

Running Head: A STUDY OF DRIVING CESSATION

A Study of Driving Cessation and its Association with Satisfaction with Life

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Abstract

Older drivers are the fastest growing segment of the Canadian driving population and, as a consequence, the numbers who face the experience of stopping driving will continue to rise. A review of the literature reveals that visual, cognitive, psychomotor, medical, demographic, and social factors are associated with driving cessation and the consequences are largely negative.

A recent cross-sectional study enabled the identification of several predictors of driving cessation, an assessment sensitive to the effect of driving cessation on well-being, and factors that can moderate the impact of driving cessation on subjective well-being (Kafka, 2008).

The purpose of this study was to conduct a follow-up to Kafka's (2008) study and further explore psychological variables in relation to driving cessation. We examined life purpose, life control, openness to experience, locus of control, and coping mode in participants who are still driving and those who have stopped to determine if psychological variables differ between these groups. We also examined life outcomes in relation to driving status, and the independent contribution of driving status to life outcomes. Compared to drivers, former drivers had a more external locus of control. Attrition through death, loss of contact, and refusal to participate resulted in a small sample of former drivers which may have obscured relationships in this study. Future research is required to replicate and expand on Kafka's (2008) results.

Keywords: aging, driving cessation, older drivers

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A Study of Driving Cessation and its Association with Satisfaction with Life

As Canadians, we rely on the comfort, security, speed, and convenience of the personal automobile. According to statistics, nearly 9 of every 10 trips in Canada are by private vehicle (Bess, 1999). As our cities become places to work rather than places to live, our urban regions expand and we find ourselves traveling greater distances just to meet our daily needs. Increasing age and retirement do not diminish our dependence on the automobile. In fact, the possession of a valid driver's license and the ability to drive have become symbols of functional and social competence and independence (Eisenhandler, 1990). In addition, public transportation is viewed by many older adults as inconvenient, unpleasant, unreliable, and unsafe (Carp, 1970; Griffen, Rapport, Coleman, & Scott, 2009; Kostyniuk, Shope, & Molnar, 2000; Siren, Hakamies-Blomqvist, & Lindeman, 2004).

Older drivers (55+) are the fastest growing segment of the Canadian driving population and this trend is expected to continue with the number almost doubling by 2040 (Canadian Association of Occupational Therapists, 2009). As a result, the number of older drivers who face the experience of stopping driving, known as driving cessation, will rise.

The loss of driving privileges can have serious consequences for older adults and, to date, a considerable amount of research has been aimed at determining why older adults stop driving and what impact it has on their well-being.

Factors Associated with Driving Cessation

Driving is a complex task that requires cognitive, sensory, and psychomotor skills. Research indicates that age-related limitations that affect driving performance begin to emerge by the time an individual reaches 55 years and become more pronounced with age (Persson, 1993). Decreases in vision and functional status, and the prevalence of medical conditions, are realities of aging that are associated with driving cessation (Campbell, Bush,

& Hale, 1993; Marottoli et al., 1993). In addition, sociodemographic variables such as age, gender (Campbell et al., 1993; Jette & Branch, 1992; Marottoli et al., 1993) income (Dellinger, Sehgal, Sleet, & Barrett-Connor, 2001; Gilley et al., 1991; Marottoli et al., 1993) and geographic location (Kington, Reuben, Rogowski, & Lillard, 1994) along with confidence in one's own skills (Brayne et al., 2000) are known to influence an individual's decision to stop driving.

Medical and Psychological Factors.

Visual Abilities. Age-related visual changes in relation to driving cessation have been examined in numerous studies. Studies using measures of static visual acuity have found a significant association between poor visual acuity and driving cessation (Byles & Galliène, 2012; DeCarlo, Scilley, Wells & Owsley, 2003; Gilhorta, Mitchell, Ivers & Cumming, 2001; Retchin, Cox, Fox & Irwin, 1998). In addition, the proportion of non-drivers increases with the degree of impairment. Keefe, Jin, Weih, McCarty and Taylor (2002) reported that while only 4.6% of participants in their study attributed poor vision to cessation when their visual acuity was 6/12 or better (normal is 6/6), the percentage rose to 33% when visual acuity was less than 6/12, and 43% if it was less than 6/18. In a cross-sectional study that compared drivers and former drivers, the odds of driving cessation were higher for individuals who had difficulty seeing in the dark ($OR = 1.9$, 95% CI [1.4, 2.5]) or difficulty with glare ($OR = 1.5$, 95% CI [1.2, 1.8]) (Gilhorta et al., 2001). Reduced contrast sensitivity was also a significant predictor of driving cessation ($OR = 1.15$, 95% CI [1.03, 1.28]) in a group of 1,425 adults aged 67 to 87; as was visual field loss in another study where 70% of former drivers tested positive for bilateral field loss on a standardized measure compared to 34% of current drivers (Segal-Gidan, Varma, Salzar, & Mack, 2010). Similar results for contrast sensitivity were obtained in another study in which near visual acuity

(NVA) was also significantly associated with driving cessation (hazard ratio (*HR*) = 1.44, 95% CI [1.01, 2.05]) along with judgment of line orientation (JLO) (*HR* = 0.60, 95% CI [0.32, 1.00]) (Emerson, Johnson, Dawson, Uc, Steven, Anderson, & Rizzo, 2011).

Medical conditions that result in visual problems or cause loss of sight in the older adult including glaucoma, retinal hemorrhage, macular degeneration, and cataracts have also been related to driving cessation. Campbell et al. (1993) found that an individual with macular degeneration was at four times greater risk of stopping driving (*OR* = 4.25, 95% CI [2.6, 7.0]). While numerous researchers have reported this strong relationship between visual disease and driving cessation (Foley, Masaki, Ross & White, 2000; Forrest, Bunker, Songer, Coben & Cauley, 1997; Hakamies-Blomqvist & Wahlstrom, 1998; Johnson, 1999; Kington et al., 1994; Marottoli et al., 1993; Stewart, Moore, Marks, May & Hale, 1993) many studies report results that conflict with one another. For example, in a study in which participants underwent detailed eye exams, Gilhorta et al. (2001) found that the presence of glaucoma increased the odds of cessation (*OR* = 2.2, 95% CI [1.3, 3.9]). Other researchers reported that glaucoma was not an independent predictor of cessation (Marottoli et al., 1993; Campbell et al., 1977). Similarly, some researchers have reported that older adults with cataracts are at higher risk of stopping driving (*OR* = 2.29, 95% CI [1.28, 4.10]) compared to those without the disease (Marottoli et al., 1993) while others have failed to support this relationship (Campbell et al., 1993). Disagreement may be due to the fact that visual difficulties are most often based on self-report which may result in misclassification. Although 25% of the participants in one study (Dellinger et al., 2001) attributed driving cessation to vision, some categorized it as a medical problem while others categorized it as a licensing problem. Altogether, visual problems showed up in five of the six categories the researchers identified as reasons for stopping. In addition, because most visual diseases are progressive, a mere

diagnosis of the disease does not indicate the degree or severity of the problem. Accurate measures based on vision exams may better predict who will continue driving and who will stop.

Cognitive Abilities. Age-related declines in cognitive functioning are a normal part of the aging process and it is estimated that approximately 16.8% of Canadians over the age of 65 have some cognitive impairment with no dementia (Kowalski, Love, Tuokko, McDonald, Hutsch, & Strauss, 2012). Researchers have examined the influence of these early cognitive declines on driving behaviour in numerous studies. Kowalski et al. (2012) measured 215 community-dwelling older adults on five cognitive tasks including perceptual processing speed gauged by the WAIS-R Digit Substitution Test, inductive reasoning, episodic memory, verbal fluency and vocabulary. Participants with no cognitive impairment ($\chi^2 (1) = 20.846, p < .05$) and those who scored below their normative peers on one cognitive task ($\chi^2 (1) = 5.725, p < .05$) were significantly more likely to be drivers than those who scored below their normative peers on two or more cognitive tasks. Emerson et al. (2011) measured general cognition in 100 older adults aged 65 to 89 using a composite score (COGSTAT) based on eight neuropsychological tests that assessed spatial orientation, visual cognition, and executive functions. Poor general cognition was a significant predictor of driving cessation ($HR = 0.56, 95\% CI [0.37, 0.85]$).

A number of researchers who have examined the relationship between cognitive impairment and driving cessation using the Mini-Mental State Exam (MMSE) as a measure of cognitive status have found that those who stopped driving scored significantly lower on the test (Brayne et al., 2000; Carr et al., 1990; Forrest et al., 1997, Talbot et al., 2005). In a cohort study that compared baseline and 9-year follow-up data, cognitive decline as measured on the MMSE was significantly less in current drivers (mean difference = -1.0, SD

= 2.5) than in former drivers (mean difference = 3.2, SD = 5.5) (Brayne et al., 2000). Studies using the Cognitive Abilities Screening Instrument have yielded the same results; as scores decrease driving cessation increases (Segal-Gidan, Varma, Salzar, & Mack, 2010; Valcour, Masaki & Blanchette, 2002; Foley et al., 2000). Valcour et al. (2002) found that while 73.3% of participants with scores that are considered good (≥ 82) on the scale were driving, the percentage dropped to 37.5% with intermediate performance (74 to 81.9). Only 23.1% of participants with poor performance (< 74) were still driving.

In a longitudinal study that included an extensive cognitive battery, Ackerman, Edwards, Ross, Ball and Lunsman (2008) examined 1,838 participants, aged 65 and older with no substantial cognitive problems, over a period of three years. Cognitive processing speed for visual attention was assessed using the four-subtest version of the Useful Field of View (UFOV) test, while cognitive speed of processing, memory, and reasoning were assessed using the Digit Symbol Substitution test. The battery also included three additional measures of memory (auditory, semantic, and prose), three additional measures of reasoning, and one measure of vocabulary. In this group only slower cognitive speed of processing assessed by the UFOV emerged as a risk factor for driving cessation ($HR = 1.373$, 95% CI [1.106, 1.706], $p = .002$). Similar results using the UFOV were obtained by Emerson et al. (2011), Edwards et al. (2008) and again later by Edwards, Bart et al. (2009) who used only subtest 2 of the UFOV test ($HR = 1.76$, 95% CI [1.15, 2.69], $p < .01$). Emerson et al. (2011) also found that poorer performance on the Benton Visual Retention Test (BVRT) a test of visual working memory predicted driving cessation ($HR = 1.75$, 95% CI [1.13, 2.70], $p < .05$). Processing speed as measured by the Digit Symbol Substitution subscale of the Wechsler Adult Intelligence Scale was a significant predictor of driving cessation in a cohort study that included 1,466 adults aged 70 and over. Data were collected at five intervals

(waves) between 1992 and 1997. Those with poor processing speed at baseline had greater odds of driving cessation at Wave 3 ($OR = 5.23$, 95% CI [1.49, 18.39], $p = .01$) (Antsey et al., 2005). In addition, poor scores on verbal reasoning predicted cessation at Wave 4 ($OR = 2.30$, 95% CI [1.20, 4.39], $p = .01$), poor scores on picture memory predicted cessation at Wave 3 ($OR = 4.04$, 95% CI [1.44, 11.39], $p = .01$), and poor scores on symbol recall predicted cessation at Wave 2 ($OR = 6.66$, 95% CI [2.24, 19.84], $p = .01$) indicating that those participants were 6.66 times at greater risk of stopping driving before the next wave approximately one year later.

Keay et al. (2009), in a large scale study that included 1,425 adults aged 67 to 87 years, also assessed several aspects of cognition, including attention, psychomotor speed/visual scanning, executive function, and visuospatial processing, and their relationship to restricting or stopping driving. Slow psychomotor speed/visual scanning as assessed by Part A of the Trail Making Test (TMT) was significantly associated with restrictions in driving and cessation ($OR = 1.02$, 95% CI [1.01, 1.03]) as was visuospatial processing ($OR = 1.14$, 95% CI [1.05, 1.24]) as measured by the Beery-Buktenica Developmental Test of Visual Motor Integration. Part A of the TMT also emerged as a significant predictor of driving cessation in a study conducted by Emerson et al. (2011) ($HR = 1.69$, 95% CI [1.09, 2.63]) but not in the final multivariate model used by Edwards, Bart et al. (2009).

Instrumental functional performance was also assessed by Ackerman et al. (2006) through measures of cognitively demanding instrumental activities of daily living (IADL) such as the ability to read and follow medication labels, manage tasks such as finances, shop, cook, perform household activities and use the phone. Impaired instrumental functional performance as measured by the Everyday Problems Test (EPT), a test strongly associated with cognitive reasoning ability, was significantly related to driving cessation ($HR = 1.59$,

95% CI [1.242, 2.056, $p < .001$]). In another small study that included adults aged 84 and older, the mean number of IADL limitations in former drivers was 2.3 ($SD = 1.8$) compared to only 0.7 ($SD = 0.9$) for those still driving. Further, the odds of driving cessation increased reaching 9.0 (95%, CI [2, 43]) for individuals with three or more IADL impairments compared to those with two or less (Brayne et al., 2000). Other researchers have supported the finding that former drivers with cognitive impairments have more IADL limitations than those who continue to drive (Carr, Jackson, & Alquire, 1990; Legh-Smith, 1986; Talbot et al., 2005). These findings have not been confirmed in the general older adult population where self-report measures of IADL have been used (Gallo, Rebok, & Lesikar, 1999; Kington et al., 1994).

Within the context of a disease process such as Alzheimer's disease (AD), driving cessation has been related to the level of cognitive impairment (Beglinger et al., 2012; Logsdon, Teri, & Larson, 1992; Foley et al., 2000; Fruend & Szinovacz, 2002; Trobe, Waller, Cook, Flannagan, Teshina & Bieliauskas, 1996). In a study that included 643 males aged 75 and older who were dementia free, only 22% of those diagnosed with very mild or mild dementia three years later were driving, in comparison to 78% of those with no signs of dementia (Foley et al., 2000). As the dementia became more severe, the rate of driving cessation increased dramatically. Of the twenty-three men who were diagnosed with moderate to severe dementia, all but one had stopped driving by the end of the three-year period. Fruend and Szinovacz (2002) also found a strong association between the severity of cognitive impairment and driving cessation in a large scale study that included both women and men aged 70 and over. In addition, they found that the association between cognitive impairment and driving cessation was more pronounced for women. Sixty-four percent of the mildly impaired women and 76% of the severely impaired women stopped driving, while

only 22% of those with no impairment stopped. With regard to men, 19% of the mildly impaired men and 43% of the severely impaired men stopped driving. Only 8% of men with no impairment stopped.

A few researchers have performed more extensive assessments of neuropsychological function in order to determine whether specific abilities are related to driving cessation in individuals with dementia. Logsdon et al. (1992) used the Mattis Dementia Rating scale (MDRS) to determine overall level of severity and to measure memory, conceptualization, construction, attention and concentration, initiation and perseveration in a group of 100 patients with Alzheimer's disease. The Blessed Dementia Rating Scale (BDRS) was used to assess ability in dressing, performing household chores, making change, and finding their way on familiar streets. Patients who stopped driving scored significantly lower on the MDRS in overall severity of dementia obtaining a mean score of 104 (standard deviation (SD) = 20, $p < .05$) in comparison to a mean score of 117 ($SD = 16$) for those who reported having no problems with driving. They also scored significantly lower on the construction subscale ($M = 3$, $SD = 2$, $p < .005$) than those who reported having no problems with driving ($M = 5$, $SD = 1$, $p < .005$) and those who still drove with reported difficulty ($M = 4$, $SD = 2$, $p < .005$). Those who stopped driving scored significantly lower on the BDRS ($M = 4.7$, $SD = 2.2$, $p < .001$), compared to drivers ($M = 2.7$, $SD = 1.6$, $p < .001$) and those driving with difficulty ($M = 3.4$, $SD = 1.7$, $p < .001$); (Logsdon et al., 1992). Conversely, Trobe et al. (1996) failed to find significant differences in BDRS scores between drivers and former drivers with Alzheimer's disease. The researchers did, however, find significant differences in Memory Quotient scores on the Wechsler Memory Scale with former drivers obtaining a mean score of 70.6 ($SD = 3.11$, $p < .05$) compared to a mean of 77.4 ($SD = 5.98$, $p < .05$) for drivers. Finger Oscillation Test scores were also significantly different. The mean dominant

hand score for former drivers was 35.4 ($SD = 2.70, p < .05$) compared to a mean of 44.6 ($SD = 5.08, p < .05$) for drivers, while the mean non-dominant hand score for former drivers was 32.7 ($SD = 2.57, p < .05$) compared to a mean of 38.7 ($SD = 3.60, p < .05$) for drivers.

Although both studies included the Weschler Adult Intelligence Scale – Revised (WAIS-R) Verbal Intelligence Quotient (IQ) and Performance IQ tests, neither found a significant association between scores on these scales and driving cessation.

Herrmann et al. (2006), as part of a 3-year prospective study known as The Canadian Outcomes Study in Dementia, also used several assessments to explore specific cognitive abilities associated with driving cessation in a community dwelling sample of 719 older patients. To be included in the study, participants had to be over the age of 60 with a DSM-IV diagnosis of dementia and a Global Deterioration Score that indicated early or mild dementia. Measures at baseline and every 6 months during the study included the Modified Mini-Mental State Examination (3MS) to assess a broad range of cognitive functions and determine a Mini-Mental State Examination Score (MMSE), the GDS to assess severity of the disease, the Functional Autonomy Measurement System (SMAF) to assess functional ability, and the Neuropsychiatric Inventory (NPI) to assess behavioural disturbances. Of the 203 participants who were active drivers at baseline, 97 stopped driving over the 3-year observation period. Those who stopped driving had a significantly higher GDS with a hazard ratio of 1.68 (95% CI [1.15, 2.45], $p = .01$), a significantly lower MMSE score indicating greater cognitive impairment with an HR of 0.90 (95% CI [0.83, 0.97], $p = .009$) and a NPI indicating the presence of three or more behavioural disturbances. Of the 12 behavioural disturbances included in the NPI, hallucinations and apathy alone were significant predictors of driving cessation with hazard ratio scores of 2.57 (95% CI [1.00, 6.60], $p = .05$) and 1.69 [1.05, 2.72], $p = .031$) respectively. Researchers who administered a psychometric battery

that included measures of episodic and semantic memory, psychomotor, visuospatial, attention, and executive functions to 143 drivers and 58 non-drivers with dementia found no differences in their psychometric profiles (Carr, Shead, & Storandt, 2005).

