Perceived multi-dimensional locus of control over young to older adults: A contemporary Australian cross-sectional study

Richard Syrkiewicz

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Perceived Multi-dimensional Locus of Control over young to older adults:
A contemporary Australian cross-sectional study

Richard Syrkiewicz

A report submitted in Partial Fulfilment of the Requirements for the Award of
Bachelor of Arts (Psychology) Honours,
Faculty of Computing, Health and Science,
Edith Cowan University.
October, 2006

"I declare that this written assignment is my own work and does not include:
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Finally, I also thank my workplace colleagues, friends and family for their general support.
Structure of Thesis

This thesis consists of two independent manuscripts, a literature review and a research paper, each formatted for submission to a specific periodical. The literature review, entitled "Perceived Multi-dimensional Locus of Control: A Review of Relevant Literature" critically examines the broad body of locus of control research over the preceding four decades. The literature review has been formatted in accordance with the Guidelines for Contribution by Authors for the Theory and Psychology peer-reviewed journal.

The research report, entitled "Perceived Multi-dimensional Locus of Control over young to older adults: A contemporary Australian cross-sectional study", details the results of a survey that addressed the lack of multi-dimensional locus of control research for the possibility of age or gender effects, and the inconsistency of the associated results from earlier studies. The research report has been formatted in accordance with the Instruction to Authors for the Journal of Personality and Social Psychology.

Each manuscript has its own title page, abstract, and reference list. However, appendices that would not be suitable for inclusion within a journal article have been included in accordance with the guidelines in the 2006 School of Psychology Honours Handbook.
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## Manuscript One: Literature Review

Perceived Multi-dimensional Locus of Control: A Review of Relevant Literature

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# Manuscript Two: Research Report

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Perceived Multi-dimensional Locus of Control: A Review of Relevant Literature

Richard Syrkiewicz
Abstract

Locus of control (LOC) influences many aspects of one’s behaviour and associated quality of life (Rotter, 1992). LOC is particularly important for the increasing older adult population and wider health-care system (Swett & Bishop, 2004). Researchers have criticised LOC studies for: an assumed dichotomy of LOC, a lack of recent investigation, non-validity of underlying theoretical position, pronounced inconsistency of findings, and inattention to possible age and gender effects. The current review presents a contemporary focus of LOC research literature to highlight the aforementioned concerns, and provides a systematic account of generalisability for key studies. In addition to discussing the associations and limitations within the current body of LOC research, directions for future investigations are discussed.

Key words: Multi-dimensional Locus of Control, Internality, Externality, Perceived Control, Motivation, Well-being, Social Learning Theory, Life-span Theory of Control, Appraisal Theory, Young Adults, Older Adults, Aging Population, Gender.

Author: Richard Syrkiewicz
Supervisor: Dr. Eyal Gringart
Submitted: August, 2006
Perceived Multi-dimensional Locus of Control: A Review of Relevant Literature

Control over key elements of one’s life is commonly viewed as a basic need of all human beings (Rotter, 1966). The need for personal control is common to all cultures and ages, as "man strives to be a causal agent, to be the primary causation for, or origin of his behavior" (DeCharms, 1968, p. 269). Perceived personal control may be defined as "the belief that one has at one’s disposal a response that can influence the aversiveness of an event" (Bandura, 1977, p. 90). If personal control is perceived to be unattainable, the person may withdraw both mentally and physically from the uncontrollable situation; inhibiting their personal growth, and promoting social isolation (Seligman, 1975). Moreover, one’s physical and mental health are directly associated with the key psychological construct of personal control (Skinner, 1971). Furthermore, Lefcourt (1982) asserted that "man must come to be more effective and more able to perceive himself as the determiner of his fate if he is to live comfortably with himself" (p. 3), otherwise the development of self-esteem, self-determination, and empowerment would be stymied. Personal control is particularly important for older adults, having substantial effects on older adult well-being, and the effectiveness of the wider health-care system (Boult, Altmann, Gilbertson, Yu, & Kane, 1996; Seshamani & Gray, 2002; Swett & Bishop, 2003). Hence, perceived personal control is an essential human need and motivation required for healthy functioning throughout life.

Noise aversion tasks constituted the first series of seminal research into human perceived control (Glass, Reim, & Singer, 1971; Glass, Singer, & Friedman, 1969). The tasks focused on participants’ ability to maintain attention to detail under distraction, whilst simultaneously judging their own ability to influence reinforcements (Rotter, 1966). Such human oriented tasks extended results from earlier studies of animals’ implied control, such as Mowrer and Viek’s (1948) series of experiments in which rats exhibited lower levels of fear if they could influence electrical shock delivery.

Similarly, Social Learning Theory (SLT) posited human perception of personal control to form a basic motivation (Rotter, 1966). Rotter’s SLT proposed an individual’s expectancies for reinforcement could be used to help predict behaviour. SLT first established the locus of
control (LOC) construct, which referred to the set of beliefs that reward or punishment was contingent on one's associated behaviour. Under SLT, an internal LOC was characterised by the perception of self-control over reinforcements, whereas an external LOC attributes outcomes of behaviour to external agents (Holt, Clark, & Krueter, 2001).

Hence, the first generalisable LOC scales were developed to assess the degree to which people perceived control in their lives as either internally or externally located. Rotter's Internal-External Control of Reinforcement Scale (I-E scale; Gore & Rotter, 1963; Rotter, 1966) typified such measurement of a uni-dimensional LOC (ULOC). The I-E scale consisted of 23 dichotomous questions relating to societal events; the higher the score, the more internal one's control orientation. Rotter's I-E scale refined broader control attribution scales, such as James' 60-item Scale of Perceived Control (James, 1957, cited in Lefcourt, 1982), and Crandall's 34-item dichotomous-choice Intellectual Achievement Responsibility Questionnaire (Crandall, Katkovsky, & Crandall, 1965).

