4
27. I get emotional support from others.	1	2	3	4
28. I just give up trying to reach my goal.	1	2	3	4
29. I make fun of the situation.	1	2	3	4
30. I put my trust in God.	1	2	3	4
31. I pretend that it hasn't really happened.	1	2	3	4
32. I do what has to be done, one step at a time.	1	2	3	4

1	2	3	4
I usually don't do this at all	**I usually do this a little bit**	**I usually do this a medium amount**	**I usually do this a lot**

33. I talk to someone who could do something concrete about the problem.	1	2	3	4
34. I try to grow as a person as a result of the experience.	1	2	3	4
35. I make a plan of action.	1	2	3	4
36. I try hard to prevent other things from interfering with my efforts at dealing with this.	1	2	3	4
37. I accept the reality of the fact that it has happened.	1	2	3	4
38. I talk to someone about how I feel.	1	2	3	4
39. I give up the attempt to get what I want.	1	2	3	4
40. I joke around about it.	1	2	3	4
41. I try to find comfort in my religion or spiritual beliefs.	1	2	3	4
42. I say to myself "this isn't real".	1	2	3	4
43. I talk to someone to find out more about the situation.	1	2	3	4
44. I let my feelings out.	1	2	3	4
45. I daydream about things other than this.	1	2	3	4
46. I try to see it in a different light, to make it seem more positive.	1	2	3	4
47. I take action to try to make the situation better.	1	2	3	4
48. I do something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.	1	2	3	4
49. I get help and advice from other people.	1	2	3	4
50. I express my negative feelings.	1	2	3	4
51. I give up the attempt to cope.	1	2	3	4
52. I say things to let my unpleasant feelings escape.	1	2	3	4

Appendix H
Goal Re-Engagement

During their lives people cannot always attain what they want and are sometimes forced to stop pursuing the goals they have set. We are interested in understanding how you usually react when this happens to you. Please indicate the extent to which you agree or disagree with each of the following statements, as it usually applies to you.

If I have to stop pursuing an important goal in my life…	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. It's easy for me to reduce my effort towards the goal.					
2. I convince myself that I have other meaningful goals to pursue.					
3. I stay committed to the goal for a long time; I can't let it go.					
4. I start working on other new goals.					
5. I think about other new goals to pursue					
6. I find it difficult to stop trying to achieve the goal.					
7. I seek other meaningful goals.					
8. It's easy for me to stop thinking about the goal and let it go.					
9. I tell myself that I have a number of other new goals to draw upon.					
10. I put effort toward other meaningful goals.					

Appendix I

Reasons for retirement from the Retirement Satisfaction Inventory

The following question relates to your retirement. Please read each one carefully and indicate your response by circling the appropriate number.

How important is each of the following in making your retirement enjoyable?

1 Unimportant | 2 Slightly Unimportant | 3 Moderately Important | 4 Very Important

22. Freedom to pursue my own interests	1	2	3	4
23. Not having to work	1	2	3	4
24. Spending more time with my family	1	2	3	4
25. Spending more time with my friends	1	2	3	4
26. More control over my own life	1	2	3	4
27. No boss	1	2	3	4
28. More travel	1	2	3	4
29. Less stress	1	2	3	4
30. Being with a group of other retired persons	1	2	3	4
31. More time for activities	1	2	3	4
32. Participation in volunteer organizations	1	2	3	4
33. Being carefree	1	2	3	4
34. More time to think	1	2	3	4
35. More relaxed	1	2	3	4
36. Can be alone more	1	2	3	4

Appendix J

The Positive and Negative Affect Schedule (PANAS)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then circle the appropriate answer next to that word. Indicate to what extent you have felt this way *during the past few weeks* by choosing the answer that *describes you best*. Use the following scale to record your answers.