While most studies examine depression as a consequence of driving cessation, Keay et al. (2009) included depressive symptoms as a predictor variable for cessation. Using 30-items from the Geriatric Depression Scale, the researchers found that the odds of restricting or stopping driving were greater for those with depressive symptoms ($OR = 1.08$, 95% CI [1.01, 1.16]).

Psychomotor Ability. Several studies have examined the relationship between physical activity and driving cessation in older adults. Marottoli et al. (1993) revealed that driving cessation was associated with a lack of participation in activities that included sports, exercise, gardening, and walking. They found that the odds of stopping driving were twice as large for older adults who had difficulties with higher-level physical functions (Rosow-Breslau disability items – climbing stairs, walking a ½ mile, heavy housework) than for those with no problems ($OR = 2.13$, 95% CI [1.48, 3.06]).

A few researchers have examined basic activities of daily living (ADL), including bathing, toileting, dressing, transferring, eating, and walking, in relation to driving. As one would expect, former drivers were more dependent than those who continued to drive (Carr et al., 1990; Legh-Smith, 1986; Stewart et al., 1993). In a longitudinal community-based study of ambulatory adults, the odds of driving cessation reached 3.37 (95% CI [2.4, 4.8]) for those with even one activity of daily living (ADL) limitation when they added housework and shopping to the list of basic activities. In fact, when compared with five other significant medical conditions including Parkinson's disease, the association between ADL limitations

and driving cessation was the strongest, accounting for 25% of the decisions to stop driving (Campbell et al., 1993).

Although Forrest et al. (1997) suggested that the significant relationship between fractures and driving cessation in their study was related to the loss of physical function, only a few studies have examined specific physical abilities. Ackerman et al. (2008) used the Turn 360° test to measure balance in 1,838 participants and found that those who scored poorly on the test were at greater risk of cessation ($HR = 1.17$, $CI [1.01, 1.35]$, $p = .002$). The same test yielded similar results ($HR = 1.23$, $CI [1.10, 1.37]$, $p < .001$) in another study that included 1,656 older adults (Edwards et al., 2008). Foley et al. (2000), in a study that included 464 older men, found that the odds of driving were twice as large for those who had a grip strength equal to or greater than 23 kilograms ($OR = 2.33$, $95\% CI [1.31, 4.16]$) and could hold a full tandem stand for at least 10 seconds ($OR = 2.17$, $95\% CI [1.24, 3.79]$). The odds of driving also increased for those who had a walking speed equal to or greater than 0.8 metres per second ($OR = 3.91$, $95\% CI [2.21, 6.93]$). Antsey, Windsor, Luszcz, and Andrews (2006) found that grip strength was also a significant predictor of driving cessation when they examined 5 waves of data collected over 5 years. Those with a weaker grip strength at the first wave had greater odds of driving cessation by Wave 3 ($OR = 1.10$, $95\% CI [1.02, 1.19]$) or Wave 4 ($OR = 1.06$, $95\% CI [1.00, 1.12]$). In Legh-Smith's (1986) study that included 144 stroke patients, those who did not resume driving had significantly lower mean arm function scores ($M = 81.32$, $SD = 31.09$) than drivers ($M = 94.68$, $SD = 14.49$, $p < .001$).

In a more recent study that spanned ten years, Edwards, Bart, et al. (2009) examined physical abilities in 1,248 community-dwelling adults over the age of 55 years. Measures included the Rapid Walk Test to determine leg strength and endurance, Arm Reach to determine upper body strength, head-neck rotation in degrees, and a self-rating for walking

distances and climbing stairs. Only Rapid Walk, signifying slower walk time, emerged as an indicator of driving cessation over the ten year period ($HR = 1.91$, 95% CI [1.37, 2.65], $p < .001$).

While several researchers have cited reaction time as a factor related to driving cessation (Dellinger et al., 2001; Johnson, 1999; Morgan, Turnbull & King, 1995) only one study examined reaction time in a driving situation. Retchin et al. (1998) compared former drivers, infrequent drivers, and frequent drivers. Using a timer that simulated traffic lights, they measured the interval between releasing the accelerator and compressing the brake. Mean reaction time for former drivers was significantly longer at 1.33 seconds compared to infrequent drivers and frequent drivers who scored a mean of 0.66 seconds and 0.84 seconds respectively ($p < .05$).

Highly disabling conditions which result in the loss of gross motor skills (e.g., Parkinson's disease and stroke) are related to giving up driving. In a study that spanned five years and included 1,656 community-based adults, aged 70-96, Campbell et al. (1993) reported that individuals with Parkinson's disease were six times more at risk of stopping driving ($OR = 6.36$, 95% CI [1.9, 21.2]) than those without the condition. Other researchers have also found a strong association between neuromuscular functioning and driving cessation (Foley et al., 2000; Forrest et al., 1997; Hakamies-Blomqvist & Wahlstrom, 1998; Johnson, 1999; Kington et al., 1994; Marottoli et al., 1993; Stewart et al., 1993).

Chronic Illness. Chronic illnesses that lead to driving cessation include diabetes and cardiovascular disease (Edwards et al., 2008; Forrest et al., 1997; Gilhotra et al., 2001; Dellinger et al., 2001; Sims et al., 2011) as well as syncope and stroke (Campbell et al., 1993). Forrest et al. (1997) found that the odds of stopping driving were higher for older adults with diabetes ($OR = 2.53$, 95% CI [1.57, 4.07]) or angina ($OR = 1.93$, 95% CI [1.29,

2.90]) compared to individuals without these conditions. Campbell et al. (1993) reported that syncope increased the odds of driving cessation ($OR = 1.91$, 95% CI [1.2, 3.0]) as did stroke related paralysis ($OR = 3.33$, 95% CI [1.2, 9.5]). Sims et al. (2011), using data from the American Cardiovascular Heart Study (CHS), found a significant association between heart failure and driving cessation ($HR = 1.43$, 95% CI [1.21, 1.68] $p < .001$) in a cohort of 5,383 community dwelling older adults.

The presence of several medical conditions simultaneously, known as comorbidity, has also been shown to influence driving cessation. Hakamies-Blomqvist and Wahlstrom (1998) found that male ex-drivers reported 2.61 illnesses in comparison to male drivers who reported 1.36 illnesses. Forrest et al. (1997) showed that the probability of driving cessation increases with each additional condition ($OR = 1.21$, 95% CI [1.13, 1.24]). Further, the probability of driving cessation is even stronger when individuals have more than one condition that affects visual and neuromuscular functioning. Campbell et al. (1993) reported that the odds of quitting were 60 times greater for participants who had three or more such conditions when compared to participants with no conditions.

In contrast, Dellinger et al. (2001) found that those who stopped driving had fewer medical conditions than those who continued to drive. To explain this inconsistency, the researchers turned to the participants' ratings of their own health status. On a scale that asked participants to rate their health as excellent, very good, good, fair, or poor, those who stopped driving reported lower levels of health. The researchers concluded that driving cessation may be based on the individual's own assessment of his or her general functioning rather than on medical diagnosis. Older people who perceive their health as poor make the decision to quit driving. Similar results have been observed by other researchers who included self-ratings of health (Anstey et al., 2005; Johnson, 1995; Jette & Branch, 1992;

Simms, Ahmed, Sawyer, & Allman, 2007) and may explain why some individuals with highly disabling and chronic conditions continue to drive.

Psychological Variables. Numerous studies have examined visual, cognitive, and psychomotor abilities, and medical conditions as predictors of driving cessation. Yet, these variables have been shown to account for only about 30% of the variance (Kington et al., 1994) leaving a considerable amount unexplained.

Psychological resource variables, such as one's life attitudes and sense of control, have been shown to affect how people respond to and manage stressful life events (Taylor, Kemeny, Reed, Bower, & Greunewald, 2000). However, psychological resources along with personality traits have typically been overlooked as predictors of driving cessation (Kafka, 2008). One exception is a study which investigated older women's reasons for stopping driving prematurely. Siren et al. (2004) included optimism as a predictor variable; however it did not reach significance.

In a recent unpublished study, Kafka (2008) found that psychological resource variables and personality traits made a unique contribution to the prediction of driving cessation, accounting for an additional 10% of the variance (Nagelkerke $R^2 = .39$) when they were added to a model that included medical and socio-demographic variables (Nagelkerke $R^2 = .29$). With regard to psychological resource variables, life purpose which measures zest for life, satisfaction, and fulfillment emerged as risk factors for driving cessation ($OR = 1.21$, 95% CI [1.01, 1.46]). Having a more external locus of control was also a risk factor ($OR = 0.86$, 95% CI [0.75, 0.99]), while life control did not reach significance. Life control measures an individual's perceived control over his or her environment at a specific point in time (Reker, Peacock, & Wong, 1987), while locus of control looks at two ends of a continuum; internal and external. People with an internal locus of control believe that they

have control over their own destiny, while people with an external locus of control believe that external forces, such as other people or luck, determine outcomes (Robinson, Shaver & Wrightsman, 1991). Of the two personality traits that were included, neither extraversion nor neuroticism reached significance as predictors of driving cessation. Psychological resource variables and personality traits are areas that need further exploration.

Demographic and Social Factors.

Age. Although many adults continue to drive well into their 80s and 90s, there is substantial evidence to conclude that the likelihood of stopping increases with age (Ackerman et al., 2008; Antsey et al., 2006, Edwards, Bart et al., 2009; Emerson et al., 2012; Jette & Branch, 1992; Marottoli et al., 1993, Talbot et al., 2005). Campbell et al. (1993) found that the odds of driving cessation reached 1.9 (95% CI [1.2, 3.2]) for participants between the ages of 75 and 79 years compared with those between the ages of 70 and 74 years. The odds of cessation increased to 11.4 (95% CI [6.6, 19.6]) for participants 85 years and over.

Gender. In 2007, Unsworth, Wells, Browning, Thomas, and Kendig reported that the women in their study were three times more at risk for stopping driving (95% CI [1.44, 6.44]) when compared with men. While numerous other studies have confirmed this gender difference (Campbell et al., 1993; Gallo et al., 1999; Hakamies-Blomqvist & Wahlstrom, 1998; Jette & Branch, 1992), recent studies that controlled for baseline driving have failed to replicate these findings (Ackerman et al., 2008; Edwards, Bart et al., 2009; Griffen et al., 2009). Edwards, Bart et al. (2009) suggest that gender differences may be diminishing in modern cohorts, but Hakamies-Blomqvist & Siren (2003) argue that this will only happen if women acquire “male like” driving habits (p. 387).

Studies demonstrate that men and women stop driving for different reasons. In a population based study designed to investigate license renewal and the reasons men and women did not renew, women often cited that they had no specific needs or only occasional needs for driving. When they decided not to renew a license it was because they no longer drove (Hakamies-Blomqvist & Wahlstrom, 1998). Fifty-one percent of the participants in a study that included 1,476 women indicated that the availability of a spouse to chauffeur them was very important in their decision to stop driving (Hakamies-Blomqvist & Siren, 2003).

Women, in a study conducted by Wilkins, Stutts and Schatz (1993), reported that driving became the responsibility of the husband once he was retired. Eventually, due to a lack of practice these women lost confidence in their driving skills and stopped driving completely. Men, on the other hand, typically continued to drive until health problems forced them to quit (Hakamies-Blomqvist & Wahlstrom, 1998). Results reported in a study conducted by Choi, Mezuk, Lohan, Edwards, and Rebok (2012) support these findings. Men who were married were six times less likely to stop driving than men without a spouse ($OR = 0.18$, 95% CI [0.06 – 0.56] $p = .003$).

Household Size. The association between household size and the odds of driving cessation is statistically significant. In fact, Freund and Szinovacz (2002) and Kington et al. (1994) concluded that driving cessation is encouraged by the availability of another driver in the home. This is consistent with results that were reported previously; married female participants who conferred driving responsibility to their retired husbands lost confidence in their driving skills and stopped driving (Wilkins et al., 1993). Kington et al. (1994) found that the odds of continuing to drive decreased ($OR = 0.64$, 95% CI [0.42-0.98], $p \leq .05$) for those who lived in households with other adult drivers.

Transportation Support. In a study that examined alternative transportation, researchers found that older adults were more likely to stop driving if they could depend on friends ($HR = 2.49$, 95% CI [1.44 – 1.28]), agencies ($HR = 6.28$, 95% CI [1.78 – 22.24]) and hired assistants ($HR = 8.04$, 95% CI [3.19 – 20.25]) for transportation support (Choi, Adams, & Kahana, 2012). In addition, older adults who live in urban areas where public transportation is readily available are more likely to stop driving than those who live in smaller communities or rural areas (Fruend & Szinovacz, 2002; Kington et al., 1994; Talbot et al., 2005).

Income/Costs. A number of researchers have found that insuring and maintaining a car is too expensive for individuals on fixed incomes (Dellinger et al., 2001; Gilley et al., 1991; Hakamies-Blomqvist & Siren, 2003; Morgan et al., 1995; O’Neill, Bruce, Kirby & Lawlor, 2000; Persson, 1993). Marottoli et al. (1993) found that having an income of less than \$5,000 was significantly associated with driving cessation in a sample of 1,316 community-living older men and women ($OR = 1.21$, 95% CI [1.01, 1.46]). Hakamies-Blomqvist and Siren (2003) noted that approximately 32% of the women and 25% of the men in their study had stopped driving because it was too expensive and 36 of 43 former drivers in a study conducted by Morgan et al. (1995) reported cost as their main reason for stopping driving. On the other hand, Unsworth et al. (2007) found that participants who described themselves as financially comfortable were more likely to stop driving compared to those with lower incomes ($OR = 2.36$, 95% CI [1.06, 4.82]). Financially comfortable older adults have other options such as hiring a driver or taxi, or moving to retirement residences that provide meals, professional care, social and physical activities, and transportation thereby making it unnecessary to drive.

Driving History and License Renewal. A few studies have examined the personal driving histories of older adults in an attempt to determine reasons for giving up driving. Hakamies-Blomqvist and Siren (2003) compared the driving histories of 1,097 female drivers and former drivers, aged 70 years, and found significant differences. While former drivers had been licensed an average of 31 years, drivers had been licensed an average of 33 ($t = 3.05, p < .01$). The ratio of active years of driving per licensed years was 0.92 for drivers and 0.33 for ex-drivers. Over the years, those still driving had driven significantly more kilometers per year ($t = 3.65, p < .001$) than ex-drivers. Of the drivers, 70.4% reported driving at least once a week, while only 34.5% of former drivers reported the same in the two years before cessation. Edwards, Bart, et al. (2009) found that fewer 'days driven per week' was a significant predictor of driving cessation ($HR = 0.83, 95\% CI [0.69, 1.00], p = .05$) in a study that examined older drivers over a ten-year period.

Hakamies-Blomqvist and Siren (2003) reported that former drivers were more likely to experience stress in 11 of 16 driving situations including driving in rush hour, overtaking vehicles, adjusting to flow, parking/reversing, crossings, switching lanes, merging from side roads, driving on slippery roads, traffic signs, driving long distances, and driving on highways. While 85% of drivers reported that they enjoyed driving very much or moderately, the percentage dropped to 64% for former drivers ($\chi^2 = 59.30, p < .001$).

Johnson (1999) examined driving history in 285 urban adults, aged 70 and older. All participants reported causing at least two, and up to four, collisions in the 12 to 18 month period prior to quitting. Although collisions resulted in driving cessation in all cases, the decision to stop driving was not by choice. Seventy-five percent of these older adults had their licenses revoked. Seventy-three percent also indicated that family and friends had given them no choice. Fear of driving was a contributing factor in only 42% of the decisions to

quit. Surprisingly, 78% of these participants reported they were safe drivers at the time of their collisions. This suggests that older urban adults either refuse to admit they should no longer drive or are unable to accurately judge their own driving abilities (Johnson, 1999).

Lower rates of licensure in adults over the age of 70 have been found in locations where older drivers are subject to screening practices (Hakamies-Blomqvist & Wahlstrom, 1998). While lower rates are attributed to the fact that some applicants are denied license renewal, Wilkins et al. (1993) revealed that fear of driving in an unfamiliar vehicle with someone evaluating them kept participants in their study from attempting to renew their licenses (Wilkins et al., 1993).

On a survey that asked older adults to choose their main reason for driving cessation from six categories, 12% selected licensing or license renewal problems related to vision, cardiovascular disease and other unspecified reasons. A comparison of men and women in this group revealed that women reported licensing problems more frequently (Dellinger et al., 2001).

Influence of Others. There is evidence that family and friends have some influence on the older adult's decision to stop driving. In a study that included 60 older adults living in rural areas with populations of up to 10,000, 70% indicated that discussions with their best friends and most influential family members had influenced their decision to quit. Of the 23 who discussed cessation with both friends and family, 61% indicated that friends had more influence on their decision than family members (Johnson, 1998b). Johnson (1995) obtained similar results in an earlier rural study, and again in a more recent study of 285 older adults living in communities of 750,000 and over (Johnson, 1999). Comments given by participants indicated that trust and support from friends and family were key factors in the decision making process (Johnson, 1998b). They also indicated that friends were more influential

because they understood the importance of the decision and the consequences it could have (Johnson, 1995). However, family and friends can also influence older adults to continue driving, even when they are no longer safe behind the wheel. Adler, Rottunda, Rasmussen, and Kuskowski (2000) found that older adults with cognitive impairments were less likely to stop driving when their spouses depended on them for transportation. Only 3 of the 15 dependent caregivers discussed cessation with their spouse, compared to 8 of the 15 who described themselves as independent ($p < .06$). Instead of encouraging cessation, they acted as copilots navigating for the impaired individual. Even when advised to quit by a doctor, the dependent spouse was significantly less likely to encourage driving cessation compared to those who were not dependent ($p < .03$).

Evidence suggests that very few health practitioners discuss the issue of driving cessation with their patients (Persson, 1993; Hakamies-Blomqvist & Wahlstrom, 1998; Johnson, 1999a; Johnson, 2000). Patients do indicate, however, that they value the practitioner's opinion. In Johnson's (2000) study, 58% of older adults revealed that the nurse practitioner's opinion was important. Adler and Kuskowski (2003) reported that 78% of their patients with dementia said they would be willing to stop driving if the request came from a physician. Trobe et al. (1996) reported that physician intervention alone influenced 28% of Alzheimer's patients to stop driving, while 52% stopped when physicians and family intervened together.

A Threshold.