Subsequently, Levenson's (1973) factor analysis found generalised LOC to be comprised of three independent dimensions of internal, powerful-others, and chance attributions of control. The three dimensions combined to form a multi-dimensional LOC (MLOC). Under Levenson's paradigm, an internal LOC (i.e., internality) was characterised by individuals that believed they could exert control over important events in their lives, whereas an externalised LOC (i.e., externality) deemed control to be exerted by powerful-others, or random chance.

Focus of the Current Review

The current paper aims to provide a comprehensive overview of LOC research literature, applying critical detail to an unresolved central issue for future investigation. In considering the vast literature in the area of LOC (i.e., over 3,000 peer-reviewed studies [Wong & Sproule, 1984]), the current review necessitated a deliberately focused, yet balanced perspective. Hence, a review of ULOC studies, with greater systematic emphasis on studies of generalised MLOC was undertaken. Such an emphasis was justified within the current paper on grounds of greater validity and generalisability of MLOC measurement.
All available demographics from studies of MLOC are detailed where relevant, and results are only presented if statistically significant (i.e., \( p < .05 \)), unless a non-significant result has substantial relevance toward future research. Additionally, as the current review suggests the need for greater validity of LOC measurement, mean scores from MLOC studies are detailed to aid the appreciation of valid associations across a variety of contexts. Furthermore, as the vast majority of LOC research considered perceived control to be an inherent (i.e., non-manipulated) variable, the direction and magnitude of correlatory associations are detailed.

The review provides eight subsequent sections: a paradigm shift in generalised LOC measurement; the importance of LOC orientation; the prominence of older adults; older adult LOC associations; constancy of LOC; and, a discussion of gender differences on LOC. Finally, a conclusion promoting future research to resolve possible age and gender differences on generalised MLOC is made, as inconsistent associations with age and gender require clarification. Specific rationale for such future investigation includes: the superior validity of the MLOC construct to ULOC, the key role of LOC within psychological functioning, and the inconsistency of empirical evidence relating LOC to both age and gender. Hypotheses that may narrow identified gaps within LOC research literature are also provided.

A Paradigm Shift in Generalised LOC Measurement

LOC has been most broadly operationalised as either a generalised perception of control (e.g., I-E scale), or as a domain-specific attribution (e.g., Weight Locus of Control [Saltzer, 1978]; Multi-dimensional Health Locus of Control [Wallston, Wallston, & DeVellis, 1978]; Work Locus of Control [Spector, 1988]). However, questionable reliability, and reduced generalisability of domain-specific scales prohibit direct comparability with more valid and wider utilised generalised LOC measures (Lachman, 1986). Though the most widely used and cited measure of generalised LOC, the I-E scale has also been criticised over: a presumed uni-dimensionality of LOC (i.e., a high score denotes internality, otherwise externality results), social desirability response bias, negatively phrased items, and a forced-choice format (for discussion, see Clarke, 2004; Blanchard-Fields & Irion, 1988; Gurin, Gurin,
& Morrison, 1978; Lefcourt, 1991). Furthermore, Alagaratnam (1984) suggested the I-E scale "suffers from serious psychometric deficiencies that may be largely responsible for literature inconsistencies" (p. 470), positing the scale to be "contaminated by sex role bias, social desirability, and mood response" (p. 471).

Subsequently, Levenson's (1973) Internality, Powerful-Others, and Chance (IPC) scale was developed as a generalised multi-dimensional measure of LOC, without a limited focus toward situations the respondent may not have experienced or reflected upon (Skinner, 1995, 1996). The IPC scale raised doubt over LOC dichotomy (i.e., under SLT and the I-E scale), supporting one's ability to perceive internal and external loci simultaneously. Essentially, the "I, P, and C sub-scales were originally designed as a reconceptualisation of Rotter's I-E scale" (Levenson, 1981, p. 17), as Levenson viewed a dichotomous LOC scale as an oversimplification, characterised by theoretical and empirical inconsistencies. Most importantly, Levenson's (1973, 1974) factor analyses reflected a non-dichotomous, tripartite perception of LOC, contrasting the ULOC assumption that internal and external LOC were mutually exclusive. An articulate summary was recently provided by Weinstein and Quigley (2006), as the move from ULOC to MLOC constituted a "theoretical shift away from the assumption that dispositional internal and external patterns of LOC form the ends of a single continuum and toward the idea that internal and external LOC are partly separable aspects of dispositional LOC" (p. 912).

On a more granular level, the IPC scale was designed to differ from the I-E scale in five ways: items are presented in a Likert-scale format (Likert, 1936) rather than dichotomous choice, improving statistical independence; statements refer to the individual respondent's views (i.e., first-person), rather than one's perception of control for people in general; wording does not imply modifiability of specific issues from which control perception is queried; scales are constructed with high parallelism in each three item set; and, correlations between IPC sub-scale items against items on the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960, cited in Levenson, 1981; Blanchard-Fields & Irion, 1988) were negligible and non-significant. Overall, the IPC scale was argued to provide a more granular, reliable, valid,

Though a dynamically different measure to the I-E scale, the IPC scale still shares the same definition of internality (I), referring to the extent individuals feel personal control over their circumstances (i.e., a high score indicating pronounced internality). Whereas, the IPC scale has two additional sub-scales of LOC externality that measure the “belief in a basic unordered and random nature of the world, coupled with the expectancy that powerful-others are in control” (Levenson, 1973, p. 15). The powerfulness of others (P) sub-scale refers to the degree one’s life circumstances are directly controlled by other people (i.e., a defensive external control perception), whereas the chance (C) sub-scale measures the extent to which fate, or luck are deemed controlling (i.e., a non-person oriented, or randomly sourced reinforcement [Levenson, 1974]).