	1 Very slightly or not at all	2 A little	3 Moderately	4 Quite a bit	5 Extremely
1.	Interested	1	2	3	4	5
2.	Distressed	1	2	3	4	5
3.	Excited	1	2	3	4	5
4.	Upset	1	2	3	4	5
5.	Strong	1	2	3	4	5
6.	Guilty	1	2	3	4	5
7.	Scared	1	2	3	4	5
8.	Hostile	1	2	3	4	5
9.	Enthusiastic	1	2	3	4	5
10.	Proud	1	2	3	4	5
11.	Irritable	1	2	3	4	5
12.	Alert	1	2	3	4	5
13.	Ashamed	1	2	3	4	5
14.	Inspired	1	2	3	4	5
15.	Nervous	1	2	3	4	5
16.	Determined	1	2	3	4	5
17.	Attentive	1	2	3	4	5
18.	Jittery	1	2	3	4	5
19.	Active	1	2	3	4	5
20.	Afraid	1	2	3	4	5

Appendix K
Everyday Activities Questionnaire Self-Perceived Competence Subscale

We'd like to know more about the things that you do in everyday life, the activities that might be necessary or important to you, that you might enjoy doing and that you may be good at.

We'd like some more information about how you spend your time. There are certain activities that everyone does, for example, eating and so on, but we'd like to know more about the other things you do.

Please use this response key to answer questions.

Ability: How good are you generally at doing this activity?
1 – not good
2 - somewhat good
3 – moderately good
4 – very good
5 – extremely good

1. Do you attend CULTURAL ACTIVITIES such as films, theatre, concerts, museums?

   How **good** do you think you are generally at doing this? 1 2 3 4 5
   (e.g., understanding the film or concert, etc.)

2. Do you play a **MUSICAL INSTRUMENT OR SING**?

   How **good** do you think you are generally at doing this? 1 2 3 4 5
   (e.g., playing difficult pieces, etc.)

3. What about **CONTINUING EDUCATION**? Have you taken any **ACADEMIC OR INFORMATION COURSES** over the **last two years**?

   How **good** do you think you are at doing this? 1 2 3 4 5
   (e.g., following and participating in class discussions, etc.)

4. Do you **READ** books, magazines, newspapers, union or association newsletters or other types of documents?

   How **good** do you think you are generally at doing this? 1 2 3 4 5
   (e.g., understanding what you read, etc.)

5. Do you play **GAMES** such as board games or card games?

   How **good** do you think you are generally at doing this? 1 2 3 4 5
   (e.g., understanding the rules, etc.)

6. Do you do any **CRAFTS AND HOBBIES**, such as knitting, woodworking, needle work, stamp collecting, or any other activities involving a regular routine or pattern, or do you do any **CREATIVE ACTIVITIES**, such as writing, painting, composing, or designing?

   How **good** do you think you are generally at doing this? 1 2 3 4 5
   (e.g., completing your projects, etc.)

7. Do you listen to the **RADIO** or watch **TV**?

   How **good** do you think you are generally at doing this? 1 2 3 4 5
   (e.g., understanding when listening/watching a program, etc.)

8. Do you **SURF THE INTERNET** to read or chat, or are you a member of a listserv?

   How **good** do you think you are generally at doing this? 1 2 3 4 5
   (e.g., knowing how to do a search, etc.)

9. Do you do any **TRAVELLING** such as day trips, holidays, recreational trips?

   How **good** do you think you are generally at doing this? 1 2 3 4 5
   (e.g., planning a trip, etc.)

Appendix L
Life Engagement Test: Assessing Purpose in Life

Please answer the following questions about yourself by indicating the extent of your agreement using the following scale:

Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1	**2**	**3**	**4**	**5**

1)	There is not enough purpose in my life.	1	2	3	4	5
2)	To me, the things I do are all worthwhile.	1	2	3	4	5
3)	Most of what I do seems trivial and unimportant to me.	1	2	3	4	5
4)	I value my activities a lot.	1	2	3	4	5
5)	I don't care very much about the things I do.	1	2	3	4	5
6)	I have lots of reasons for living.	1	2	3	4	5