The most common way for older adults to stop driving is a gradual change in their driving behaviour. Driving cessation resulting from a sudden disabling event is less common (Persson, 1993). Persson (1993) suggested that older adults reach a personal threshold. When one or two limitations are present they compensate. For example, those with visual

problems avoid driving at night, while those who are worried about the increasing costs of operating a vehicle decrease their mileage. However, as the factors accumulate it becomes more difficult to compensate and a final event such as a collision or health problem results in the decision to stop driving. In an urban study that included 56 participants, 80% followed this pattern (Persson, 1993). Marottoli et al. (1993) obtained similar results in a sample of 1,316 older adults. While 17% of participants stopped driving when one or two factors were present, 49% stopped when three or more were present.

The Consequences of Driving Cessation

Considering the extent to which we rely on the personal automobile and the symbolic importance it holds in our society, one would expect that giving up driving privileges would have a serious impact on many aspects of life. Research demonstrates that driving cessation affects community and social integration, personal and social identity, subjective well-being, cognitive health, longevity, and even the lives of friends and family.

Community and Social Integration.

Meeting Transportation Needs. Older adults who stop driving must find alternatives to meet their transportation needs. Fifteen older women, in a study conducted by Bonnel (1999), identified two strategies for managing day-to-day activities; informal resources which included family, friends and neighbours, and formal resources which included community transportation systems and government programs. Several studies (Azad, Byszewski, & Molnar, 1999; Bauer, Rottunda & Adler, 2003; DeCarlo et al., 2003; Kostyniuk et al., 2003; Rosenbloom, 2001; Rosenblum & Corn, 2002a, 2002b) have found that while former drivers depend on a variety of means for transportation, informal resources are relied on most often. Rosenblum and Corn (2001a) found that two thirds of former drivers relied on family or friends as their usual mode of transportation. Rosenbloom (2002) noted gender differences

with women being more likely to access formal resources. Approximately 83% of their male participants relied on family and friends for rides to medical appointments and to obtain groceries. In contrast, only about 66% of the women relied on family and friends for rides to medical appointments and 76% to obtain groceries. Women's bus travel tripled while none of the men reported using buses.

Older adults have indicated that the informal system provides greater flexibility and also provides emotional support (Bonnell, 1999; Bauer et al., 2003) and in most cases family and friends are supportive and willing to provide rides (Corn & Rosenblum, 2002). Those who have access to and use the formal system have identified numerous disadvantages (Johnson, 1998a; Johnson, 2000; Lister, 1999; Peel, Westmoreland, & Steinberg, 2001). Schedules and locations are often inconvenient and access can be difficult for individuals who are frail. Bus rides and waits are often too long and cabs are too expensive. Those who have never relied on public transportation simply do not know how to use the bus or read the schedule (Bryanton, Weeks, & Lees, 2010). Johnson (2000) reported that nurse practitioners who assist older adults to cope with the loss of their driver's license expressed frustration. They described difficulties with unreliable and expensive transportation systems but also feared that involving family would create conflict making an already bad situation worse.

Loss of driving privileges is especially troublesome for those who live alone or with non-drivers. Taylor and Tripodes (2001) examined 315 older former drivers with dementia and found that the odds of experiencing serious transportation difficulties were reduced by 80% for travel to medical appointments and by 83% for travel to social activities when there was a driver in the home. Transportation difficulties for essential shopping trips were 12 times higher in homes without a licensed driver when compared to those with a licensed driver. Alternative and special transportation services were not suitable for individuals who

needed supervision at both ends of the trip and so they were used by only 2% of participants. The majority of these former drivers depended on family members for transportation.

Mobility options that allow more individual control have also been reported. For example, one elderly woman kept her car and hired neighbours to drive while another found that prepaid long-term taxi use was more economical than single use, was convenient, and met her needs (Bryanton, et al. 2010).

Impact on Daily Activities. For many older adults, driving cessation leads to transportation problems that result in a substantial decline in community and social integration. Rosenbloom (2001) found that both the frequency and distance traveled by older adults fell after cessation and differed by gender. Women made 1.9 fewer daily trips with daily mileage dropping by 60.9%. Men made 2.1 fewer daily trips and reduced their mileage by 63.3%. Marottoli et al. (1993) also observed this negative impact on out-of-home activity levels in a longitudinal study that included 1,316 community dwelling adults aged 65 and older. Participation in nine social activities such as outings to restaurants and recreational events, shopping, day or overnight trips, performing volunteer work, and attending religious services was affected by driving cessation. Information gathered at three-year intervals between 1982 and 1988 revealed that those who drove at baseline had higher activity levels than those who did not drive at baseline. Those who stopped driving after an interview had lower activity levels at the subsequent interview, with the magnitude in activity decline being three times higher than the average decline among participants. Fifteen older women who participated in a qualitative study conducted by Bonnel (1999) also reported giving up social outings with friends, attendance at church, volunteer work, meals out, and trips to see out of town family. These findings are similar to those reported by Liddle, Gustafsson, Bartlett, and McKenna (2012). While 66% of current drivers in their study participated in volunteering

activities, only 30% of former drivers were volunteers ($\chi^2 (1) = 7.9; p = .05$). Former drivers were also less likely to be involved in family member roles ($\chi^2 (1) = 6.7; p = .009$) and spent significantly more time in solitary leisure ($R^2 = .14, p = .003$) and less time in social leisure ($R^2 = .06, p = .01$) than current drivers. Through an interview that included 11 older female former drivers, Bryanton et al. (2010) found that participants were more likely to ask for rides to activities that were deemed necessary such as medical appointments, rather than to social activities.

Kim and Richardson (2006) examined consumption patterns in 1,287 older adults between 1998 and 2002. Although spending for basic needs such as food and clothing did not change, those who stopped driving after 1998 had significantly reduced their spending in areas that the authors suggest are associated with life satisfaction and quality of life such as trips, tickets to events, and dining out. Similar results were obtained by Taylor and Tripodes (2001) who found that trips for shopping and to social and recreational activities were adversely affected after license revocation due to dementia. The number of participants who did their own shopping prior to license revocation fell from 40% to 9% after the loss, and the number who rarely participated in social activities increased from 5% to 13%. Rosenblum et al. (2002b) examined activity levels in older adults who stopped driving due to visual impairment, and found that 50% of participants reported a reduction in social activities such as participating in hobbies and going out to visit friends. Legh-Smith (1986) also found that stroke patients who stopped driving had a significant reduction in bus travel and shopping and Azad et al. (2002) reported that 58% of patients with memory disorders indicated that leisure activities were more affected by driving cessation than instrumental activities of daily living. Finally, DeCarlo et al. (2003) examined differences between drivers and former

drivers with age-related maculopathy and found that former drivers scored significantly lower in social functioning and experienced more role difficulties.

Psychological and Physical Well-Being.

Feelings and Losses. The cancellation of a drivers' license can be a devastating experience for older adults. Whitehead, Howie, and Lovell (2006) reported that the loss of driving privileges affected both the personal and social identity of older adults. Participants claimed they had lost pride, self-esteem, and confidence, and many felt their lives were spiraling out of control. Some spoke of “‘losing everything’ . . . : Without a driving license (pause) . . . well it is the end of my life . . .” (p. 177). Surprise, fear, sadness, blame, and anger are also emotions expressed when individuals realize they can no longer drive (Liddle, Turpin, McKenna, Kubus, Lambley, & McCaffrey, 2009).

In an urban study that included 285 urban adults (Johnson, 1999), comments made during interview sessions revealed that loss of driving privileges was a “resounding and overwhelming concern” (p.16) for 81% of the participants. Older adults in many cases were uncomfortable asking friends and family members for rides because they felt they were inconveniencing them and becoming a burden (Bauer et al., 2003; Bryanton et al., 2010; Johnson, 1999; Peel et al., 2001).

Loneliness was the result of isolation for 78% of the participants and was the most significant impact of driving cessation in a rural study that included 60 older adults (Johnson, 1998b). In three different studies, Johnson (1995, 1998b, 1999) obtained interview data where individuals expressed feelings of isolation through statements such as this:

Before I turned in the license, I had nightmares about being alone and sick with no way to get anywhere. I knew . . . I would be alone without

my car. And, I am . . . I miss my friends. They come when they can, but I'm alone. The days are long (Johnson, 1995, p. 135-136).

Regret is evident in older adults who experience isolation and loneliness. In a group of 75 rural older adults who had stopped driving, 78% revealed that even though they were unsafe behind the wheel, if they could do it over they would not give up their licenses (Johnson, 1995). This participant's comments were representative of many others; "I knew I had to do it because of the troubles I was having staying on the street and all, but if I had it to do over, I'd never do it. I'd pretend longer" (p. 134).

Even before they stop driving older adults worry about the consequences of cessation. In a study in which 81% of the participants were still driving, analysis of interview sessions revealed that driving cessation was the most frequently discussed of nine themes (Yassuda, 1999). Forty-percent of responses were related to issues of driving cessation including how to avoid it, alternative transportation, preparation and resistance, and emotions about the change, while another 10% of responses were related to concerns about independence. Safety issues and health factors, such as neurological, sensory, and motor changes that could affect driving represented only 22% of the responses. However, research also suggests that those who have not experienced the loss of a license view the experience more negatively than those who have (Carp, 1971). Although older adults' views of driving cessation as they anticipate the change are negative, over time they adjust to non-driver status and worry less (Corn & Rosenblum, 2002). One-hundred and sixty-two adults over the age of 60, with visual impairments, had numerous worries when they stopped driving. The top ranking worry for participants was "becoming a burden to others", followed by "not getting where I want to go". After stopping "not getting where I want to go" became the top ranking worry followed by "losing my independence". While most worries decreased over time, worry about

isolation and having fun decreased more for women than men. Worries about “relationships with friends” increased for both genders, and especially for those who did not have a driver in the home or were over the age of 80.

Although older adults may be worried about isolation and relationships with friends, research suggests that driving cessation has little impact on social support. Mezuk and Rebok (2008) addressed the impact of driving cessation on social integration and support, in a study that spanned 13 years, and reported that although an individual’s network size of friends decreased, driving cessation did not significantly change the support that individuals received from their friends and families. In addition, Bonnel’s (1999) participants indicated that worries about being a burden were reduced to some extent when they developed relationships in which they exchanged gas money or food for rides.

Researchers have found that some older adults enjoy “driving for the sake of driving” (Ralston, Bell, Mote, Rainey, Braymont & Shotwell, 2001, p. 64). With the loss of a license these older adults have lost the opportunity to participate in a recreational activity that they take considerable pleasure in.

Even when transportation alternatives are available, the loss of a license can impact the quality of daily activities. Interview responses from a number of qualitative studies reveal that older adults do not enjoy activities to the same extent because of restrictions placed upon them by their alternative transportation arrangements. Restrictions include a lack of spontaneity resulting from the need to plan ahead, not being able to get to desired locations, not being able to stay for as long as desired, having to wait until someone is available to drive, and feeling dependent (Bauer et al., 2003; Buys & Carpenter, 2002; Lister, 1999; Logsdon et al., 1992; Rosenblum & Corn, 2002a, Wilkins et al., 1993). Liddle, Gustafsson, Bartlett, and McKenna (2011) suggested that the unhappiness, grief, isolation,

and inability to participate in valued roles resulting from driving cessation contributed to significantly lower scores on the Life Satisfaction Index ($F(2) = 4.18, p = .016$).

Because a driver's licence is a government issued document with a photograph, it is a form of identification that can be used for numerous purposes. Without it, former drivers find that they have difficulty accessing services within the community such as motorized mobility aids in shopping centres. Many seniors hang on to their expired licence as a means of maintaining their identity (Liddle et al., 2009).

There is a dearth of literature related to positive consequences of driving cessation. Pellerito (2009), however, encouraged participants in a qualitative study to share their positive experiences about driving cessation and found that five themes emerged. Of the 30 participants, eight reported that they felt an increased sense of relief and six felt a heightened sense of personal safety because they no longer had to drive. Six participants felt that social ties with family members or friends who provided rides had been strengthened, and they enjoyed the increased time they were spending with them. Another eight participants indicated that their involvement in the community actually increased. Likewise, participants in another study reported at least some benefits and positive feelings related to driving cessation from reduced stress to financial relief, and new social connections (Liddle, Turpin, Carlson, & McKenna, 2008).

Depression. Depression is another consequence of driving cessation that many people experience. Legh-Smith (1986) compared stroke patients who resumed driving to those who did not due to residual disability. Patients who did not resume driving were significantly more depressed on the Wakefield Self-Assessment Depression Inventory. Thirty-seven percent of the 67 patients obtained scores that indicated probable or certain depression compared to only 7% who resumed driving.

Three more recent studies have examined depression in relation to driving cessation using larger samples and controlling for health-related factors. In a longitudinal study that included 1,316 community-dwelling older adults, Marottoli et al. (1997) found that depressive symptoms increased more in participants who stopped driving than in current drivers and non-drivers (defined as those who had never driven or had stopped before the study began). Using the Centre for Epidemiologic Studies-Depression (CES-D) scale, depressive symptoms were assessed at three intervals over a six-year period. Although the mean number of depressive symptoms increased for all three groups, the group who stopped driving after the first assessment had the highest mean number of depressive symptoms in later assessments. At all three assessments, drivers had the lowest mean CES-D scores. Driving cessation remained one of the strongest predictors of increased depressive symptoms (regression coefficient 2.464, $SE = 0.758$, $p = .001$) even after controlling for sociodemographic and health-related variables that could affect either depressive symptoms or driving cessation. In a similar longitudinal study that included three assessments over a five-year period, Fonda et al. (2001) found that the risk for depressive symptoms was 1.44 times greater ($p < .05$) for those who quit driving between the first and second CES-D assessment than for those who continued to drive at the second assessment. More recently, Ragland, Satariano, and MacLeod (2005) observed 1,419 community dwelling adults, aged 55 and older, over a three year period to determine if driving cessation was associated with increased depressive symptoms. After controlling for age, sex, marital status, education, and health, participants who stopped driving during the three year interval reported higher levels of depression on the CES-D than those who continued to drive (9.7 compared with 5.7; $p < .001$). In addition, depression scores were significantly higher for men.

Decline and Death. More dire consequences of driving cessation have been suggested and examined by a few researchers. Edwards, Lunsman, Perkins, Rebok, and Roth (2009) examined the effects of driving cessation on health trajectories in 690 adults aged 65 and older. Assessments performed at cessation and again at one, two, three, and five year follow-up visits indicated significantly steeper declines in general health for those who stopped driving. Participants who stopped driving after the first assessment in a study conducted by Fonda, Wallace, and Herzog (2001) were more likely to require proxies, an indication of cognitive decline, or die by third assessment which led the researchers to suggest that driving may, in some way, guard against these outcomes. In fact, cognitive decline resulting from the isolation caused by driving cessation was a fear expressed by participants in a study of rural elders (Johnson, 2002). Being a former driver was an independent risk factor for entry into long-term care (LTC) institutions ($HR = 4.85$, 95% CI [3.26, 7.21]) in a study conducted by Freeman, Gange, Munoz, and West (2006). In a recent study, Edwards, Perkins, Ross, and Reynolds (2009) followed 660 community-dwelling adults, aged 63 to 97, to determine if driving status predicted mortality. After adjusting for known predictors of driving cessation including sensory and cognitive decline, comorbidity, poor health, psychological well-being, physical function, depression, and performance on the MMSE, former drivers were 4.86 times more likely to die within a 3-year period than those who continued to drive.

Impact on Others.

In many cases the loss of driving privileges affects entire households. Taylor and Tripodes (2001) examined changes in household travel patterns and responsibilities that were the result of license revocation in a group of 315 patients with dementia. They found that former drivers continued to rely on the private automobile to get to medical appointments

and social or recreational activities, depending heavily on family members for transportation. Most former drivers (> 55%) depended on a spouse or adult child (> 23%) for transportation. Older women, because they were more likely to be widowed, depended more often on adult children for rides when they lost their licence to drive. In cases where the individual who lost a licence was responsible for household shopping, spouses (61%) and adult children (15%) often took over the task.

In Taylor and Tripodes (2001) study, the loss of a driver's licence due to dementia had serious implications for spouses and adult children, who were most often women, because they had to assume driving and shopping responsibilities. Forty-two percent of caregivers reported that they missed work at least occasionally to chauffeur the former driver. The authors suggest that the survey responses may not accurately reflect the extent of the problem because caregivers "downplay problems, transportation or otherwise, because they believe that such complaints reflect poorly on their ability to provide care" (p. 522). In another study, 45.2% of family/caregiver respondents indicated that providing transportation had a severe-to-moderate impact on their workload (Azad et al., 2002). Johnson (1999), who found that 65% of her participants reported that family members were available 39% or less of the time, suggests that families make promises without realizing how difficult it will be to keep up with the older adults' transportation needs.

Bonnel (1999) warned health care providers to be "aware of the ripple effect" that results when older adults stop driving (p.10). In a qualitative study designed to investigate the challenges faced by older women who stopped driving, her participants acknowledged that friends and neighbours who had depended on them for rides were affected by their decision to stop driving. Peel et al. (2002) reported that those who depended on a former driver for rides often experienced feelings of loss and depression (Peel et al., 2002).

Family and friends also have to deal with relationship strain when a senior is angry over the loss of their licence. Although in many cases they are relieved that the elder is off the road, the uncertainty of how to approach the subject or how they can assist can result in feelings of tension and discomfort (Johnson, 1998b).

The Present Study

While previous studies have shown that visual, cognitive, psychomotor, medical, demographic, and social factors are associated with driving cessation, there is an absence of information regarding psychological variables that may be associated with this event. Considering that psychological variables influence people's reactions to life events, how they manage stress, and the level of well-being they experience (Taylor et al., 2000) they may help predict how people respond to driving cessation. In a recent cross-sectional study that included 222 participants, ranging in age from 55 to 91 years, Kafka (2008) established differences between drivers and former drivers on measures of life purpose, life control, and locus of control. Higher scores for life purpose indicated that drivers had higher zest for life, satisfaction, and fulfillment than former drivers. Life control scores were also higher for drivers indicating that they felt they were currently directing their own lives. Compared to former drivers, drivers were more likely to have an internal locus of control; they believed that they had control over their own destiny. Former drivers, on the other hand, had an external locus of control indicating they believed that external factors were determining outcomes. The present study, therefore, will attempt to replicate these findings, and will further explore psychological variables to determine if differences exist between drivers and former drivers. Openness to experience, one domain of the NEO Five-Factor Inventory (Costa & McCrae, 1989) considered relevant to understanding interpersonal interactions and social behavior will be included in this study. This broad dimension measures depth of

feeling, innovativeness, creativity, and behavioural flexibility. People who are open to experience view challenging situations as opportunities for growth and may experience driving cessation more positively. In addition, because it has been suggested that older adults shift from assimilative coping to accommodative coping to buffer the effects of older age, coping mode will be included as well. Assimilative coping refers to pursuing goals in light of obstacles, while accommodative coping involves reinterpreting and relinquishing blocked goals (Brandstadter & Renner, 1990). Older adults are believed to shift modes to preserve integrity and maintain their self-image when they face extreme challenges (Brandstadter, Wenura, & Greve, 1993).