Additionally, only the IPC scale allows for the possibility of independent expression of generalisable LOC dimensions across time (Gurin, Gurin, & Morrison, 1978). For example, if adults were to maintain their levels of internal LOC across their life-span, they may still evidence differing P and C sub-scale results (i.e., an impossible scenario under ULOC measurement). Furthermore, the IPC scale provides greater synchronization to the wider psychological constructs of sense of control, self-efficacy, learned helplessness, and self-esteem (Birren, Lubben, Rowe, & Deutchman, 1991).

**Empirical Support for the IPC Scale**

Although the IPC scale contains statements that reflect a wide variety of situations, Levenson (1974) reported internal consistency via Kuder-Richardson (K-R 20) coefficients as moderately high: I (.64), P (.77), and C (.78); with Spearman-Brown split-half reliabilities of .62 (I), .66 (P), and .64 (C). Subsequently, Levenson (1981) reported similar consistency: I ($r = .64$ to .67), P ($r = .73$ to .79), and C ($r = .73$ to .79). Recently, the International Personality Item Pool (IPIP, 2006) supported IPC scale reliability, reporting similarly favourable sub-scale correlations: I ($r = .71$), P ($r = .81$), and C ($r = .72$).

Levenson’s (1974) test-retest reliability analysis also evidenced sound correlations over a seven week test-retest interval: I ($r = .66$), P ($r = .62$), and C ($r = .73$). Sound reliability
was further reported from Levenson's (1981) seven week test-retest across sub-scales
\(r = .60 \text{ to } .73\), with satisfactory contiguous split-half reliability \(r = .62 \text{ to } .66\).

On construct validity, Levenson (1974) found significant low-order correlations between
P and C to I \((r = -.25 \text{ to } .19)\), and P to C \((r = .41 \text{ to } .46)\). In a review of 16 studies that
sampled non-clinical adults, the I sub-scale has evidenced a mean range of 32.98 to 40.40,
a P range of 14.64 to 24.00, and C range of 12.00 to 23.80 (Levenson, 1981). In support,
Collins and Ffrench (1998) observed similar scores from a broadly aged sample of Australian
adults: I \(M = 34.89, SD = 4.91\), P \(M = 22.12, SD = 5.38\), and C \(M = 21.62, SD = 6.05\).

Although the IPC scale has considerable statistical support for empirical application, the
majority of LOC studies had not utilised such generalised MLOC measurement (Lefcourt,
1991), having continued to employ the I-E scale (Rotter, 1991). As a result, a substantially
greater incidence of LOC internality may have been reported due to the I-E scale lacking the
ability to correctly measure external LOC dimensionality (Lachman, 1986). Furthermore,
Lachman (1991) advocated the IPC scale to be more applicable for research of older adult's
LOC than the I-E scale, yet the IPC scale has not been empirically utilised to the same extent.

Similarly, Brosschot, Gebhardt and Godaert (1994) posited the IPC scale as the most
valid measure of LOC, albeit substantially under-applied. Brosschot, Gebhardt and Godaert
compared IPC scale scores to the I-E scale across several Dutch samples, including: high
school teachers \(n = 125\), psychology students \(n = 59\), health-care patients \(n = 86\), and
blood donors \(n = 180\). The I-E scale was found to narrowly assess chance oriented LOC
alone, showing a strong positive correlation with the IPC sub-scale \((r = .68, p < .001)\). The
authors concluded, that unless chance based LOC was a researcher's focus, only the IPC
scale could validly quantify the relative dimensions of generalised LOC. Hence, the plethora
of I-E scale research may have simply measured one aspect of the three underlying
dimensions of MLOC (i.e., randomly attributed control for non-contingent reinforcement).

A clear recommendation was made by Clarke (2004), advocating "empirical studies to
treat locus of control as a multi-dimensional rather than uni-dimensional construct" (p.247).
In rationalising the relative lack of IPC scale to I-E scale usage within LOC literature (i.e.,
approximately one-tenth), Clarke posited an absence of focus on why internality and externality were multi-dimensional to be responsible. If debate had arisen over the multi-dimensional nature of LOC, the spate of ULOC research may have been rivalled.

The Importance of LOC Orientation

SLT is largely derived from the construct of perceived control, as a generalised expectancy biased toward internal rather than external control of reinforcements (Rotter, 1966). Rotter argued that perceived control reflects the degree to which individuals perceive rewards or punishments to be directly contingent on their behaviour, prompting a rational individual to exert control toward maximising rewards and minimising punishment. However, Skinner (1971) argued that an external LOC should manifest over the long-term, as people "must abandon their comfortably held myths of freedom and will, and should accept the external sources of control outside their influence" (p. 16). Hence, from a theoretical perspective, LOC has had contrasting seminal views over the need and prevalence for an internal or external LOC.

As LOC research has attracted substantial investigation since the late 1960's, a wide array of associations has been reported under both ULOC and MLOC measurement. To provide a balanced perspective for the importance of LOC associations, both ULOC and MLOC findings are discussed. However, the current paper provides greater detail for investigations of MLOC associations, as both a greater validity of generalised LOC measurement, and a wider focus than random attributions of control is required (for review, see Brosschot, Gebhardt, & Godaert, 1994).

ULOC Associations

As most LOC studies have utilised a ULOC framework (Lefcourt, 1991) that purports a dichotomous view (i.e., only internal or external LOC is possible), the vast majority ULOC research has focused on discerning associations for LOC internality compared to externality (Weinstein & Quigley, 2006).

The Case for Internality.

Studies of ULOC have attributed a substantial variety of empirical associations with an
internal LOC, the majority of which denote greater benefits for the individual than externality. Such benefits of ULOC internality include: an increased ability to delay immediate gratification (Bialer, 1961); greater perceived opportunities (Feather, 1968; Gore & Rotter, 1963; Hamsher, Geller, & Rotter, 1968; Rotter, 1966); lower levels of depression (Beck, 1967; Husaini & Neff, 1980; Rodin, 1986); reduced dysfunctional behaviour (Rotter; Chance, & Phares, 1972); reduced negative mood under stress (Kilpatrick, Dubin, & Marcotte, 1974); increased altruism (Ubbinck & Sadava, 1974); increased ability to cope with stress (Anderson, 1977); increased life expectancy (Rodin & Langer, 1977; Schulz, 1976); enhanced coping after failure (Lefcourt, Miller, Ware, & Sherk, 1981); greater tolerance of acute pain (Thompson, 1981; Williams, Golding, Phillips, & Towell, 2003); reduced anxiety (Lefcourt, 1982); greater academic achievement (Crandall & Crandall, 1983); reduced impact of stressors on mental and physical health (Cohen & Edwards, 1989); increased physical and emotional well-being (Baltes & Baltes, 1986; Bandura, 1982, 1997; Perlmutter, Monty, & Chan, 1986; Seligman, 1975); greater therapist prognoses for illness recovery (Cohen, 1980); improved emotion-focused coping (Blanchard-Fields & Irion, 1988); improved self-efficacy for goal orientation (Phillips & Gully, 1997); and, increased emotional well-being (Bostic & Ptacek, 2001; Klonowicz, 2001; Lang & Heckhausen, 2001).

Furthermore, broad meta-analyses of ULOC have surmised lower incidence of most mental health problems and mental disorders (e.g., Sweeney, Anderson, & Bailey, 1986), as well as greater subjective well-being (e.g., DeNeve & Cooper, 1998) for individuals with an internal LOC.

However, an internal ULOC may not prove as beneficial as the aforementioned examples suggest, particularly for associations between internality and reaction to stressors. Burger's (1989) meta-analysis of LOC literature found internality related to: disruptive concern over self-presentation, increased self-blame for negative outcomes, increased attention to predictable events, and the avoidance of non-certain goals due to heightened anxiety. Therefore, Burger's results contrast most ULOC researchers' views that clearly espouse the functional advantages of internality.
The Case for Externality.

In contrast to internality, ULOC externality is commonly associated with disadvantages for the individual, such as: increased belief in obstacles inhibitory to therapeutic change (Beck, 1967); reduced enjoyment of positive experience (Rotter, Chance, & Phares, 1972); more negative moods with reduced task persistence under stress (Kilpatrick, Dubin, & Marcotte, 1974); greater stress levels with reduced coping and problem-solving ability (Anderson, 1977); inhibited immunologic function (Rodin & Timko, 1991); increased severity and duration of mood disorders (Daniels & Guppy, 1997); reduced subjective well-being (Klonowicz, 2001); and, greater feelings of helplessness with dependence upon external support for guidance (Nelson, Rosenfeld, Breitbart, & Galietta, 2002).

Meta-analyses of ULOC studies have also provided collective support for a deleterious view of externality. Lefcourt's (1982) extensive review of over 80 ULOC studies surmised "there is good reason to believe, on the basis of research reviewed, that external control orientation and abnormal personal functioning are correlated" (p. 129). Furthermore, Benassi, Dufour and Sweeney (1988) applied meta-analytic techniques to 97 studies of ULOC and depression conducted over 1973 to 1985. The authors reported ULOC externality and degree of depression to be substantially related, as moderately strong effects were consistently evidenced across studies (i.e., all effects were positive).

However, whether an individual study or meta-analysis approach was undertaken, deficiencies within ULOC research have rarely received due attention. Referring to ULOC research promoting the relative efficacy LOC internality over externality, Barling and Patz (1980) summarised such research as having "failed to yield significant differences between the two" (p.79). Furthermore, "inadequate operationalising of the theory and neglect of individual characteristics" (p.80) was deemed causal. Barling and Patz called for LOC research to be re-investigated, with additional emphasis to be placed on valid measurement, and consideration of generalisable characteristics of participants. Such a view raises further doubt over the veracity of prior ULOC findings, especially if non-valid measures were analysed against non-generalisable samples.
IPC Associations

Levenson (1981) had stressed that the dimensions of generalised LOC are independently tripartite, as a person may be high or low on either dimension, and externality has two different dimensions (i.e., a MLOC). Although Levenson had found three independent dimensions of generalised LOC to exist, her measure is commonly reported with the P and C sub-scales paired to represent externality (Clarke, 2004). Such combination may occur as both P and C relate to the belief that control is attributed to factors beyond one's influence (De Man, Hall, & Stout, 1990). In order to link associations of external ULOC to external MLOC, associations with P and C sub-scales are discussed within the current review to represent externality; but such grouping does not imply support for an internal-external LOC dichotomy (i.e., a ULOC). Therefore, the current paper considers each MLOC study for its contribution to the internality versus externality focus within ULOC literature, and for independent associations with I, P, and C sub-scales.

From the comparatively few MLOC studies relative to ULOC research, a sample of ten studies are systematically detailed below, illustrating how generalised MLOC has been associated with important aspects of mental and physical activity. Additionally, doubt is raised over the merit of LOC internality (i.e., under ULOC literature). Furthermore, the need for additional MLOC research is argued due to: common limitations within study design and sampling methods; and, an absence of age and gender consideration (i.e., generalisable characteristics of participants; for discussion, see Barling & Patz, 1980).

Levenson and Miller (1976) studied the relationship between MLOC and socio-political activism. A sample of politically active female students ($n = 66$, age not reported), and politically active male college students ($n = 48$) were surveyed. As hypothesised, internality was higher for individuals with a conservative political ideology ($M = 34.12$, dispersion not reported) than for liberals ($M = 31.53$). However, only a liberal political ideology was positively associated with activism, whereas conservatives had reduced levels of activism if their P scores were elevated. Hence, a conservative view of one's role in society was concluded to negate one's belief in internal control, if powerful-others were also significant.
Levenson highlighted that a ULOC view could not have evidenced the effect of P scores on I, as an external orientation would have precluded observation of any internality scores.