With regard to the impact of driving cessation on older adults, researchers have, for the most part, concluded that the outcomes are negative. However, these results have been obtained using measures that assess only the negative emotional states and cognitive components of well-being (Fonda et al., 2001; Legh-Smith, 1986; Marottoli et al., 1997) while ignoring positive emotional states (Kafka, 2008). Despite the fact that many older adults experience negative consequences related to driving cessation, there are reports of positive experiences from at least two qualitative studies (Little et al., 2008; Pellerito, 2009). Accurate assessment using measures that are both comprehensive and balanced is important in order to develop interventions that reduce the adverse consequences of driving cessation. Kafka (2008) identified a scale that assesses both positive and negative affective and cognitive states and provides a comprehensive assessment of the impact of driving cessation on subjective well-being. This scale, known as the Memorial University of Newfoundland Scale of Happiness (MUNSH), will be used along with the Satisfaction with Life Scale (SWLS) and the Geriatric Depression Scale (GDS) to examine both positive and negative outcomes associated with driving cessation.

The fact that there are reports of positive outcomes related to driving cessation suggests that certain variables may moderate, or influence, the strength or direction of the relationship between driving cessation and life outcomes. In a study that included 700 community dwelling adults over the age of 70, Windsor, Anstey, Butterworth, Luszcz, and Andrews (2008) examined perceived control as a moderator of the relationship between driving cessation and depression. Of the 53 participants who stopped driving, those with poorer self-rated health, and whose sense of control decreased after cessation, had higher depressive-symptom scores. Kafka (2008) obtained similar results in his study. Participants who scored higher on subjective measures of health and life control also scored higher on the MUNSH. Further examination of the role of psychological variables as moderators of the relationship between driving cessation and life outcomes is necessary.

The main objective of this research is to conduct a follow-up to Kafka's (2008) cross-sectional study, and further explore psychological variables in relation to driving cessation.

The specific research questions are:

1. Do differences exist between drivers and former drivers with regard to psychological variables? We hypothesized that former drivers would score lower than drivers on measures of life purpose and life control, and higher on measures of openness to experience, locus of control, and flexible goal adjustment.
2. Are life outcomes affected by driving status?
We hypothesized that former drivers would score higher than drivers on measures of depression, negative affect, and negative experience, and lower on measures of life satisfaction, general subjective well-being, positive affect, and positive experience.
3. What is the independent contribution of driving status to life outcome?

We will determine the proportion of life outcome that is uniquely predicted by driving status after controlling for known predictors of driving cessation (age and health).

4. Do psychological variables explain the change in life outcomes?

We hypothesized that psychological variables would moderate the relationship between driving status and life outcomes after controlling for known predictors of driving cessation.

Method

Study Design

Data collected in this follow-up study were combined with data collected in Kafka's (2008) cross-sectional driving cessation study.

Participants

At the time of Kafka's (2008) study, 175 of the 222 participants expressed interest in volunteering for a second phase of the study. Through an online obituary search, we learned that 24 of these older adults were deceased. Attempts were made to contact the remaining 151 potential participants.

Procedure

Upon approval of the Lakehead University Research Ethics Board, potential participants were contacted by the researchers through letter or e-mail, according to the contact information available, and invited to participate in the study. The letter or e-mail informed potential participants about the study, and indicated that a researcher would telephone them in the near future to discuss whether they would like to participate. During the telephone call, the researcher obtained informed verbal consent from individuals who indicated that they would like to participate in this phase. These potential participants were then mailed a cover letter, written consent form, and the questionnaire package. Participants

were asked to sign and date the written consent form indicating that they read the cover letter and understood the purpose of the study and the procedures involved, after which they were instructed to complete the pencil and paper questionnaire package. The length of time required to complete the questionnaires was approximately one hour.

Within two weeks, the researcher made a follow-up telephone call to the participants to ensure receipt of the questionnaire package and address questions or concerns. Participants were reminded to return their completed questionnaires to the researcher in the enclosed postage-paid envelope. Letters and telephone scripts are provided in Appendix A.

Materials

This follow-up study employed the same instruments as Kafka (2008) with one additional questionnaire, the Tenacious Goal Pursuit and Flexible Adjustment Scales, added to the package, as well as items from the Openness to Experience domain of the NEO Five-Factor Inventory. A brief description of each questionnaire follows.

Demographic Information. The Demographic Information tool uses 16 closed-ended questions that gather general demographic facts including age, gender, marital status, education level, income level, and housing type, as well as details related to health conditions, medications, and medication use that may affect an individual's ability to drive safely. See Appendix B.

Driving Cessation Questionnaire. Two versions of the Driving Cessation Questionnaire were included in the package; a Driver's Version and a Non-Driver's Version. The Driver's Version consisted of 19 questions that assess driving patterns, importance of driving, satisfaction and comfort with driving, anticipated reasons for future cessation, and available support systems. The Non-Driver's Version consisted of 12 questions that assess reasons for driving cessation, preparation for driving cessation, and available support

systems. The questionnaire is a combination of two previously used surveys; one from The Older and Wiser Driver Questionnaire (Tuokko, 2003) and the other from the Older Driver's Screener (Stutts, Wilkins, Reinfurt, Rodgman, & Van Heusen-Causey, 2001). See Appendix C and Appendix D.

Life Attitude Profile. The Life Attitude Profile (LAP) is a 56-item scale that assesses attitudes toward life across seven primary dimensions; life purpose, existential vacuum, life control, death acceptance, will to meaning, goal seeking, and future meaning (Reker & Peacock, 1981). Two of the seven dimensions, life purpose and life control, have been deemed suitable for exploring quality of life in older adults and were included in the questionnaire package. The nine items in the life purpose dimension measure zest for life, satisfaction, and fulfillment. The six items of the life control dimension measure freedom to make life choices (Reker, Peacock, & Wong, 1987). Participants respond to each item with a Yes, No, or Don't Know. With regard to psychometric properties, both dimensions have correlated significantly with other measures such as Shostrom's Personal Orientation Inventory thereby confirming that the scales have good construct validity (Reker & Peacock, 1981). Internal consistency is good for both life purpose and life control with Cronbach's alpha reaching .83 and .78 respectively (Reker & Peacock, 1981). Test-retest reliability has also been confirmed with coefficients of .83 for life purpose and .61 for life control (Reker, Peacock, & Wong, 1987). See Appendix E.

Memorial University of Newfoundland Scale of Happiness. The Memorial University of Newfoundland Scale of Happiness (MUNSH), developed by Kozma and Stones (1980), consists of 24 items that measure self-appraised current, transitory affective states, and dispositional aspects of happiness. Participants respond with a Yes, No, or Don't Know to five positive affect items, five negative affect items, seven general positive

experience items, and seven general negative experience items. As a measure of avowed happiness, the MUNSH has been validated and cross-validated with other measures, including the Philadelphia Geriatric Center Morale Scale (PGC) and the Life Satisfaction Index-Z (LSI-Z) and exhibits good construct validity (Kozma & Stones, 1980). Tests of internal consistency and test-retest reliability have also been adequate with coefficients of .85 (Cronbach's alpha) and .70 respectively (Kozma & Stones, 1980). See Appendix F.

NEO Five-Factor Inventory. The NEO Five-Factor Inventory (NEO-FFI) is a shortened version of Costa and McCrae's (1989) 240-item personality inventory through which personality is assessed in terms of five basic factors: Extraversion, Neuroticism, Agreeableness, Openness to Experience, and Conscientiousness. The Openness to Experience factor was included in the questionnaire package. Openness to experience, a broad dimension that measures depth of feeling, innovation, creativity, behavioural flexibility, intellectual curiosity, and unconventional attitudes, is considered the most relevant to understanding interpersonal interactions and social behavior (McCrae, 1996). Each factor is measured through 12 items to which participants respond on a 5-point Likert scale ranging from strongly disagree to strongly agree. See Appendix G.

Satisfaction with Life Scale. The Satisfaction with Life Scale (SWLS) is a cognitive-judgemental appraisal of one's satisfaction with life. As such, the standard for comparison is set by the individual and not imposed by the researcher. In addition, rather than assessing specific domains of life such as work or material wealth, the SWLS asks for an overall evaluation of life (Diener, Emmons, Larsen & Griffin, 1985). For example, one of the five items on the scale states "The conditions of my life are excellent" (Diener et al., 1985, p. 72). Participants respond on a 7-point Likert scale that ranges from strongly disagree to strongly agree. Moderately strong correlations with other assessments of subjective well-being and

life satisfaction demonstrate that the scale has good construct validity (Pavot, Diener, Colvin, & Sandvik, 1991). Internal consistency of the SWLS is supported with alpha coefficients exceeding .80 (Pavot & Diener, 1993), in addition to test-retest reliability at two-months with a correlation coefficient of .82 (Diener et al., 1985). See Appendix H.

Health Questionnaire. The Health Questionnaire assesses current health status, the presence of pain and, if one experiences pain, how the pain interferes with mood, activities, sleep, and enjoyment of life. The 27 items on the questionnaire are taken from the Canadian Study of Health and Aging-2 (Health Canada, 1997). See Appendix I.

Activities of Daily Living Questionnaire. The Activities of Daily Living Questionnaire consists of 14 items that assess activities of daily living (ADL) and instrumental activities of daily living (IADL) in order to determine an individual's functional status. ADL include bathing, toileting, continence, dressing, transferring, eating, and walking, while IADL include using the phone, self-administration of medications, shopping, housework, managing finances, and cooking. Participants respond to 11 items by indicating that they are unable to perform the activity, can perform it without help, or can perform it with some help. Two items require yes/no responses, and one item requires participants to indicate the number of days per week they left their house in the last month (two or more, one, or none). In 1991, The Canadian Study of Health and Aging adopted many of the ADL and IADL items from the Older Americans Resources and Services Survey (OARS) questionnaire (Duke University, 1975) and added three of their own to create the Activities of Daily Living Questionnaire. Breithaupt and McDowell (2001) confirmed, through item response model (IRM) analysis, that the ADL and IADL items represent two separate dimensions of disability that differ in severity. See Appendix J.

Internal-External Locus of Control Scale. The Internal-External Locus of Control

Scale (LOC) (Rotter, 1966) consists of 29 items that assess general conceptions regarding relations between actions and outcomes. An internal locus of control signifies a belief that outcomes are contingent on actions, with the opposite being true for an external locus of control (Robinson, Shaver & Wrightsman, 1991). Filler items will be excluded to reduce completion time and, therefore, 24 items will be included in the questionnaire. The scale has adequate internal consistency with a coefficient of .70 (Kuder-Richardson) and adequate test-retest reliability with a coefficient of .72 after one month (Rotter, 1966). See Appendix K.

Geriatric Depression Scale Short Form. The Geriatric Depression Scale Short Form (GDS) (Yesavage et al., 1983) assesses depression in individuals who are 55 years of age or greater. It consists of the 15-items from the original Geriatric Depression Scale Long Form (GDS-LF) that are the most highly correlated with depressive symptoms. Individuals respond to each item with a yes/no (Leshner & Berryhill, 1994). The GDS measures sense of emptiness, satisfaction with life, and envy of others (Iglesias, 2004). It is highly correlated with the validated GDS-LF ($r = .98$) (Leshner & Berryhill, 1994). In addition, comparison of the GDS and the Zung Self-Rating Depression Scale resulted in a correlation of .76, demonstrating adequate construct validity. Internal validity has also been demonstrated for the GDS, with an alpha coefficient of .82 (Iglesias, 2004). See Appendix L.

Short Form-12 Health Survey. The Short Form-12 Health Survey (SF-12) is a subset of 12 items from the Short Form-36 Health Survey (SF-36). Like the SF-36, the SF-12 measures eight components of physical and mental health and provides a representative sampling of how participants evaluate their health status, how they feel, and what they are able to do (Ware, Kosinski, & Keller, 1996). The four physical components, known as the Physical Component Summary (PCS-12) assess health related to physical functioning, physical role functioning, bodily pain, and general health perceptions. The four mental health

components, known as the Mental Component Summary (MCS-12) assess vitality, emotional role functioning, social role functioning, and mental health (Brazier, Jones & Kind, 1993). Although shortened, the SF-12 compares favourably to the SF-36 for test-retest reliability with coefficients of .76 for the MCS-12 and .89 for the PCS-12 (Ware et al., 1996). In evaluations of the test's ability to discriminate between diagnostic groups, relative validity coefficients for the PCS-12 and MCS-12 were 0.67 and 0.97 respectively, also comparing well to the SF-36 (Ware et al., 1996). See Appendix M.

Tenacious Goal Pursuit and Flexible Goal Adjustment Scales. The Tenacious Goal Pursuit scale (TGP) and the Flexible Goal Adjustment scale (FGA), more commonly known as the TENSIFLEX, was developed to assess assimilative coping and accommodative coping, respectively (Brandtstädter & Renner, 1990). Each scale consists of 15 items which are rated on a 5-point Likert scale that ranges from strongly agree to strongly disagree (Meuller & Kim, 2004). Brandtstädter and Renner (1990) assert that these two processes of coping are activated when one is confronted with problems and crises related to personal development. Those with an assimilative coping style are inclined to “tenaciously pursue goals even in the face of obstacles and under high risk of failure” (p. 61), while those with an accommodative coping style are inclined to “positively reinterpret initially aversive situations and to relinquish blocked goal perspectives easily” (p. 61). Brandtstädter, Wentura and Greve (1993) argue that a shift to accommodative coping over assimilative coping has a buffering effect in older age allowing people to preserve integrity and maintain their self-image in the face of serious functional decline. Alpha coefficients for internal consistency are satisfactory at 0.82 for the TGP scale, and 0.74 for the FGA scale (Mueller & Kim, 2004). See Appendix N.

Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS); Version 21.0 software. Data were entered into SPSS, reverse coded as required (NEO-FFI, TENFLEX), and scored. Descriptive statistics including means, standard deviations and ranges were examined to detect data entry errors and corrections were made. In addition, data were checked prior to analysis to determine if the assumptions underlying each statistical test were met.

Most questionnaires were completed fully, or had only a few missing values, with the exception of one. To address missing values in the Internal-External Locus of Control Questionnaire, a Missing Value Analysis was conducted in SPSS. The analysis determines the pattern of missing data and, because the result was not statistically significant, revealed that data was missing completely at random (MCAR) ($\chi^2(345) = 328.35, p < .732$). Missing values were then imputed using the expectation-maximization (EM) subcommand in SPSS. EM is a two-step method. The E, or expectation step, computes and substitutes expected values for the missing data based on current parameters of the observed values. The M, or maximization step, calculates a maximum-likelihood estimate based on these resolved completions. Analysis is then conducted on the new imputed data set (IBM Corporation, 2012; Tabachnick & Fidell, 2007). This method is considered one of the simplest and most reasonable approaches for imputing values when very little data are missing and the data are MCAR (Tabachnick & Fidell, 2007) and was deemed necessary in order to retain as much data as possible from the small former driver sample. Cases with more than one or two missing values (more than 8%) on any one questionnaire were deleted from analysis for that particular variable.

To determine if there is a difference in psychological variables between drivers and former drivers, we used independent samples t-tests. The psychological variables we examined included life purpose, life control, locus of control, openness to experience, locus of control, and two coping modes; flexible goal adjustment and tenacious goal pursuit.

To determine if life outcomes are affected by driving status we used a general linear mixed-effects model for each life outcome measure. The independent variable was driving status with two levels: still driving and ceased driving. Life outcomes, the dependent variables, were scores on the GDS, SWLS, MUNSH, and MUNSH subscales including Negative Affect, Positive Affect, Negative Experience and Positive Experience. The covariates were baseline scores on the GDS, SWLS, MUNSH, and MUNSH subscales, which were measured by Kafka (2008).

To examine the independent contribution of driving status to life outcome we repeated the general linear mixed-effects models described above with the following additional covariates also included: age and health.

To determine if psychological variables moderate the relationship between driving status and life outcomes we planned to repeat the general linear mixed-effect model described above (with baseline scores, age, and health as covariates) and include interaction terms. The moderator variables (psychological variables) considered were life purpose, life control, openness to experience, locus of control, and coping mode. An interaction between driving status and a psychological variable would indicate a moderator influence.

Due to the small sample size, we were unable to address this hypothesis without overfitting the models. Overfitting, or trying to estimate too many unknowns for the number of observations, can yield complicated relationships that cannot be replicated in future studies (Babyak, 2004).

Results

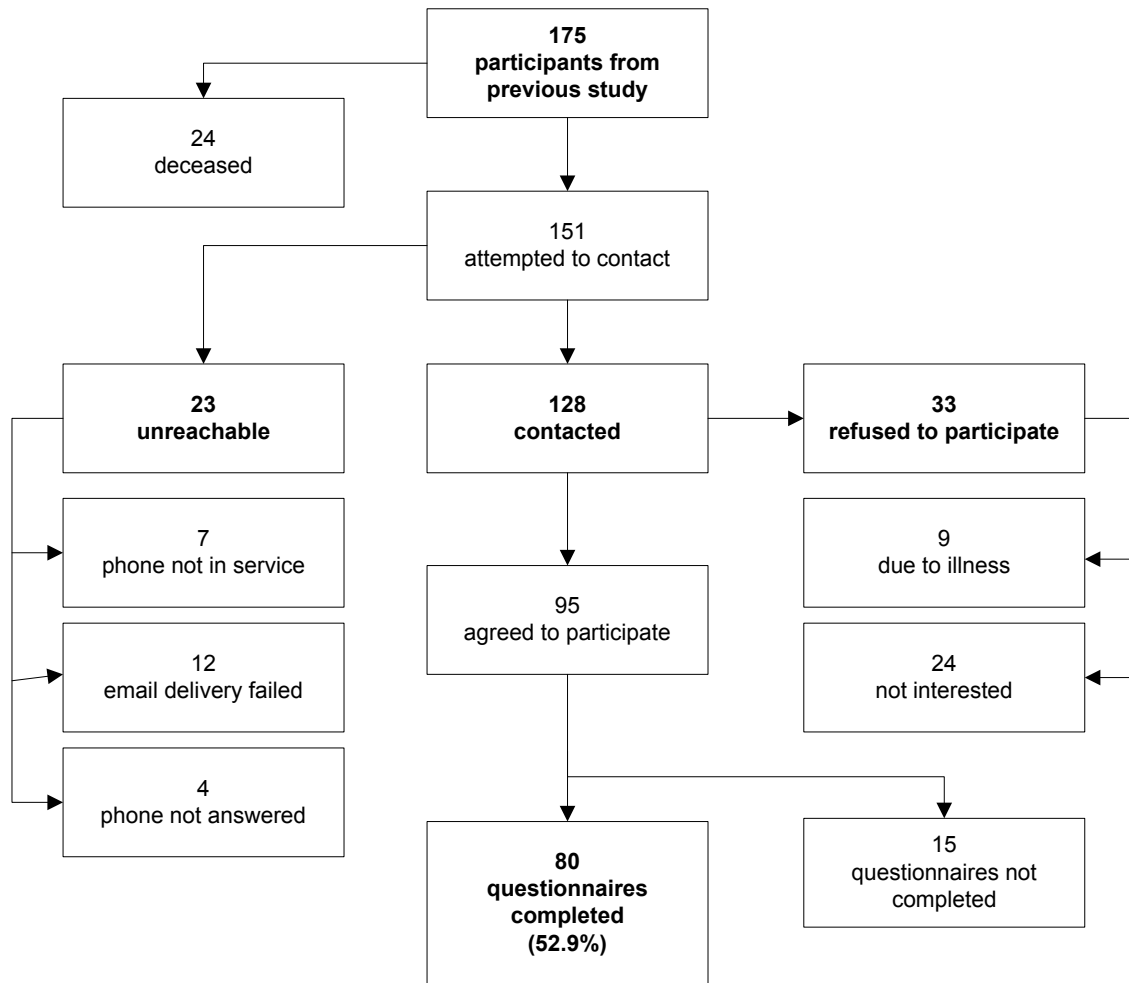
Sample Characteristics

Although we attempted to contact 151 potential participants, 23 were unreachable. Of the remaining 128 potential participants who were contacted, 95 expressed interest in the study and were mailed questionnaire packages, whereas 33 did not agree to participate. Ultimately, 80 completed and returned the questionnaire package, representing a 53% response rate. See details in Figure 1.

Of the 80 individuals who participated in this study, 35 (43.8%) were male and 45 (56.3%) were female. Their mean age was 76.34 ($SD = 8.76$). More than half (56.3%) reported that they were married or cohabiting, while 31.3% were widowed and the remaining 8.8% were divorced. The remaining individuals were single (2.5%) or separated (1.3%). Their incomes ranged between \$41,000 and \$50,999 per year, and their mean level of education was 14.29 years ($SD = 3.79$).

The majority of participants (92.5%) reported living in a location with a population of over 100,000. Of these, 42 (52.5%) resided in Winnipeg, Manitoba, and 30 (37.5%) resided in Thunder Bay, while 2 (2.5%) lived in Southeastern Ontario. The remaining 6 (7.5%) lived in locations with populations of less than 10,000 in Manitoba and Ontario. In total, 67 (83.8%) participants were drivers and 13 (16.3%) were former drivers.

Figure 1 Flow of Participants in A Study of Driving Cessation and its Association with Satisfaction with Life



Of the original 222 participants in Kafka’s study, 175 expressed interest in this study and gave permission for the researchers to contact them. Eighty questionnaires were completed and returned.

Table 1 Descriptive Statistics – Baseline and Follow-Up Scores - Total Sample, Drivers, and Former Drivers

		Total Sample (<i>n</i> = 80)			Drivers (<i>n</i> = 67)			Former Drivers (<i>n</i> = 13)		
		<i>n</i>	<i>M (SD)</i>	<i>Range</i>	<i>n</i>	<i>M (SD)</i>	<i>Range</i>	<i>n</i>	<i>M (SD)</i>	<i>Range</i>
Demographic characteristics										
Age (years)	Baseline	80	71.59 (8.78)	57-91	67	70.18 (8.13)	57-91	13	78.85 (8.69)	59-90
	Follow-up	80	76.34 (8.76)	61-96	67	74.67 (7.93)	61-96	13	84.92 (8.04)	64-94
Education (years)	Baseline	80	14.50 (3.79)	6-24	67	14.60 (3.56)	6-24	13	14.00 (4.95)	7-23
	Follow-up	80	14.29 (3.79)	6-24	67	14.51 (3.86)	6-24	13	13.15 (3.34)	8-17
Household income	Baseline	80	4.88 (1.95)	1-10	67	4.84 (1.95)	1-10	13	5.08 (2.02)	2-8
	Follow-up	67	5.36 (2.18)	2-10	56	5.39 (2.08)	2-10	11	5.18 (2.75)	2-10
Health and functional status										
Activities of Daily Living	Baseline	80	24.71(3.00)	15-26	67	24.76 (3.14)	15-26	13	24.46 (2.26)	18-26
	Follow-up	80	24.55 (2.25)	15-26	67	25.19 (1.18)	21-26	13	21.23 (3.37)	15-25
Health conditions (#)	Baseline	80	3.48 (2.72)	0-10	67	3.18 (2.55)	0-10	13	5.00 (3.19)	0-10
	Follow-up	80	4.36 (3.13)	0-14	67	3.90 (2.93)	0-14	13	6.77 (3.09)	2-12
Health SF-12 physical	Baseline	80	44.00 (11.25)	17-65	67	44.81 (10.85)	19-65	13	39.80 (12.72)	17-57
	Follow-up	80	41.86 (11.90)	16-64	67	43.78 (11.67)	16-64	13	31.96 (7.50)	21-47

		Total Sample (<i>n</i> = 80)			Drivers (<i>n</i> = 67)			Former Drivers (<i>n</i> = 13)		
		<i>n</i>	<i>M</i> (<i>SD</i>)	<i>Range</i>	<i>n</i>	<i>M</i> (<i>SD</i>)	<i>Range</i>	<i>n</i>	<i>M</i> (<i>SD</i>)	<i>Range</i>
Psychological variables										
Life Attitude Profile										
Life control	Baseline	80	10.59 (2.14)	2-12	67	10.57 (2.24)	2-12	13	10.69 (1.55)	8-12
	Follow-up	79	10.57 (2.12)	3-12	66	10.64 (1.98)	5-12	13	10.23 (2.77)	3-12
Life purpose	Baseline	80	13.55 (3.08)	5-16	67	13.70 (2.94)	6-16	13	12.77 (3.75)	5-16
	Follow-up	79	13.54 (2.15)	3-16	66	13.82 (2.90)	7-16	13	12.15 (4.12)	3-16
Neo-FFI										
	Openness to Experience ^a	79	36.94 (2.91)	31-44	66	37.15 (2.81)	31-44	13	36.08 (3.30)	31-43
I-E Locus of Control	Baseline	79	7.97 (3.58)	1-17	67	7.73 (3.59)	1-17	13	9.33 (3.28)	5-16
	Follow-up	60	11.75 (2.20)	8-16	51	11.65 (2.13)	8-16	9	12.33 (2.55)	9-16
Tenflex										
	Flexible goal adjustment ^a	78	9.50 (5.07)	-3-32	66	9.45 (4.41)	-3-21	12	7.83 (3.97)	2-15
	Tenacious goal pursuit ^a	77	4.34 (7.11)	-9-28	65	4.58 (7.21)	-9-28	12	3.00 (6.67)	-8-14

		Total Sample (<i>n</i> = 80)			Drivers (<i>n</i> = 67)			Former Drivers (<i>n</i> = 13)		
		<i>n</i>	<i>M</i> (<i>SD</i>)	<i>Range</i>	<i>n</i>	<i>M</i> (<i>SD</i>)	<i>Range</i>	<i>n</i>	<i>M</i> (<i>SD</i>)	<i>Range</i>
Life Outcomes										
Geriatric Depression Scale	Baseline	78	1.69 (2.09)	0-9	65	1.45 (1.85)	0-8	13	2.92 (2.81)	0-9
	Follow-up	79	1.96 (2.48)	0-12	67	1.59 (2.19)	0-12	13	3.67 (3.14)	0-9
MUNSH Total	Baseline	80	17.65 (7.66)	-8-24	60	18.13 (7.29)	-8-24	12	15.25 (9.25)	-1-24
	Follow-up	80	16.25 (8.75)	-13-24	67	17.22 (7.67)	-13-24	13	11.23 (12.15)	-10-24
Positive affect	Baseline	76	8.39 (2.40)	0-10	64	8.61(2.22)	0-10	12	7.25 (3.04)	2-10
	Follow-up	80	8.24 (2.40)	0-10	67	8.42 (2.26)	0-10	13	7.31 (2.93)	2-10
Negative affect	Baseline	76	1.26 (2.14)	0-10	63	1.30 (2.17)	0-10	13	1.08 (2.10)	0-6
	Follow-up	80	1.29 (2.06)	0-8	67	1.12 (1.78)	0-7	13	2.15 (3.08)	0-8
Positive experience	Baseline	76	11.82 (2.94)	2-14	63	11.94 (2.80)	2-14	13	11.23 (3.61)	4-14
	Follow-up	80	11.60 (2.87)	4-14	67	11.82 (2.65)	4-14	13	10.46 (3.73)	4-14
Negative experience	Baseline	76	1.53 (2.15)	0-7	63	1.27 (1.99)	0-7	13	2.77 (2.56)	0-7
	Follow-up	80	2.30 (3.09)	0-14	67	1.90 (2.70)	0-14	13	4.38 (4.13)	0-12
Satisfaction with Life Scale	Baseline	79	25.91 (6.41)	5-35	66	26.08 (6.10)	5-35	13	25.08 (8.03)	5-35
	Follow-up	80	25.21 (5.54)	5-35	67	25.36 (5.70)	5-35	13	24.46 (4.79)	18-32

Higher scores are better for Activities of Daily Living, Physical Health, Life Control, Life Purpose, Openness to Experience, and Flexible Goal Adjustment. Higher scores indicate higher income. Lower scores are better Locus of Control, Tenacious Goal Pursuit, Geriatric Depression Scale, MUNSH Negative Affect, and MUNSH Negative Experience. ^aBaseline data was not collected in Kafka (2008).

Consistent with previous studies of driving status, drivers were significantly younger than former drivers with a mean difference of 10.25 years. Drivers were also more independent in activities of daily living than former drivers and reported significantly better overall health and fewer health conditions than former drivers. See Table 2. A Chi-square test for association conducted between gender and driving status was not statistically significant, $\chi^2(1) = 0.176, p = .458$.

Table 2. Descriptive Statistics and Results of Independent-Samples t-tests by Driving Status

	Drivers (<i>n</i> = 67)		Former Drivers (<i>n</i> = 13)		95% CI for Mean Difference	<i>t</i> -test	<i>df</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Sample Characteristics							
ADL	25.19	1.18	21.23	3.37	1.91, 6.01	4.19*	12.58
Age	74.67	7.93	84.92	8.04	6.62, 17.0	4.26*	78
Education	14.51	3.86	13.15	3.34	-0.922, 3.65	1.19	78
Health	43.78	11.67	31.96	7.50	6.62, 17.01	4.69*	24.91
Health conditions	3.90	2.93	6.77	3.09	-4.66, -1.09	3.21*	78
Income	5.39	2.08	5.18	2.75	-1.23, 1.66	0.29	65

Note: Welch-Satterthwaite approximation employed due to unequal group variances for ADL and Health conditions. Income is based on Drivers (*n* = 56) and Former Drivers (*n* = 11). **p* < .05

Do Differences Exist Between Drivers and Former Drivers with Regard to

Psychological Variables?

We hypothesized that former drivers would score lower than drivers on measures of life purpose and life control, and higher on measures of openness to experience, locus of control, and flexible goal adjustment.

To determine if differences exist between drivers and former drivers with regard to these psychological variables, six independent-samples t-tests were conducted with driving status as the independent variable and life purpose, life control, openness to experience, locus of control, assimilative coping mode and accommodative coping mode as dependent variables. In total, twelve cases with missing values exceeding 8% were deleted from the original sample; one from life control, one from life purpose, six from locus of control, two from tenacious goal pursuit, one from flexible goal adjustment, and one from openness to experience. The remaining missing values were imputed using EM. Analysis was then performed using the SPSS Explore and SPSS Independent-Samples t-test procedures for testing of assumptions.

Results obtained from testing of assumptions revealed the presence of one extreme outlier for life control as assessed by inspection of a boxplot. This data point was within the range of possible scores and was therefore included in the analysis. Life control scores were not normally distributed for drivers with a skewness of 1.30 ($SE = 0.30$) and for former drivers with a skewness of -1.92 ($SE = 0.62$). Life purpose scores were also not normally distributed for drivers with a skewness of -1.11 ($SE = 0.30$). When logarithmic transformations failed to normally distribute the data, an Independent-samples t-test was conducted and a non-parametric test (Mann-Whitney U test) was also conducted to confirm the results.

Locus of control was lower in drivers ($N = 62$, $M = 7.87$, $SD = 3.3$) than former drivers ($N = 12$, $M = 9.94$, $SD = 3.0$), with a statistically significant difference, 2.07 (95% CI [4.13, 0.02]), $t(72) = 2.01$, $p = .048$. There were no statistically significant differences between drivers and former drivers for life purpose, life control, openness to experience,

flexible goal adjustment, or tenacious goal pursuit. Table 3 presents the results obtained from the independent-samples *t*-tests.

Table 3. Results of Independent-samples *t*-tests for Psychological Variables by Driving Status

	Driver		Former Driver		<i>t</i> -test	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Psychological Variables						
Flexible Goal Adjustment	9.80	5.21	7.83	3.97	1.21	.218
Life Control	10.64	1.98	10.23	2.77	0.63	.531
Life Purpose	13.82	2.90	12.15	4.12	1.76	.083
Locus of Control	7.87	3.32	9.94	2.98	2.07	.048*
Openness to Experience	37.15	2.81	36.08	3.30	1.72	.090
Tenacious Goal Pursuit	4.44	7.23	3.00	6.70	0.67	.505

Are Life Outcomes Affected by Driving Status?

We hypothesized that former drivers would score higher on measures of depression, negative affect, and negative experience, and lower on measures of life satisfaction, general subjective well-being, positive affect, and positive experience.

To determine if life outcomes are affected by driving status we planned to use a general linear model for each life outcome measure. The independent variable was driving status with two levels: still driving and ceased driving. Life outcomes, the dependent variables, were scores on the SWLS, GDS, MUNSH, and MUNSH subscales which include Negative Affect, Positive Affect, Negative Experience, and Positive Experience. The covariates were baseline scores on the SWLS, GDS, MUNSH and MUNSH subscales which were measured by Kafka (2008). Eight cases with missing values exceeding 8% on a life outcome measure were deleted from the original sample of 80 participants leaving 75

available for analysis for the MUNSH including 63 drivers and 12 former drivers, 79 for the SWLS including 66 drivers and 13 former drivers, and 78 for the GDS including 66 drivers and 12 former drivers. In addition, 74 participants were included in analysis for the Negative Affect subscale of the MUNSH including 62 drivers and 12 former drivers, 75 for the Positive Affect subscale including 62 drivers and 13 former drivers, 76 for the Negative Experience subscale including 63 drivers and 13 former drivers, and 77 for the Positive Experience subscale including 64 drivers and 13 former drivers. Overall, six missing values were imputed using EM.

Evaluation of the assumptions for outliers, normality, linearity, homogeneity of regression, and homogeneity of variances was performed. Visual examination of the results revealed the presence of outliers in all scales. These data points were deemed within the range of possible scores for each scale and were included in the analysis. GDS scores, MUNSH scores, and MUNSH subscale scores for positive affect and negative experience were approximately normally distributed for drivers but not non-drivers. In addition, the assumption of homogeneity of variances was violated for each of these scales. Log transformations failed to normally distribute the data for all scales and did not reduce heterogeneity for the GDS or positive affect subscale of the MUNSH. With unequal variances, the issue of unequal sample sizes becomes serious making the statistical test “appreciably less robust to heterogeneity of variance” (Howell, 2007, p. 316). In our case, the two groups have very different variances and a large discrepancy in sample sizes. Increasing the sample size was not an option. Therefore, a decision was made to run a general linear mixed-effects model for each life outcome measure. The MIXED procedure offers flexibility by allowing the researcher to specify the covariance structure thereby fitting a model that best describes the data. To allow the variances for the groups to be heterogeneous, a diagonal

matrix was selected as the covariance type and issued through the command syntax `COVTYPE(DIAG)`¹ (SPSS, 2005).

Further, homogeneity of regression was violated for both the Negative Affect and Positive Experience subscales of the MUNSH indicating that interpreting the results of either model would be inappropriate. Homogeneity of regression assumes that the slope of the regression line between the covariate and dependent variable will be approximately equal for each level of the independent variable (Tabachnick and Fidell, 2007). Visual examination of the scatterplots for negative affect and positive experience revealed an interaction in both cases; the relationship between baseline scores (covariate) and follow-up scores (dependent variable) was different for drivers and former drivers (independent variable) and the results of a regression model would not be accurate. Figure 2 illustrates the interaction for the Negative Affect subscale. When baseline scores on negative affect are 0, there is a mean difference of .579 in scores between drivers and former drivers at follow-up. With baseline scores of 3, the mean difference in scores between drivers and former drivers increases to 2.75, and at baseline scores of 6, the mean difference in scores increases further to 4.92. Figure 3 illustrates the interaction for Positive Experience subscale. When baseline scores on positive experience are 4, there is a mean difference of 2.63 in scores between drivers and former drivers at follow-up. With baseline scores of 9, however, the mean difference in scores between drivers and former drivers decreases to .143, and at baseline scores of 14, the mean difference in scores increases to 2.35.