Krampen’s (1980) study was one of the first investigations which specifically aimed to clarify the merits of an internal LOC; investigating whether alcoholism was differentially associated with MLOC, hopelessness, and Machiavellianism. The sample consisted of 50 adults with a pronounced history of alcoholism, and 56 adults without a history of alcoholism. A factorial MANOVA evidenced an overall MLOC difference between-groups, as the alcoholism sample evidenced significantly greater P scores ($M = 26.72, SD = 5.98$), and C scores ($M = 29.22, SD = 6.59$) than the non-alcoholism group: P ($M = 23.07, SD = 4.67$); C ($M = 23.77, SD = 5.60$). Alcoholism was also associated with greater Machiavellianism and hopelessness, yet internality scores did not significantly differ between groups. Krampen concluded that internality did not exemplify more functional behaviour, as alcohol may be viewed by alcoholics as a personally controlled form of self-medication to lessen the impact of external influences.

Depression, anhedonia, and alexithymia were investigated for associations with MLOC by Loas et al. (1996). The IPC scale was administered to a sample of 59 unipolar major depressive inpatients, and 56 non-depressed participants. Externality scores were significantly higher for the depressed inpatients (means not reported), whereas internality did not significantly differ. An external MLOC was also associated with significantly greater anhedonia (i.e., absence of pleasure experience), and alexithymia (i.e., inability to verbally describe emotions). The authors concluded that externality would inhibit the effectiveness of therapies for depression, unless therapy specifically aimed to reduce MLOC externality.

Collins and Ffrench’s (1998) study provided a rare example of MLOC research with an Australian sample (i.e., only two studies were located). MLOC was investigated for associations with dissociation (i.e., non-integrated cognitive activity), and coping strategy (i.e., problem, or emotion focused). Their non-clinical sample consisted of 130 adults aged between 18 and 58 years. Participants’ scores evidenced significantly higher internality ($M = 34.89, SD = 4.91$), than either the P ($M = 22.12, SD = 5.38$), or C ($M = 21.62, SD = 6.05$)
sub-scales. Internality was also associated with lower levels of dissociation, whereas externality was not related to dissociation or coping strategy. Contrary to their hypothesis, a more integrated cognitive ability (i.e., reduced dissociation) for participants with an internal LOC did not extend to a preference for a particular coping strategy.

In a wider focus of MLOC and mental health, Kennedy, Lynch and Schwab (1998) investigated associations between MLOC and six mental disorders (i.e., major depressive disorder, panic disorder, generalised anxiety disorder, social phobia, obsessive-compulsive disorder, and mixed anxiety disorder). The sample consisted of 193 adults aged 18 to 65 years, split into a diagnosed group \( (n = 161) \), and group of non-diagnosed theology students \( (n = 32) \). Each of the diagnosed groups had significantly higher P scores than the student group (means not reported). Similarly, C scores across all diagnoses, except social phobia and obsessive-compulsive disorder, were greater than the students’ scores. The broad association between a pre-existing mental disorder and MLOC externality prompted the researchers to conclude externality was negatively associated with functional adjustment, though internality did not significantly differ between groups.

In an expansion of the earlier detailed Collins and Ffrench (1998) study, Collins and Jones (2003) aimed to generalise the prior findings to a larger, international sample. Utilising an internet survey, 161 Australian and 133 North American adults participated. Using only the P and C sub-scales, Australians evidenced significantly lower powerful-others \( (M = 22.16, \text{ dispersion not reported}) \) and chance \( (M = 22.22) \) LOC than North Americans \( (P \ [M = 23.60]; C \ [M = 23.81]) \). The 2003 study provided additional support for the association between externality and dissociation, evidencing a weak positive relation between P and C sub-scales \( (r = .17 \text{ to } .50) \). The authors concluded that LOC externality coincided with an elevated stress experience, given tendencies to dissociate and perceive events as beyond one's control; though an explanation for ignoring internality was not provided.

The association of ULOC with depression has received substantial attention (e.g., Beck, 1967; Kilpatrick, Dubin, & Marcotte, 1974; Husaini & Neff, 1980; Rodin, 1986; Daniels & Guppy, 1997). However, Clarke's (2004) study provided a novel focus on the influence of
neuroticism on the relation between MLOC and depression. The IPC scale was completed by 162 psychology students from New Zealand, aged 17 to 57 years. Although depression and neuroticism were moderately positively correlated ($r = .64$, $p < .001$), participants' internal LOC was not related to the P and C sub-scales, depression, or neuroticism. After controlling for both age and gender, aggregate externality (i.e., P and C) showed a moderately positive correlation with both depression and neuroticism ($r = .47$, $p < .001$), prompting Clarke to suggest that an external LOC exacerbates depressed emotions and neurotic tendencies. The study also highlighted the importance of considering age and gender when researching LOC associations.

In one of the most novel studies of LOC associations, Chak and Leung (2004) explored MLOC and internet addiction. A total of 722 respondents participated via mailed ($n = 340$) and online ($n = 382$) surveys. Approximately 80% of respondents were aged from 12 to 26 years. Internality of LOC showed a weak negative correlation with internet addiction ($r = -.13$, $p < .01$), and both externality measures showed weak positive relation with excessive internet use: P ($r = .17$, $p < .001$); C ($r = .27$). Internet addiction also had a weak positive relation to shyness ($r = .20$), prompting the authors to tentatively suggest a lack of internal LOC, combined with shyness, increased the probability of internet addiction. The study also highlighted the continued applicability of MLOC to contemporary individual and societal issues.

In the most recently published study of MLOC, Weinstein and Quigley's (2006) experiment investigated whether MLOC predicted appraisal ability and cardiovascular reactivity to a novel coping task (i.e., a computer game with markedly increasing difficulty). Two samples of psychology students were utilised: 19 females for the first study, and 22 females for the second; all participants received academic credit and a small monetary stipend. Internality was related to greater pre-task coping, and lower self-reported post-task stress levels; whereas P and C sub-scales were not predictive of either coping or stress ratings. On cardiovascular and blood pressure reactivity, only P scores predicted heart rates. Weinstein and Quigley argued for the merits of internality over externality, in terms of
improved coping, reduced stress, and lower physiological demand for difficult tasks. The authors also highlighted that the IPC scale provided a richness of LOC measurement, which a ULOC scale would have inhibited.