¹ A complete guide is available online From SPSS Inc. (2005). Linear Mixed-Effects Modeling in SPSS: An Introduction to the MIXED Procedure. `COVTYPE(DIAG)` is addressed on page 18.

http://www.spss.ch/upload/1107355943_LinearMixedEffectsModelling.pdf

Figure 2 - MUNSH - Negative Affect Subscale

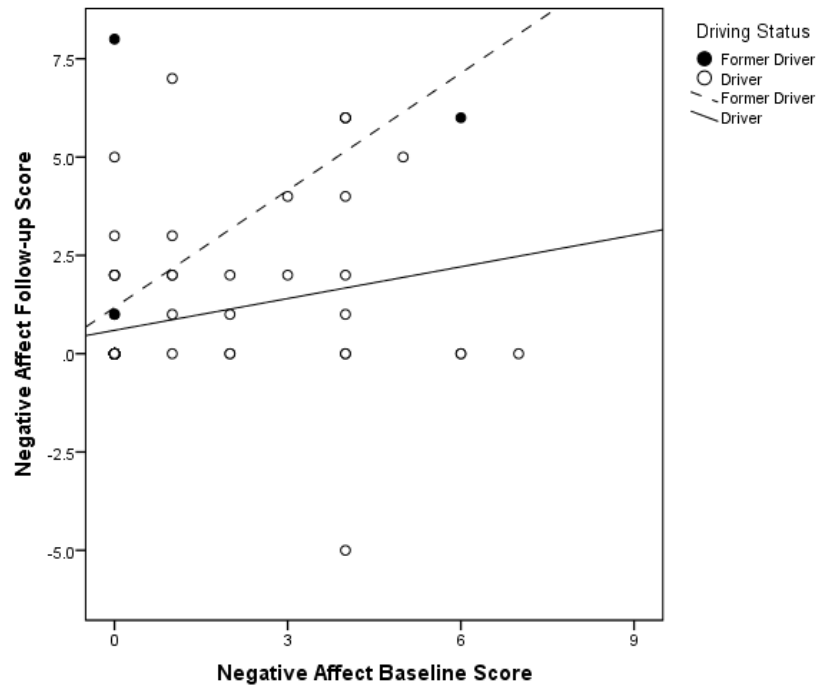


Figure 3 - MUNSH - Positive Experience Subscale

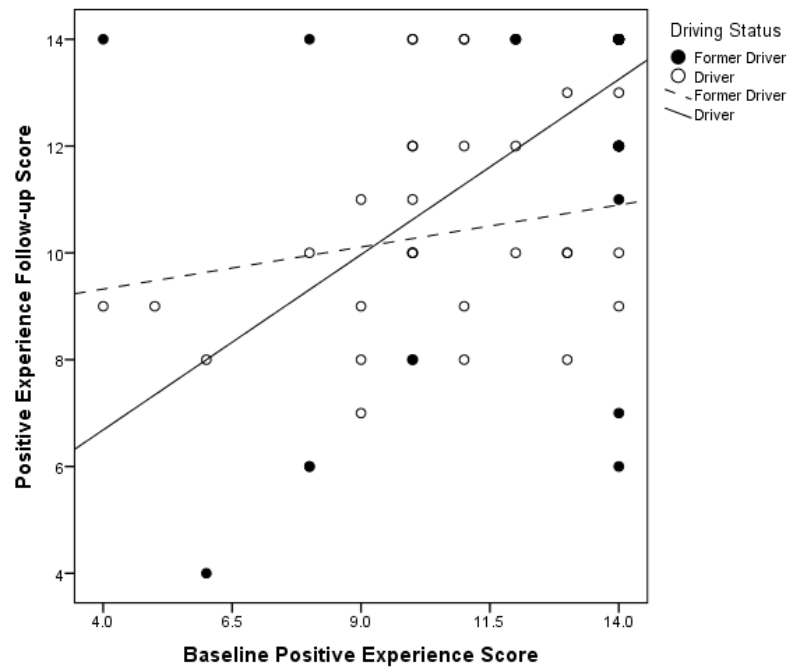


Table 4 presents the results of the general linear mixed-effects model. After adjustment for the covariate, there were no statistically significant differences between drivers and former drivers on either the GDS or the SWLS. Nor were there statistically significant differences between drivers and former drivers on the MUNSH or the MUNSH subscales for Negative Experience or Positive Affect.

Table 4. Results of the General Linear Mixed-Effects Model - Life Outcomes by Driving Status

	<i>df</i>	<i>F</i>	<i>p</i>
Life Outcomes			
GDS	13.51	0.713	.413
SWLS	16.34	0.070	.794
MUNSH	12.68	2.606	.131
Positive Affect	72.00	0.87	.772
Driving Status×NA	12.51	3.05	.105
Negative Experience	73.00	3.458	.121
Driving Status×PE	12.74	0.738	.105

Note: Numerator degrees of freedom are always equal to one. Denominator degrees of freedom are values obtained by Satterthwaite approximation (SPSS, 2005).

What is the Independent Contribution of Driving Status to Life Outcomes?

Our third aim was to determine the proportion of life outcome that is uniquely predicted by driving status after controlling for known predictors of driving cessation (age and health). To do this, we repeated the general linear mixed-effects model for each life outcome measure with the additional covariates of age and health. So for these models, the independent variable was driving status with two levels: still driving and ceased driving. Life

outcomes, the dependent variables, were scores on the SWLS, GDS, MUNSH, and the MUNSH Positive and Negative Affect and Positive and Negative Experience subscales. Covariates were baseline scores on the SWLS, GDS, MUNSH and MUNSH subscales measured by Kafka (2008), age, and health. Assumptions regarding outliers, normality, linearity, and homogeneity of regression were met for both age and health. Homogeneity of variances was violated for health but, as discussed in the previous section, is easily handled by the general linear mixed-effects model.

In most situations, covariates are added to a regression equation to determine if they will reduce the association between the independent variable and dependent variable. In this case, because we had already determined that there was not a statistically significant difference between drivers and former drivers on any of the life outcomes, we conducted the analyses in case there was negative confounding; a situation in which the addition of covariates increases the association between the independent and dependent variable (MacKinnon, 2000).

After adjustment for covariates, driving status did not independently contribute to life outcomes as measured by the SWLS, GDS, MUNSH or the MUNSH Positive Affect, Positive Experience and Negative Experience subscales. Homogeneity of regression was violated for negative affect. The results are presented in Table 5.

Table 5. Results of the General Linear Mixed-Effects Model - Life Outcomes by Driving Status with Covariates

Dependent Variable	Source of Variance	<i>df</i>	<i>F</i>	<i>p</i>
GDS	Driving Status	8.40	2.13	.181
	Covariates			
	Baseline GDS score	10.24	11.96	.006
	Age	8.61	1.02	.339
	Health	8.27	2.71	.137
SWLS	Driving Status	21.64	0.89	.768
	Covariates			
	Baseline SWLS score	61.52	56.46	<.001
	Age	8.61	0.13	.720
	Health	66.96	0.08	.778
MUNSH	Driving Status	16.00	2.10	.166
	Covariates			
	Baseline MUNSH score	67.58	47.60	.001
	Age	63.38	0.32	.577
	Health	61.72	0.20	.655
Positive Affect	Driving Status	19.09	0.68	.798
	Covariates			
	Baseline PA score	69.72	29.85	.001
	Age	64.17	0.64	.414
	Health	61.95	2.77	.101
Negative Affect	Driving Status	19.22	0.30	.590
	Covariates			
	Baseline NA score	14.39	13.67	.002
	Age	62.79	1.99	.163
	Health	59.99	2.48	.121
	Driving Status×NA	13.37	5.07	.042
Positive Experience	Driving Status	12.79	1.58	.231
	Covariates			
	Baseline PE score	12.86	6.53	.024
	Age	63.63	0.11	.740
	Health Driving	61.06	0.13	.725
	Driving Status×PE	12.82	2.48	.139
Negative Experience	Driving Status	21.25	0.93	.346
	Covariates			
	Baseline NE score	70.97	23.43	.001
	Age	67.52	0.08	.784
	Health	63.13	0.39	.536

Note: Numerator degrees of freedom are always equal to one. Denominator degrees of freedom are values obtained by Satterthwaite approximation (SPSS, 2005).

Discussion

In this study of driving cessation, we examined psychological variables and life outcomes in older drivers and former drivers. Our investigation was guided by three specific research questions: 1) Do differences exist between drivers and former drivers with regard to psychological variables? 2) Are life outcomes affected by driving status? 3) What is the independent contribution of driving status to life outcomes?

Group Differences and Psychological Variables

Former drivers scored significantly higher on the locus of control scale than drivers indicating that they have a more external locus of control. People with an internal locus of control believe that outcomes are related to their own actions and behaviours, while people with an external locus of control attribute outcomes to external forces such as luck or fate (Robinson, Shaver & Wrightsman, 1991). Individuals with an external locus of control are less likely to exert effort, initiate responses, and be persistent. In relation to driving behaviour, they may not consider actions that would help them continue driving safely such as driver improvement courses or maintaining physical strength and as such, external locus of control may predict driving cessation. On the other hand, an external locus of control may be a consequence of driving cessation which is also consistent with older adults' accounts of their feelings about losing their driving privileges that were found in our literature review. With the loss of a license, older adults experienced many restrictions that resulted in a lack of spontaneity and fears of being a burden that contributed to feeling that they were no longer in control of their own lives. In either case, and taking into consideration that control has been described as "one of the most critical variables involved in an individual's psychological health and well-being" (Shapiro, Schwartz, & Astin, 1996, p. 1214), these results have important implications for research, policy, and the training of health and social service

professionals. Research must continue to explore strategies that are acceptable to older adults and that will help them continue to drive safely for as long as possible. Policy-makers must ensure that education and training programs for older drivers are widely available and affordable. Research is also required to identify strategies to help former drivers and their families plan for and cope with cessation. Policy-makers must support educational programs that train health and social service professionals to guide and support older adults, their families, and caregivers during and after driving cessation (Liddle et al., 2009; Ragland et al., 2005). These educational programs should make health and social service professionals aware of the impact of driving cessation so that they can refer former drivers to the appropriate services such as counseling to help them cope, and provide them with information about mobility alternatives in their communities, delivery services, and activities that are close to home. In addition, policy-makers must work with urban planners to ensure the effective use of land to avoid auto dependence and to ensure that transportation systems can accommodate the needs of the older population.

Drivers in Kafka's study scored significantly higher on measures of life control and life purpose, and although drivers in the present study also scored higher than former drivers on these measures our results did not reach statistical significance. There were no significant differences between drivers and former drivers with regard to openness to experience or coping mode.

Life Outcomes and Driving Status

Our second question was to determine if life outcomes are affected by driving status. We found no significant differences between drivers and former drivers on life outcomes as measured by scores on the GDS, SWLS, MUNSH, and the MUNSH subscales which include Positive Affect and Negative Experience. These results do not support those obtained by

Kafka (2008) who demonstrated that former drivers had significantly higher scores for depression, and experienced more negative emotions (negative affect) and negative experiences than older adults who continued to drive. Numerous other studies have also reported depression in former drivers using various assessment instruments (Fonda et al., 2007; Legh-Smith, 1986; Marottoli et al., 1997; Ragland et al., 2005). In fact, Marottoli et al. (1997), using the C-ESD, found driving cessation to be one of the strongest predictors of increased depressive symptoms after controlling for socioeconomic and health variables. Kafka's participants also reported significantly less satisfaction with life. Likewise, a more recent study conducted by Liddle et al. (2011), who examined life satisfaction in older adults, found that former drivers reported significantly lower satisfaction as measured by the Life Satisfaction Index. Although our sample was comparable to those of other studies of driving cessation with regard to characteristics, it is possible that former drivers who did not cope well had been forced to relocate and we were unable to reach them for this study or they simply did not accept our invitation to participate.

Kafka (2008), in the only study we know of that examined positive outcomes, demonstrated that drivers experienced more positive emotions (positive affect) and positive experiences than older adults who stopped driving. In contrast, our research did not support these findings.

The lack of statistically significant findings in this study must be interpreted with caution as it may not mean that there are no differences between drivers and former drivers on these measures. Instead, we must consider this "absence of evidence of a difference" (p. 485) as an issue of statistical power (Altman and Bland, 1995). Without statistical power, effects that exist cannot reach statistical significance and we fail to reject the null hypothesis; a Type II error (Tabachnick and Fidell, 2007). One of the major determinants of power is

sample size. In this study, although we recruited 80 participants, only 13 were former drivers and with missing data on some of the measures, this number was further reduced to 12 for two of the final analyses; LOC and GDS. Increasing power by increasing sample size was not an option. While longitudinal studies provide a wealth of information related to change, one of their greatest drawbacks is attrition; especially when the sample consists of older adults. Attrition through death and loss of contact reduced our pool of participants by 32%, and refusal to participate and illness accounted for an additional loss of 18%. Repeated attempts to contact individuals who expressed interest but failed to return their completed questionnaires were unsuccessful.

Although our results on these life outcomes did not reach statistical significance, observation of the mean difference between groups on each measure reveals what we expected to find (See Table 1); former drivers mean scores were higher on measures of depression, negative affect, and negative experience, and lower on measures of life satisfaction, general subjective well-being, positive affect, and positive experience. Therefore, it is plausible that a larger sample size would demonstrate statistically that life outcomes are negatively affected by driving status.

The Independent Contribution of Driving Status to Life Outcomes

There was no evidence that driving status makes an independent contribution to life outcomes in this study. Again, the lack of statistically significant findings must be interpreted with caution due to the small sample size.

One issue that emerged from our analyses was that, in each case, the baseline life outcome covariate reached statistical significance as a source of variance in our dependent variable (follow-up life outcome scores), while driving status and our other covariates, age and health, did not. Baseline life outcome scores are an important source of variance and

should be included as covariates in future analyses. Criteria set out by Tabachnick and Fidell (2007) suggests that the use of age and health as covariates in future research would not be warranted because they were not statistically significant. They would only lower the power of the analysis. Once again, however, one must interpret these findings in light of the small sample size. Still, until proven otherwise with larger samples, we have to at least consider that life outcome scores could be predicted by baseline life outcome scores rather than driving status. The use of Kafka's (2008) baseline data to answer this question was particularly valuable for this reason.

Limitations

The major limitation of this study was the small sample of former drivers which may have obscured the relationship between both psychological variables and driving status, and life outcomes and driving status in the analyses we conducted. Therefore, due to the small sample of former drivers in the present study, a Type II error cannot be discounted. The fact that depression related to driving cessation did not reach significance in our study when it has been explored and confirmed as statistically significant by numerous other studies suggests that our sample of former drivers was too small to detect meaningful differences in many areas. In addition, examining whether psychological variables moderate the relationship between driving status and life outcomes was unfeasible with such a small sample.

Another limitation of the present study related to sample is the generalizability of the findings. Participants were originally recruited from community, volunteer, and business organizations and so may be more socially connected, active, and healthier than the general population of older adults. In addition, the majority of participants were city dwellers recruited from two different cities and, as such, these finding may not be generalizable to

other cities or to rural areas where community resources and public transportation are not readily available, walking distances for shopping are unrealistic, and delivery services for groceries and medications are lacking.

Attrition was also a limitation, as we have to consider that those who were unreachable, refused to participate, or failed to complete and return the questionnaires may be very different from those who responded. It is possible that individuals who do not cope well with the disruption to their lifestyle resulting from driving cessation may be forced to move to more supportive environments or they may withdraw participation from various activities. Therefore, our sample may not represent these older adults who may be less satisfied with life.

A number of variables not taken into consideration in this research could have influenced the results. First of all, former drivers who live with a driver may not experience limitations with regard to community and social integration, and meeting daily needs and, therefore, may not feel or report declines in subjective well-being. This may also be true for those living in retirement communities or assisted living facilities that have built-in support systems to provide meals, recreational activities, and transportation to outings. In addition, we do not know for how long our participants had been former drivers. Five of the thirteen former drivers had stopped driving before they participated in Kafka's study. Therefore, it is possible that some of these older adults had been former drivers for as long as eight years by the time they participated in this study, while others may have just stopped. The specific timing of their cessation would be an important factor to consider when measuring subjective well-being as there is evidence to suggest that as the time after driving cessation increases, negative feelings decrease (Taylor and Tripodes, 2001). Also of concern is the 35 year difference between the youngest and oldest participants in this study. Gerontologists classify

old age into three distinct stages to reflect the changing wants and needs of this group. It follows that the relationship between driving cessation and satisfaction with life could vary depending on the stage and this should be a consideration in future research. While there were more females than males in this study, 56% and 44% respectively, this is a realistic representation of the population. According to Statistics Canada (2012), the proportion of women over 65 years of age was 56% in 2010. The proportion of women increases with age, however, which would have to be considered in research that divides participants into stages.

Finally, driving cessation may be voluntary or involuntary. Initially, we planned to examine differences between three groups: drivers, voluntary former drivers, and involuntary former drivers. Due to the small sample size, however, we collapsed the voluntary former and involuntary former drivers into one group. In light of the finding that individuals who have their licences revoked “experience the impact of driving cessation strongly” (Liddle et al., 2008, p. 379) this is an important factor that should be considered in relation to subjective well-being and psychological variables such as one’s perceived control.

Future Directions

To date, relatively few studies have explored psychological variables and subjective well-being in relation to driving cessation. As our research was unable to corroborate most of the results obtained by Kafka (2008) due to small sample size, future research is required to validate his findings. Specifically, focus should be on obtaining a larger sample ensuring that both drivers and former drivers are adequately represented, in addition to addressing the other limitations discussed previously.

Our results, along with Kafka’s (2008), revealed that former drivers felt as if they had less control over their own lives. Because feeling that one has control over one’s life is critical to psychological health and well-being, future research should investigate strategies

for helping former drivers and their families cope with the transition from driver to former driver and address the challenges that result from driving cessation.

For this same reason, determining how life outcomes are affected by driving status and if, and which, psychological variables moderate the relationship between driving status and life outcomes remain important issues that must be considered in future research. Indeed, they both have practical implications for policy makers, and health and social service professionals. Understanding why, and how, some people experience positive life outcomes may help in understanding how to improve the situation of those who experience negative life outcomes. Knowing that specific psychological variables can help an individual to cope with the loss of a driver's licence can prompt the development of interventions that will ensure former drivers continue to maintain an acceptable level of life satisfaction for as long as possible.

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Appendix A

Telephone Scripts and Letters

Telephone Script – Follow-up to Questionnaire Booklet

May I please speak to [participant's name]?

Hello. My name is Jennifer Peltonen. I am the Lakehead University Master of Science student who sent you the driving cessation questionnaire.

I am calling to see if you have any questions about the Questionnaire Booklet.

- Responses will depend on participant's questions. -

Remember, you may decline to answer any of the questions you do not wish to answer.

After questions are answered - Once again, if you have any questions or concerns please do not hesitate to contact me or one of the other researchers involved in this study.

Thank you so much for agreeing to participate.

Good-bye.

Letter – Intent to Contact

Dear (Potential Participant's Name):

You are invited to take part in a research study being conducted by Lakehead University Professor Dr. Michel Bédard, Postdoctoral Fellow Nadia Mullen, and Master of Science student Jennifer Peltonen. You may recall your previous participation in Garrett Kafka's study entitled "A Study of Driving Cessation in Older Drivers." The aim of this study is to gain further information about older adults driving experiences.