Each of the aforementioned studies highlighted the merits of focusing on MLOC rather than on ULOC. Only via focusing on MLOC, could the association of internality to externality have evidenced a richer, inter-related framework. For example, whilst internality was independently measured, powerful-others externality: negated the influence of internality on activism (Levenson & Miller, 1976); was elevated for all diagnosed mental disorders, yet contrasted by reduced chance orientations for social phobia and obsessive-compulsive disorder (Kennedy, Lynch, & Schwab, 1998); and, predicted heart rates under stress (Weinstein & Quigley, 2006). None of these results would have been found, if a uni-dimensional scale of LOC had been applied, where a greater score would simply denote internality (i.e., also negating externality).

As earlier discussed, ULOC internality has been associated with greater functionality than externality, yet MLOC studies present a richer, simultaneously inter-related view of three measurable dimensions of LOC. MLOC results also raised doubt over the previously reported benefits of an internal ULOC, for example: Krampen's (1980) study found that LOC internality was not indicative of greater functionality, whilst simultaneously relating alcoholism to external LOC; and, Loas et al. (1996) found internality was not related to depression, whilst externality was associated with depression, anhedonia, and alexithymia. Although an external MLOC continued the theme of detrimental association, the sampled studies provided greater validity and richness of measurement that questioned the merits of an internal LOC.

Though the MLOC construct demonstrates superior validity of LOC measurement than ULOC, most of the MLOC studies sampled suffered from limitations to generalisability; only the Levenson and Miller (1976) study exemplified scientifically robust research. The remaining MLOC studies lacked any detail concerning: sample heterogeneity, confound estimation, data collection setting, or commentary on study limitations. In addition, the recent investigation by Weinstein and Quigley (2006) lacked sample randomisation and
blinding within their experimental design. Furthermore, only the Clarke (2004) study considered the possibility of gender differences (for discussion, see p. 33 of the current paper), and none of the studies explored MLOC for possible age differences. Therefore, the lack of adherence to scientific principles of robust research design, and lack of age or gender analysis limited the generalisability of MLOC research sampled (for discussion, see Barling & Patz, 1980).

Whilst the vast majority of ULOC and MLOC studies have promoted the merits of internality and detrimental associations of externality, Levenson’s (1981) view that “externality is not always bad, to see reinforcements as not contingent upon one’s own actions is not necessarily maladjusted” (p. 53) remains in stark contrast. Levenson viewed the possibility that powerful-others or chance may influence one’s life to be realistic, if such control attributions accurately reflected the individuals’ life experience and developed beliefs. Furthermore, Levenson argued that externality may serve a protective function, especially for negative events.

Although no studies within the ULOC and MLOC literature were found that investigated the accuracy of one’s control beliefs, Molinari and Khanna (1981) aimed to clarify the overwhelmingly negative associations attributed to externality. The authors likened the powerful-others dimension to a defensive externality, where blame for failure or feelings of anxiety is directed at others. The chance sub-scale was described to form congruent-externality, as chance-externals perceive reinforcements to lack controllable antecedents (i.e., congruent to learned helplessness). Molinari and Khanna hypothesised chance oriented externality would be dysfunctional in their sample of 305 introductory psychology undergraduates. As ULOC research predicted, internality showed a weak negative correlation with both depression ($r = -.39$) and anxiety ($r = -.29$). Additionally, both externality sub-scales were positively associated with anxiety ($P [r = .30]; C [r = .36]$); though only the C sub-scale was associated with increased depression ($r = .27$). Molinari and Khanna concluded that powerful-others externality served a self-protective role, as it seemed to reduce one’s depression compared to a chance orientation. However, the weak correlations
provided limited support for the mediating effect of defensive externality. Additionally, generalisability concerns were raised over sample heterogeneity, confound estimation, and absence of commentary concerning study limitations.

Overall, the importance of LOC within one's life is clear, and measurement of one's LOC has been argued to form a crucial element within the information gathering stage of therapy (Collins & Ffrench, 1998). The generally positive associations of internality and relatively negative associations of externality are commonly reported, though MLOC research had presented a more complex view of the role of internality. However, a greater emphasis upon robust MLOC research is required to clarify such LOC associations, with consideration of possible effects of gender and age across the life-span.

The Prominence of Older Adults

According to Henry (2004), the Australian population is rapidly aging "due to a higher life expectancy and collapse in birth rates following the post-war baby boom" (p. 81). Henry estimated that 30% of retirees had retired due to disability, yet viewed research to have only recently begun to focus on elements of preventative health-care for older adults. By the year 2049, an increase of at least 300% in functional disabilities is expected across the global population, with mental-physical co-morbidity for 20% of individuals aged 55 and older (Boult, Altmann, Gilbertson, Yu, & Kane, 1996). Additionally, within the United States almost 75% of adults aged over 65 have at least one chronic illness, with 50% having two chronic illnesses (Swett & Bishop, 2003). The authors also called for greater research of older adults' views, as 25% of the world's population was estimated to be aged over 65 by the year 2050.

The increased older adult population is also expected to form the most substantial drain on future health-care systems (Boult, Altmann, Gilbertson, Yu, & Kane, 1996; Seshamani & Gray, 2002; Swett & Bishop, 2003). Over 1996 to 1999, Seshamani and Gray reported that per capita costs for the 65 and over age-band rose by 8% in the United Kingdom, 12% in Canada, 20% in Japan, yet 56% in Australia. The authors exclaimed, "more research is needed in this area to provide a stronger theoretical framework for the effect of age on health-care demand" (p. 293). Therefore, the need to improve our understanding of factors that are
likely to affect older adults' health requires urgent attention.

The Importance of Researching Older Adult LOC

Levenson (1981) provided an apt call for ongoing research into older adult LOC, that: “work must continue in the direction of refinements from attribution research, illuminating how man can grapple with the burdens of his life and even his death” (p. 62). A view echoed by Marzillier and Hall (1992), recommending greater research of contemporary older adult cohorts as “life has to be lived forwards, but it can only be understood backwards” (p. 169). The need for current research of older adults' perspectives has also been recognised within Australia, as the National Health and Medical Research Council (NHMRC, 1996, 2005) has recommended research to focus upon psychological factors that may contribute to older adults' well-being.

As many chronic diseases amongst Australia's aging population are substantially preventable (Australian Institute of Health and Welfare [AIHW], 2004), it is crucial that theoretical models related to older adult well-being attract ongoing investigations (NHMRC, 2005). As a strong sense of personal control is an important factor in successful aging and well-being (e.g., Baltes & Baltes, 1986; Collins & Ffrench, 1998; DeNeve & Cooper, 1998; Lachman & Weaver, 1998; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000) research of older adult LOC is both timely and important.

Though the importance of researching LOC for older adults is evident, Birren et al. (1991) viewed the LOC literature as having ignored older adults, and to lack contemporary relevance as most studies were conducted prior to 1975. The authors summarised that “much has been learned about perceived control, much more remains to be learned, especially in regard to changes that may accompany aging” (p. 309). Furthermore, most LOC research has not sampled older adults to discern their LOC perceptions, but simply presumed internality of LOC would be negatively correlated with physical aging, or had extrapolated trends across narrow age-bands (Lefcourt, 1991). Additionally, LOC research for older adults has often focused upon older adults' transition to nursing homes, though only 5% of older adults may encounter institutional living (Marzillier & Hall, 1992; Svensson, 1984).
Schulz and Heckhausen (1996) argued the greater focus upon younger adults within LOC literature evidenced researcher bias; particularly the belief that LOC internality provides a greater benefit for young adults. Therefore a clear need to update our understanding of older adult LOC perceptions was recommended, but only without preconceived bias. However, older adults may themselves have preconceived notions of control. Simons, McCallum, Friedlander and Simons (2000) researched older adults' level of "severe disability-free life expectations" (p. 143). The results showed that expectations had increased within England, Wales, and the USA, but flattened for Australia. The authors recommended future research to focus on exploring why older Australians perceive their latter years would involve severe disability.

Future research of older adults' LOC is also required to clarify results from previous older adult LOC research; continuing the need for clarification of inconsistent findings. Wolinsky, Wywrich, Babu, Kroenke and Tierney's (2003) meta-analysis of older adult LOC, concluded that an inconsistency of LOC definition and measurement necessitates "further research on the relationships among age, aging, and the sense of control" (p. 212). Inconsistency in aging research may also extend to the broad body of gerontology, as Robine and Michel (2004) surmised aging theories to either declare a long-term view of healthy aging, or a contrasting view of a looming disability pandemic. Whether a long-term pandemic is forecasted or otherwise, Faison and Mintzer (2005) recommended older adult LOC research was necessitated by the short-term trend of rising older adult suicide rates, as "a growing public health concern is suicide in elderly persons; efforts must be made to understand suicide in the aging population" (p. 542).

Therefore, there is a clear and current need for additional research into likely antecedents of older adults' health and well-being. Although LOC has been widely associated with many key health factors, a greater research focus on older adults' LOC has not eventuated. Valid research of older adults' LOC would clarify the inconsistent results reported by prior investigations, and may directly benefit both older adults and entire healthcare systems.
Older Adult LOC Associations

Similar to the earlier detailed section on 'the importance of LOC orientation', studies that had focused upon older adults' ULOC continue to advocate internality. Older adults' internality of ULOC has been associated with: greater happiness and activity levels, with improved physical and mental health (Langer & Rodin, 1976); heightened intellectual performance (Birren et al., 1991); and, greater recall of episodic memory (Amrhein, Bond, & Hamilton, 1999). In contrast to younger adults' ULOC, older adults have also shown less functional associations with internality, such as: a reduced ability to engage with supporting environments (Birren et al., 1991), and greater self-blame for negative events (Blank, 1982; Lachman, 1991; Lachman & McArthur, 1986; Rodin & Langer, 1980). Thus, older adults' internality may also be related to nondesirable behaviours.

As was the case for ULOC research of younger adults, "the control literature suggests that older persons are more likely to have an external loci of control" (Birren et al., 1991, p. 286). ULOC externality of older adults has also evidenced negative associations, such as increased incidence and severity of depression in cases where the environment was deemed uncontrollable (Seligman, 1975); greater allocation of control over one's health toward medical professionals (Achterberg & Lawlis, 1979); increased passivity and learned helplessness (Rotter, 1992); reduced subjective well-being (Lang & Heckhausen, 2001); greater severity of depression for the terminally ill, with reduced spiritual well-being (Nelson, Rosenfeld, Breitbart, & Galietta, 2002); and, inhibited coping ability for challenging events (Kellett, 2004).

Hence, ULOC studies show older adults to perceive both internality and externality of LOC, yet older adult internality may have reduced functionality than younger adult internality. Older adult externality may also be more prevalent, though the ULOC framework has been argued to provide a non-valid reflection of LOC. Therefore, the importance of contemporary empirical evidence of older adults' MLOC is magnified. However, relative to MLOC studies on younger adult samples, very few studies have applied the IPC scale to older adults.
Older Adult IPC Associations

Lachman and Leff (1989) examined whether control beliefs were related to individual differences in intellectual aging in a five-year longitudinal sample of 63 older adults with a mean age of 77.52 years ($SD = 5.12$). Over the five-year period no significant differences in generalised MLOC, intellectual functioning, or perceived internal control over intellectual functioning were found. Although 42 females and 21 males were within the follow-up sample, the possibility of gender differences was not considered.