This follow-up study titled "A Longitudinal Study of Driving Cessation and its Association with Satisfaction with Life" will be combined with the previous study to form a longitudinal study of driving cessation. We anticipate that the information we acquire will help older adults and their families prepare for, and adjust to, driving cessation and assist with developing programs to make it a more positive experience.

Your participation would involve spending approximately one hour completing a questionnaire booklet in your home.

I will be contacting you by phone or email in the near future to see if you are interested in participating in this follow-up study. If you agree, a questionnaire booklet will be mailed to you. I look forward to speaking with you and will be happy to answer any questions that you may have.

Thank you,

Jennifer Peltonen,

Master of Science Student in Psychology
Lakehead University
jjpelton@lakeheadu.ca

Telephone Script – Follow-up to Letter

May I please speak to [potential participant's name]?

Hello. My name is Jennifer Peltonen and I am a Master of Science student in the Department of Psychology at Lakehead University.

I am contacting you because you were a participant in a study designed to examine driving cessation in older drivers. Recently, I sent a letter describing a follow-up study that I am currently conducting. Did you receive this letter?

If No - I am currently conducting a follow up study of driving cessation and its association with satisfaction with life. The results of the two studies will be combined and the information we acquire will help us develop programs to make driving cessation a more positive experience.

Your participation would involve spending approximately one hour completing a questionnaire booklet. Would you be interested in participating in this study?

If No -Thank you and have a good day.

If Yes - Thank you. I will mail you a questionnaire booklet, which you should receive in about 1 week. You'll need to complete the questionnaires and mail them back in the postage-paid envelope that we provide. I'll give you another call in about 3 weeks to see how you're getting on. If you have any difficulties answering any question, I will be able to offer assistance then.

If Yes - As outlined in the letter, the goal of this study is to gain more information about driving cessation, so we can develop programs to make it a more positive experience. Your participation would involve spending about 1 hour completing a questionnaire booklet. Would you be interested in participating in this study?

If No - Thank you and have a good day.

If Yes - Thank you. I will mail you a questionnaire booklet, which you should receive in about 1 week. You'll need to complete the questionnaires and mail them back in the postage-paid envelope that we provide. I'll give you another call in about 3 weeks to see how you're getting on. If you have any difficulties answering any question, I will be able to offer assistance then.

Have a good day.

Cover Letter

Dear Potential Participant:

Thank you for considering participating in this study titled “A Longitudinal Study of Driving Cessation and its Association with Satisfaction with Life” conducted by Lakehead University Professor Dr. Michel Bédard, Postdoctoral Fellow Nadia Mullen, and Master of Science student, Jennifer Peltonen.

The aim of this study is to collect further information from people who have already participated in “A Study of Driving Cessation in Older Drivers.”

The results of these studies will be combined to form a longitudinal study of driving cessation. The purpose of this research is to examine why some people stop driving, and to look at the factors that make the experience of stopping driving either positive or negative. We anticipate that the information we acquire will help older adults and their families prepare for, and adjust to, driving cessation and assist with developing programs to make it a more positive experience.

Your participation will involve spending approximately one hour completing a questionnaire booklet. We will also contact you by phone to answer any questions you may have with regard to the questionnaires and guide you through the booklet if you wish.

Participation in this research is completely voluntary and you may withdraw at any time without consequence. You may also refuse to answer any questions. All responses will be accepted. There are no perceived risks or direct benefits associated with participation in this study. This research has been approved by Lakehead University’s Research Ethics Board, and is funded by a Team Grant from Canadian Institutes of Health Research awarded to Candrive.

If you agree to participate, before starting the questionnaires, please sign and date the consent form. Please do not include any personal information on the questionnaires. To ensure confidentiality, we will detach your signed consent from the questionnaires. In addition, data will be stored in a secure location at Lakehead University for a period of five years and access to it will be restricted to the principal investigators and project staff. The results of this study will be evaluated by a thesis committee, shared with policy- and decision-makers, and may be published in scientific journals or presented at professional meetings. Under no circumstances will your name or other identifying information, such as your telephone number or address, be reported.

A summary of the research results will be mailed to those interested (you will have the opportunity to indicate your interest on the consent form). If you decide at a later date that you wish to receive a summary of the results, please contact one of the researchers.

If you have any questions or concerns about the study, please contact one of the researchers. If you have questions or concerns regarding the ethics of the project, please contact the Research Ethics Officer. Contact details are listed below.

Thank you,

Jennifer Peltonen,
Master of Science Student (Psychology)
Lakehead University

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Consent Form

I _____ consent to take part in “A Longitudinal Study of Driving Cessation and its Association with Satisfaction with Life”. The purpose of this research is to examine why some people stop driving, and to look at the factors that make the experience of stopping driving either positive or negative.

I have read the information contained in the cover letter about the above titled study, which describes what I will be asked to do if I participate. I understand the purpose of the study and that participation involves spending approximately one hour completing a questionnaire booklet. I realize that participation is voluntary, that I may refuse to answer any questions, and that I can withdraw at any time from the study without consequence.

I understand that there is no apparent risk of physical or psychological harm or direct benefit to me by participating in this study. I understand that the information I provide is considered confidential and will be stored in a secure location at Lakehead University for 5 years with access restricted to the principle investigator and project staff, and under no circumstance will my name or other identifying information be reported in any publication or public presentation of research findings. I also understand that the research findings will be mailed to me, upon request, following the completion of the study.

Signature of Participant

Date

I would like to receive a summary of the results.

Yes

No

If yes, please indicate where you would like us to send the results.

Address _____

Email _____

Appendix B

Demographic Information

For this study we need to know some information about you. All responses are completely confidential.

1. Date of completion of questionnaire: / /
MM DD YYYY

2. Gender: Check only one. Male Female

3. Date of birth: / /
MM DD YYYY

4. Marital status: Check only one.
 - Married/Cohabiting
 - Single
 - Widowed
 - Separated
 - Divorced

5. a. Please indicate **each** education level that you have completed.

	Yes	No
Elementary	<input type="checkbox"/>	<input type="checkbox"/>
Secondary	<input type="checkbox"/>	<input type="checkbox"/>
College	<input type="checkbox"/>	<input type="checkbox"/>
University	<input type="checkbox"/>	<input type="checkbox"/>

- b. Please indicate your total years of education:

6. Please indicate your total household pre-tax income. Check only one.

- | | |
|--|--|
| <input type="checkbox"/> 0 - \$10,000 | <input type="checkbox"/> \$51,000 - \$60,999 |
| <input type="checkbox"/> \$11,000 - \$20,999 | <input type="checkbox"/> \$61,000 - \$70,999 |
| <input type="checkbox"/> \$21,000 - \$30,999 | <input type="checkbox"/> \$71,000 - \$80,999 |
| <input type="checkbox"/> \$31,000 - \$40,999 | <input type="checkbox"/> \$81,000 - \$90,999 |
| <input type="checkbox"/> \$41,000 - \$50,999 | <input type="checkbox"/> ≥ \$100,000 |

7. Indicate your principle place of residence. Check only one.

- House
- Apartment
- Senior Citizens Home
- Retirement Community
- Assisted Living Facility

8. Do you live alone? Yes No

IF NO, please indicate the people that live in your household and if they hold drivers licenses.

	Live With		Drivers License	
	Yes	No	Yes	No
Spouse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Daughter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Son	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Another Relative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Friend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If other, please specify: _____

9. Please indicate, as best as possible, where you live. Check only one.

- Area away from a major centre - population less than 10,000
- Small urban centre - population more than 10,000 but less than 50,000
- Mid-urban centre - population between 50,000 to 100,000
- Large urban centre - population more than 100,000

10. Which of the following conditions do you believe affect a person's ability to drive safely?

	Yes	No
Diabetes or high blood sugar	<input type="checkbox"/>	<input type="checkbox"/>
Heart disease	<input type="checkbox"/>	<input type="checkbox"/>
Stroke	<input type="checkbox"/>	<input type="checkbox"/>
Seizures or epilepsy	<input type="checkbox"/>	<input type="checkbox"/>
Parkinson's disease	<input type="checkbox"/>	<input type="checkbox"/>
Sleep apnea or sleeping sickness	<input type="checkbox"/>	<input type="checkbox"/>
Narcolepsy	<input type="checkbox"/>	<input type="checkbox"/>
Dementia (e.g., Alzheimer disease)	<input type="checkbox"/>	<input type="checkbox"/>
Physical Frailty (reduced flexibility or reduced muscle strength)	<input type="checkbox"/>	<input type="checkbox"/>
Poor hearing	<input type="checkbox"/>	<input type="checkbox"/>
Poor vision	<input type="checkbox"/>	<input type="checkbox"/>
Arthritis	<input type="checkbox"/>	<input type="checkbox"/>
Broken bones	<input type="checkbox"/>	<input type="checkbox"/>
Sudden lapses in consciousness (Syncope)	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>

Please specify for other:

11. Please list all your current medications. Write the specific name(s) as printed on the label(s) and then indicate whether you believe these would affect a person's ability to drive safely.

a. Medication Name	b. Affects Driving	
	Yes	No
1. _____	<input type="checkbox"/>	<input type="checkbox"/>
2. _____	<input type="checkbox"/>	<input type="checkbox"/>
3. _____	<input type="checkbox"/>	<input type="checkbox"/>
4. _____	<input type="checkbox"/>	<input type="checkbox"/>
5. _____	<input type="checkbox"/>	<input type="checkbox"/>
6. _____	<input type="checkbox"/>	<input type="checkbox"/>
7. _____	<input type="checkbox"/>	<input type="checkbox"/>
8. _____	<input type="checkbox"/>	<input type="checkbox"/>
9. _____	<input type="checkbox"/>	<input type="checkbox"/>
10. _____	<input type="checkbox"/>	<input type="checkbox"/>

12. Do you currently own a vehicle? Yes No

If **YES**, please **estimate** the cost to maintain your vehicle for one year: \$ _____

13. Compared to other drivers in your age group, how would you rate your driving abilities? Check only one.

- A lot better
- Better
- The same
- Worse
- Much worse

Appendix C

Driving Cessation Questionnaire

1. Please circle the most appropriate statement:
- a. I currently have a valid driver's license. (**Go to the set of questions below.**)
 - b. I have had a driver's license in the past, but I do not at this present time. (**Go to page 10.**)

If you answered that you currently have a valid driver's license, please complete the following questions.

2. What might cause you to think about stopping driving? Check all that apply.

- Being in an accident/almost being in an accident
- Causing an accident/almost causing an accident
- Advice from family members or close friends
- A physician or eye doctor's advice
- Too expensive to keep up a car, paying insurance, etc
- Decided should not be driving on own

Other...Specify _____

3. a. If you were to stop driving, how likely would someone be able to drive you? Check only one.

- Very likely
- Somewhat likely
- Somewhat unlikely
- Not at all

- b. If you indicated that someone would be able to drive you please indicate the NUMBER OF PEOPLE that would be able to drive you.

Number _____

4. Do you ever feel that you need more support? Check only one.
- All the time
 - Often
 - Sometimes
 - Never
5. Currently, how often would you say you drive? Check only one.
- Daily/almost daily
 - 2-3 times a week
 - Once a week or less ₃
 - Never
6. Approximately, how many kilometers (miles) do you drive per week? Check only one.
- 0-35 (0-56)
 - 36-70 (57.6-112)
 - 71-100 (113.6-160)
 - 101-150 (161.6-240)
 - 151-199 (241.6-318.4)
 - Over 200 (Over 320)
7. Would you say you are driving. . . Check only one.
- Much more than you would like
 - More than you would like
 - About as much as you would like
 - Less than you would like
 - A lot less than you would like

8. Which driving situation (s) do you find stressful, uncomfortable, or avoid when possible? Check all that apply.

- Turning left at intersections
- Driving at night
- Maintaining the speed limit
- Driving in unfamiliar situations
- Driving with passengers in cars
- Navigating parking lots
- Changing lanes/merging
- Parallel parking
- Driving in heavy traffic
- Backing up
- Driving in bad weather
- None of these

Other _____

9. Was there a time in your life when you drove more or less often than you do now, or is this about how often you have always driven? Check only one.

- Used to drive more
- Same as always driven
- Used to drive less

10. If you are driving less now, did you cut back gradually or all at once? Check only one.

- Gradually
- All at once

11. Do you think you may stop driving within the next two years? Check only one.

- Definitely
- Probably
- Maybe/maybe not
- Probably not
- Definitely not

12. Do you expect to be driving 5 years from now? Check only one.

- Definitely
- Probably
- Unsure
- Probably not
- Definitely not

13. How much thought have you given to how you would get to places if you could no longer drive? Check only one.

- A lot of thought
- Some thought
- Not much thought
- Not at all

14. a. How often do you go to the following locations? AND

b. How long, on average, does it take you to make a return visit to all that apply? Please indicate driving time only.

How Often? (check only one time per location)

How Long?

	Daily	Weekly	Monthly	Less than once a month	Does not Apply	Hours/Minutes
Grocery Store	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____
Family Doctor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____
Hospital	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____
Seniors Centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____

If other, please specify.

15. Overall, how able are you to get to places you want to go? Check only one.

- Very able
- Somewhat able
- Not very able
- Not at all able

16. How important is it for you to keep driving as long as you can? Check only one.

- Very important
- Somewhat important
- Not very important
- Not at all important

17. How do you feel about driving? Check only one.

- Have always enjoyed it
- Used to enjoy driving, but not as much now
- Neither like nor dislike driving
- Never did like driving that much
- Did not like driving at all

18. Which form(s) of transportation are available in your community? Check all that apply.

- Buses
- Taxis
- Volunteer drivers

Other.... Specify _____

Go to page 14 and continue with the questionnaire please.

Appendix D

Driving Cessation Questionnaire (Non Driver's Version)

If you answered that you had a driver's license in the past, but not at this present time for **question #1** on **page 5** please complete the following questions.

1. Why did you stop driving? Check all that apply.

- Being in an accident/almost being in an accident
- Causing an accident/almost causing an accident
- Advice from family members or close friends
- A physician or eye doctor's advice
- Too expensive to keep up a car, pay insurance, etc.
- Decided should not be driving on own

Other....Specify_____

2. When did you stop driving? Check only one.

- Within the last year
- Between 1 to 2 years ago
- Between 2 to 3 years ago
- Over 3 years ago

3. Did you stop driving suddenly or gradually? Check only one.

- Suddenly
- Gradually (For example, adjusting your driving patterns such as not driving at night)

4. a. Taking into account your experience as a non-driver, is there anything that you would have done differently to help yourself be better prepared for getting along without driving? Check only one.

No Yes

b. IF YOU answered YES here are some things people do to prepare themselves for not driving? PLEASE CHECK ALL THAT APPLY.

- Move somewhere with better transportation
- Move closer to relatives
- Move into housing that provides transportation
- Move closer to shopping, other destinations
- Develop a network of friends and/or neighbours for rides
- Save more money to pay for transportation
- Encourage my partner to drive/drive more

Other.....Specify_____

5. Do you feel that if you had taken steps to help yourself become better prepared for getting along without driving this would have lessened the impact on your life? Check only one.

- Yes, quite a bit
- Yes, somewhat
- Yes, a little bit
- It would have made no difference

6. a. How likely is someone able to drive you? Check only one.

- Very likely
- Somewhat likely
- Somewhat unlikely
- Not at all

b. If you indicated that someone would be able to drive you, either VERY LIKELY or SOMEWHAT LIKELY , please indicate the NUMBER OF PEOPLE that would be able to drive you: _____

7. Do you ever feel that you need more support? Check only one.

- All the time
- Often
- Sometimes
- Never

8. a. How often do you go to the following locations? AND

b. How long, on average, does it take you to make a return visit to all that apply? Please indicate driving time only.

	How Often? (check only one time per location)					How Long?
	Daily	Weekly	Monthly	Less than once a month	Does not Apply	Hours/Minutes
Grocery Store	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Family Doctor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Hospital	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Seniors Centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

If other, please specify:

9. Overall, how able are you to get to places you want to go? Check only one.

- Very able
- Somewhat able
- Not very able
- Not at all able

10. Which form(s) of transportation are available in your community?
Check all that apply.

- Buses
- Volunteer drivers
- Taxis
- Other....Specify_____

11. Which form (s) of transportation do you use? Check all that apply.

- Car as passenger
- Bus
- Taxi
- Walk
- Bicycle
- Handi-transit
- Volunteer driver

Go to page 14 and continue with the questionnaire please.

Appendix E

Life Attitude Profile

The following questions are concerned with life attitudes. Whenever a statement is true for you, please circle "Yes"; if it is untrue for you circle "No"; if you can't decide about a question, circle "Don't Know".

- | | | | |
|--|-----|----|------------|
| 1. My life is running over with good things. | Yes | No | Don't Know |
| 2. My life is in my hands and I am in control. | Yes | No | Don't Know |
| 3. Life to me seems very exciting. | Yes | No | Don't Know |
| 4. I determine what happens in my life. | Yes | No | Don't Know |
| 5. Basically, I am living the kind of life I want. | Yes | No | Don't Know |
| 6. I believe I am absolutely free to make all my life choices. | Yes | No | Don't Know |
| 7. I get a great thrill out of just being alive. | Yes | No | Don't Know |
| 8. My accomplishments in life are largely determined by my own efforts. | Yes | No | Don't Know |
| 9. Every day is constantly new and different. | Yes | No | Don't Know |
| 10. I regard the opportunity to direct my life as very important. | Yes | No | Don't Know |
| 11. I have discovered a satisfying life purpose. | Yes | No | Don't Know |
| 12. It is possible for me to live my life in terms of what I want to do. | Yes | No | Don't Know |
| 13. In thinking of my life, I see a reason for existing. | Yes | No | Don't Know |
| 14. The meaning of life is evident in the world around us. | Yes | No | Don't Know |

Appendix F

Memorial University of Newfoundland Scale of Happiness

The following questions are concerned with several aspects of well-being. Whenever a statement is true for you, circle "Yes"; if it is untrue for you circle "No"; if you can't decide about a question, circle "Don't know".

In the past month have you ever felt:

- | | | | |
|--|-----|----|------------|
| 1. On top of the world? | Yes | No | Don't Know |
| 2. In high spirits? | Yes | No | Don't Know |
| 3. Particularly content with your life? | Yes | No | Don't Know |
| 4. Lucky? | Yes | No | Don't Know |
| 5. Very lonely or remote from people? | Yes | No | Don't Know |
| 6. Bored? | Yes | No | Don't Know |
| 7. Depressed or very unhappy? | Yes | No | Don't Know |
| 8. Flustered because you didn't know what to do? | Yes | No | Don't Know |
| 9. Bitter about the way your life has turned out? | Yes | No | Don't Know |
| 10. Generally satisfied with the way your life has turned out? | Yes | No | Don't Know |

The next set of questions has to do with more general life experiences.

11. This is the dreariest time of my life.	Yes	No	Don't Know
12. I am just as happy as when I was younger.	Yes	No	Don't Know
13. Most of the things I do are boring and monotonous.	Yes	No	Don't Know
14. The things I do are as interesting to me as they ever were.	Yes	No	Don't Know
15. As I look back on my life I am fairly well satisfied.	Yes	No	Don't Know
16. Things keep getting worse as I get older.	Yes	No	Don't Know
17. Do you often feel lonely?	Yes	No	Don't Know
18. Little things bother me more this year.	Yes	No	Don't Know
19. Do you like living in this city (town, etc.)?	Yes	No	Don't Know
20. I sometimes feel that life isn't worth living.	Yes	No	Don't Know
21. I am as happy now as I was when I was younger.	Yes	No	Don't Know
22. Life is hard for me most of the time.	Yes	No	Don't Know
23. Are you satisfied with your life today?	Yes	No	Don't Know
24. My health is at least as good as most people's my age.	Yes	No	Don't Know

Appendix G

NEO-FFI

Instructions:

Please rate how much you agree or disagree with each statement below by circling one of the scale categories. Use the scale categories as shown below. Be sure to choose the scale category that most accurately describes you as you really are. Answer fairly quickly, and make use of all levels of the scale in your answers.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
SD	D	N	A	SA

1. I am not a worrier.	SD	D	N	A	SA
2. I like to have a lot of people around me.	SD	D	N	A	SA
3. I often feel inferior to others.	SD	D	N	A	SA
4. I laugh easily.	SD	D	N	A	SA
5. When I'm under a great deal of stress, sometimes I feel like I'm going to pieces.	SD	D	N	A	SA
6. I don't consider myself especially "light-hearted".	SD	D	N	A	SA
7. I rarely feel lonely or blue.	SD	D	N	A	SA
8. I really enjoy talking to people.	SD	D	N	A	SA
9. I often feel tense and jittery.	SD	D	N	A	SA
10. I like to be where the action is.	SD	D	N	A	SA

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
SD	D	N	A	SA

11. Sometimes I feel completely worthless.	SD	D	N	A	SA
12. I usually prefer to do things alone.	SD	D	N	A	SA
13. I rarely feel fearful or anxious.	SD	D	N	A	SA
14. I often feel as if I'm bursting with energy.	SD	D	N	A	SA
15. I often get angry at the way people treat me.	SD	D	N	A	SA
16. I am a cheerful, high-spirited person.	SD	D	N	A	SA
17. Too often, when things go wrong, I get discouraged and feel like giving up.	SD	D	N	A	SA
18. I am not a cheerful optimist.	SD	D	N	A	SA
19. I am seldom sad or depressed.	SD	D	N	A	SA
20. My life is fast-paced.	SD	D	N	A	SA
21. I often feel helpless and want someone else to solve my problems.	SD	D	N	A	SA
22. I am a very active person.	SD	D	N	A	SA
23. At times I have been so ashamed I just wanted to hide.	SD	D	N	A	SA
24. I would rather go my own way than be a leader of others.	SD	D	N	A	SA

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
SD	D	N	A	SA

25. I don't like to waste my time daydreaming.	SD	D	N	A	SA
26. Once I find the right way to do something, I stick to it.	SD	D	N	A	SA
27. I am intrigued by the patterns I find in art and nature.	SD	D	N	A	SA
28. I believe letting students hear controversial speakers can only confuse and mislead them.	SD	D	N	A	SA
29. Poetry has little or no effect on me.	SD	D	N	A	SA
30. I often try new and foreign foods.	SD	D	N	A	SA
31. I seldom notice the moods or feelings that different environments produce.	SD	D	N	A	SA
32. I believe we should look to our religious authorities for decisions on moral issues.	SD	D	N	A	SA
33. Sometimes when I am reading poetry or looking at a work of art, I feel a chill or wave of excitement.	SD	D	N	A	SA
34. I have little interest in speculating on the nature of the universe or the human condition.	SD	D	N	A	SA
35. I have a lot of intellectual curiosity.	SD	D	N	A	SA
36. I often enjoy playing with theories or abstract ideas.	SD	D	N	A	SA

Appendix H**Satisfaction with Life Scale**

Below are five statements that you may agree or disagree with. Using the 1-7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item.

- 1 Strongly disagree
- 2 Disagree
- 3 Slightly disagree
- 4 Neither agree nor disagree
- 5 Slightly agree
- 6 Agree
- 7 Strongly agree

- _____ 1. In most ways my life is close to ideal.
- _____ 2. The conditions of my life are excellent.
- _____ 3. I am satisfied with my life.
- _____ 4. So far I have gotten the important things I want out of life.
- _____ 5. If I could live my life over, I would change almost nothing.

Appendix I

Health Questionnaire

1. How is your health these days? Check only one.

- Very good
 Pretty good
 Not too good
 Poor
 Very poor

2. Compared to one year ago, how would you rate your health in general now? Check only one.

- Much better
 Somewhat better
 About the same
 Poor
 Very poor

The following are health problems that people often have. A physician may have diagnosed some of these health problems or you may have been hospitalized for these problems. For each problem, please state whether you have had it in the past year. You can check yes or no. If the problem started a long time ago but symptoms lasted into the past year, choose yes.

	Yes	No
3. High blood pressure (whether controlled by medication or not)	<input type="checkbox"/>	<input type="checkbox"/>
4. Heart and circulation problems (hardened arteries, heart problems)	<input type="checkbox"/>	<input type="checkbox"/>
5. Stroke or effects of stroke	<input type="checkbox"/>	<input type="checkbox"/>
6. Arthritis or rheumatism	<input type="checkbox"/>	<input type="checkbox"/>
7. Parkinson's disease or other neurological disease (except stroke)	<input type="checkbox"/>	<input type="checkbox"/>

	Yes	No
8. Eye trouble not relieved by glasses (glaucoma, cataracts)	<input type="checkbox"/>	<input type="checkbox"/>
9. Ear trouble (hearing loss)	<input type="checkbox"/>	<input type="checkbox"/>
10. Dental problems	<input type="checkbox"/>	<input type="checkbox"/>
11. Chest problems (asthma, pneumonia, emphysema, bronchitis)	<input type="checkbox"/>	<input type="checkbox"/>
12. Stomach problems	<input type="checkbox"/>	<input type="checkbox"/>
13. Bladder control problems	<input type="checkbox"/>	<input type="checkbox"/>
14. Bowel control problems	<input type="checkbox"/>	<input type="checkbox"/>
15. Trouble with feet or ankles	<input type="checkbox"/>	<input type="checkbox"/>
16. Skin problems	<input type="checkbox"/>	<input type="checkbox"/>
17. Fractures (broken bones)	<input type="checkbox"/>	<input type="checkbox"/>
18. Diabetes or high blood sugar	<input type="checkbox"/>	<input type="checkbox"/>
19. Seizures or epilepsy	<input type="checkbox"/>	<input type="checkbox"/>
20. Sleep apnea or sleeping sickness	<input type="checkbox"/>	<input type="checkbox"/>
21. Narcolepsy	<input type="checkbox"/>	<input type="checkbox"/>
22. Dementia (Alzheimer's disease)	<input type="checkbox"/>	<input type="checkbox"/>
23. Physical frailty (reduced flexibility or reduced muscle strength)	<input type="checkbox"/>	<input type="checkbox"/>
24. Syncope	<input type="checkbox"/>	<input type="checkbox"/>
25. Other Specify _____		

26. I have not been diagnosed with any medical conditions or suffer from any health problems. Check only one.

Yes

No

27. How much bodily pain have you had during the past 4 weeks? Check only one.

None

Very mild

Moderate

Severe

Very severe

28. If you have experienced bodily pain during the past 4 weeks, how much did pain interfere with the following things? Check only one for each item.

	Not at all	A little bit	Moderately	Quite a bit	Extremely
a. Mood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Ability to move about	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Sleep	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Normal tasks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Recreational activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Enjoyment of life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix J**Activities of Daily Living Questionnaire**

Here are some questions about things we all need to do as a part of our daily lives. Please indicate whether you can do these activities without help, if you need some help to do them, or if you can't do them at all. Tell us about your present situation when answering these questions. Check only one.

1. Can you eat:
 - without help
 - with some help
 - unable to feed yourself

2. Can you dress and undress yourself:
 - without help
 - with some help
 - unable to dress yourself

3. Can you take care of your own personal appearance:
 - without help
 - with some help
 - unable to take care of own appearance

4. Can you walk:
 - without help
 - with some help
 - unable to walk without help

5. Can you get out of bed:
 - without help
 - with some help
 - unable to get out of bed without help

6. Can you go to the bathroom:
 - without help
 - with some help
 - unable to go to the bathroom on own

7. Can you use the telephone:
- without help
 - with some help
 - unable to use telephone on own
8. Can you go shopping for your clothes or groceries:
- without help
 - with some help
 - unable to go shopping on own
9. Can you prepare your own meals:
- without help
 - with some help
 - unable to prepare own meals
10. Can you do your housework:
- without help
 - with some help
 - unable to do own housework
11. Can you take your own medicine
- without help
 - with some help
 - unable to take own medicine
12. Do you ever use a walker or 4-pronged cane to get around?
- yes
 - no
13. Do you ever use a wheelchair?
- yes
 - no
14. During the last month, how many days have you gone out of the house or building in which you live?
- Two or more days a week
 - One day a week or less
 - Never

Appendix K**Internal-External Locus of Control Scale (I-E Scale)**

This is a measure of personal belief. Each item consists of a pair of alternatives. Please check the one statement of each pair which you more strongly *believe* to be the case as far as you're concerned. Be sure to select the one you actually *believe* to be more true rather than the one you think you should choose or the one you would like to be true. Please answer these items carefully but do not spend too much time on any one item. Be sure to answer every item.

1. Many of the unhappy things in people's lives are partly due to bad luck.
OR
 People's misfortunes result from mistakes they make.
2. One of the major reasons we have wars is because people don't take enough interest in politics.
OR
 There will always be wars, no matter how hard people try to prevent them.
3. In the long run, people get the respect they deserve in this world.
OR
 Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.
4. The idea that teachers are unfair to students is nonsense.
OR
 Most students don't realize the extent to which their grades are influenced by accidental happenings.
5. Without the right breaks one cannot be an effective leader.
OR
 Capable people who fail to become leaders have not taken advantage of their opportunities.

6. No matter how hard you try some people just don't like you.
OR
 People who can't get others to like them don't understand how to get along with others.
7. I have often found that what is going to happen will happen.
OR
 Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.
8. In the case of the well-prepared student there is rarely ever such a thing as an unfair test.
OR
 Many times exam questions tend to be so unrelated to course work that studying is really useless.
9. Becoming a success is a matter of hard work, luck has little or nothing to do with it.
OR
 Getting a good job depends mainly on being in the right place at the right time.
10. The average citizen can have an influence in government decisions.
OR
 This world is run by the few people in power, and there is not much the little guy can do about it.
11. When I make plans, I am almost certain that I can make them work.
OR
 It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.
12. In my case getting what I want has little or nothing to do with luck.
OR
 Many times we might just as well decide what to do by flipping a coin.

13. Who gets to be the boss often depends on who was lucky enough to be in the right place first.
OR
 Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.
14. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.
OR
 By taking an active part in political and social affairs the people can control world events.
15. Most people don't realize the extent to which their lives are controlled by accidental happenings.
OR
 There really is no such thing as "luck".
16. One should always be willing to admit mistakes.
OR
 It is usually best to cover up one's mistakes.
17. It is hard to know whether or not a person really likes you.
OR
 How many friends you have depends upon how nice a person you are.
18. In the long run the bad things that happen to us are balanced by the good ones.
OR
 Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.
19. With enough effort we can wipe out political corruption.
OR
 It is difficult for people to have much control over the things politicians do in office.

20. Sometimes I can't understand how teachers arrive at the grades they give.
- OR
- There is a direct connection between how hard I study and the grades I get.
21. Many times I feel that I have little influence over the things that happen to me.
- OR
- It is impossible for me to believe that chance or luck plays an important role in my life.
22. People are lonely because they don't try to be friendly.
- OR
- There's not much use in trying too hard to please people, if they like you, they like you.
23. What happens to me is my own doing.
- OR
- Sometimes I feel that I don't have enough control over the direction my life is taking.
24. Most of the time I can't understand why politicians behave the way they do.
- OR
- In the long run the people are responsible for bad government on a national as well as on a local level.

Appendix L**Geriatric Depression Scale Short Form (GDS-SF)**

Choose the best answer for how you felt this past week.

	Yes	No
1. Are you basically satisfied with your life?	<input type="checkbox"/>	<input type="checkbox"/>
2. Have you dropped many of your activities and interests?	<input type="checkbox"/>	<input type="checkbox"/>
3. Do you feel that your life is empty?	<input type="checkbox"/>	<input type="checkbox"/>
4. Do you often get bored?	<input type="checkbox"/>	<input type="checkbox"/>
5. Are you in good spirits most of the time?	<input type="checkbox"/>	<input type="checkbox"/>
6. Are you afraid that something bad is going to happen to you?	<input type="checkbox"/>	<input type="checkbox"/>
7. Do you feel happy most of the time?	<input type="checkbox"/>	<input type="checkbox"/>
8. Do you often feel helpless?	<input type="checkbox"/>	<input type="checkbox"/>
9. Do you prefer to stay at home, rather than going out and doing new things?	<input type="checkbox"/>	<input type="checkbox"/>
10. Do you feel that you have more problems with memory than most?	<input type="checkbox"/>	<input type="checkbox"/>
11. Do you think it is wonderful to be alive now?	<input type="checkbox"/>	<input type="checkbox"/>
12. Do you feel pretty worthless the way you are now?	<input type="checkbox"/>	<input type="checkbox"/>
13. Do you feel full of energy?	<input type="checkbox"/>	<input type="checkbox"/>
14. Do you feel that your situation is hopeless?	<input type="checkbox"/>	<input type="checkbox"/>
15. Do you think that most people are better off than you are?	<input type="checkbox"/>	<input type="checkbox"/>

Appendix M

SF-12 Health Survey

INSTRUCTIONS: This questionnaire asks you about your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. Please answer every question by marking one box. If you are unsure about how to answer, please give the best answer you can.

1. In general, would you say your health is:

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Excellent | Very Good | Good | Fair | Poor |

The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

- | | Yes,
Limited
a Lot | Yes,
Limited
a Little | No, Not
Limited
at all |
|--|-----------------------------------|--------------------------------------|---------------------------------------|
| 2. Moderate activities such as moving a table, pushing a vacuum cleaner, bowling, or playing golf. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Climbing several flights of stairs. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

During the past **4 weeks** have you had any of the following problems with your work or other regular daily activities **as a result of your physical health?**

- | | Yes | No |
|--|--------------------------|--------------------------|
| 4. Accomplished less than you would like | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Were limited in the kind of work or other activities | <input type="checkbox"/> | <input type="checkbox"/> |

12. During the **past 4 weeks**, how much of the time has **your physical health or emotional problems interfered** with your social activities (like visiting with friends, relatives, etc.)?

**All of the
time**

**Most of
the time**

**Some of
the time**

**A little of
the time**

**None of
the time**

Appendix N
TENFLEX

Please indicate the extent to which you agree with the following statements.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	SD	D	N	A	SA
1. When I get stuck on something, it's hard for me to find a new approach.	SD	D	N	A	SA
2. The harder a goal is to achieve, the more appeal it has to me.	SD	D	N	A	SA
3. I can be very obstinate in pursuing my goal.	SD	D	N	A	SA
4. I find it easy to see something positive even in a serious mishap.	SD	D	N	A	SA
5. When faced with obstacles, I usually double my efforts.	SD	D	N	A	SA
6. To avoid disappointments, I don't set my goals too high.	SD	D	N	A	SA
7. Even when things seem hopeless, I keep on fighting to reach my goals.	SD	D	N	A	SA
8. When everything seems to be going wrong, I can usually find a bright side to the situation.	SD	D	N	A	SA
9. I tend to lose interest in matters where I cannot keep up with others.	SD	D	N	A	SA
10. I find it easy to give up a wish if it seems difficult to fulfill it.	SD	D	N	A	SA
11. When I run up against insurmountable obstacles, I prefer to look for a new goal.	SD	D	N	A	SA
12. Life is much more pleasurable when I do not expect too much from it.	SD	D	N	A	SA

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	SD	D	N	A	SA
13. I create many problems for myself because of my high demands.	SD	D	N	A	SA
14. When I have tried hard but cannot solve a problem, I find it easy just to leave it unsolved.	SD	D	N	A	SA
15. In, general I am not upset very long about an opportunity passed up.	SD	D	N	A	SA
16. I adapt quite easily to changes in plans or circumstances.	SD	D	N	A	SA
17. I usually find something positive even about giving up something I cherish.	SD	D	N	A	SA
18. I avoid grappling with problems for which I have no solution.	SD	D	N	A	SA
19. I usually have no difficulties in recognizing where my limits are.	SD	D	N	A	SA
20. If I find I cannot reach a goal, I'd prefer to change my goal than to keep struggling.	SD	D	N	A	SA
21. After a serious drawback, I soon turn to new tasks.	SD	D	N	A	SA
22. Faced with a serious problem, I sometimes simply pay no attention to it.	SD	D	N	A	SA
23. If I don't get something I want, I take it with patience.	SD	D	N	A	SA
24. Faced with disappointment, I usually remind myself that other things in life are just as important.	SD	D	N	A	SA

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
SD	D	N	A	SA

25. I find that even life's troubles have their bright side.	SD	D	N	A	SA
26. It is very difficult for me to accept a setback or defeat.	SD	D	N	A	SA
27. Even when a situation seems hopeless, I still try to master it.	SD	D	N	A	SA
28. I stick to my goals and projects even in face of great difficulties.	SD	D	N	A	SA
29. When I get into serious trouble, I immediately look how to make the best out of the situation.	SD	D	N	A	SA
30. I'm never really satisfied unless things come up to my wishes exactly.	SD	D	N	A	SA