In a recent study of MLOC and aging, Kunzmann, Little and Smith (2002) examined MLOC for associations to emotional well-being. Both cross-sectional ($n = 516$) and longitudinal ($n = 206$) samples from the Berlin Aging Study were analysed, covering a substantial older adult age range of 70 to 103 years. The cross-sectional sample showed positive association between internality and positive affect ($r = .37, p < .01$), whereas powerful-others orientation showed a weak negative association with positive affect ($r = -.15$) and was positively associated with negative affect ($r = .23$); longitudinal results evidenced similar relationships. The authors concluded an internal LOC is associated with high emotional well-being for older adults, whereas a powerful-others attribution may form an emotional risk factor in older age. However, generalisability of MLOC results was limited, as only three items from the I and P sub-scales were utilised (i.e., excluding five items from each sub-scale, and omission of the entire chance measure). As for most studies of MLOC, the possibility of gender differences was not considered.

Although very few studies have measured generalised MLOC solely for an older adult sample, both MLOC and ULOC research generally report LOC externality to be more problematic (i.e., as per younger adults). Internality continues to be generally associated with benefits for older adults, though studies have provided caution over the presumed merits of internality. Furthermore, older adults' LOC has been extrapolated from narrow age-bands within studies of younger participants' LOC (Lefcourt, 1991); this may only be appropriate if LOC was constant across the life-span.
How Constant is LOC?

Though there are few examples of generalised LOC investigations that had exclusively sampled older adults, research to discern the stability of control across the life-span provides a more prolific source of older adults’ LOC perceptions.

Substantially novel events may occur as one reaches older adult-hood and later life, including retirement from full-time employment, significant physical health decline, deaths of family and friends, greater engagement in life-review activities, and relocation to residential care (Blanchard-Fields & Irion, 1988). Therefore, one could logically presume that perceptions of control may alter with life experience, as “among the most obvious sources of change in the perception of causality are those associated with age” (Lefcourt, 1982, p. 150).

In contrast, research of perceived control has commonly assumed that LOC forms a part of one's personality (Nehrke, Hulicka, & Morganti, 1980; Lang & Heckhausen, 2001), implying that an individual's LOC is a relatively stable trait across the life-span (Lefcourt, 1991; Phares, 2001). Clarke's (2004) study provides an apt summation, advocating LOC as a personality trait that "involves a general, enduring belief in the controllability of outcomes of events in one's life" (p. 246).

If LOC was indeed constant, Levenson (1981) posited a key benefit of LOC constancy would be the reduction of negative stereotypes of older adults as being helpless, passive, or fatalistic. However, Levenson did not assume either constancy or non-constancy of MLOC to be the case. Regardless of whether LOC is genetic or learnt, Legerski, Cornwall and O’Neil (2006) logically argued that the personality view of LOC may prove unstable for particularly novel experiences, as one’s LOC would modify as a function of novel experience and event outcome.

The Case for Constancy

Lefcourt (1982) surmised that most ULOC studies "contain descriptions of locus of control that make it appear as if it were a stable attribute" (p. 148). In support, Buss and Finn (1987) promoted a consolidation of personality traits, yet retained ULOC as a valid "social cognitive trait related to public self-consciousness and morality" (p. 435).
Furthermore, the Life-Span Theory of Control (LSTC; Heckhausen & Schulz, 1995; Schulz & Heckhausen, 1996) addressed one's capacity to influence outcomes within their environment. The LSTC argues for stability of personal control across the adult life-span (Heckhausen & Schulz, 1995), and became the basis to the widely held assumption of LOC constancy (Cloninger, 1996). According to Lang and Heckhausen (2001), the LSTC's core assumption is that individuals aim to elevate happiness and satisfaction via mastering control over everyday tasks and goals, and then strive to maintain their level of happiness by maintaining elevated personal control.

Additionally, the view that LOC constancy is promoted by the LSTC is strongly related to the assumed internal orientation of the personal control construct (Rothbaum, Weisz, & Snyder, 1992). Under the LSTC, personal control concerns how one acts towards their external environment (i.e., primary control), and their own internal environment (i.e., secondary control). The assumed internality of personal control was tentatively stated by Heckhausen and Schulz (1995), that "if we assume that generalised or internal control is roughly equivalent to our concept of primary control, these data provide additional support for the stability of perceived control throughout the adult life course" (p. 296). However, Rothbaum, Weisz and Snyder argued that personal control may be fundamentally different to LOC, as primary control targets the external world with the view to change it, whereas secondary control aims to change the self and one's strategies to elevate primary control. Hence, the LSTC has simply assumed that the stability of primary control should approximate constancy of internal LOC, yet the LSTC uses this assumption to argue that stability of personal control (i.e., constancy of both primary and secondary control) evidences constancy of all perceived control (i.e., internal and external generalised LOC). Therefore doubt must be raised over the merits of citing the LSTC as a basis for assuming generalised LOC to be constant.

Furthermore, in comparison to Levenson's (1973/1981) more valid view of MLOC, the LSTC's construct of personal control scarcely approximates the three dimensions of generalised MLOC. Personal control refers to the process of actively maintaining primary
and secondary control, whereas MLOC refers to one's attribution of control to internal, powerful-others, or chance. Therefore, acceptance of the LSTC as evidence for MLOC constancy is based on an illogical link to the assumption that stability of primary control may approximate stability of ULOC internality.

IPC Constancy.

Lachman's (1986) investigation aimed to clarify the assumption of LOC constancy, as Lachman suggested that cross-sectional research of age differences had produced inconsistent findings due to sample compositions, research design, and differing measurement instruments. Lachman's first sample comprised 100 college students (76 females, 24 males) with a mean age of 21 years, and 96 older adults (79 females, 17 males) aged 60 to 89 years ($M = 69.22$, $SD = 6.88$). No significant age differences were found on any of the IPC sub-scales. The second study sampled 51 college students (25 females, 26 males) with a mean age of 19.45 years, and 48 older adults (25 females, 23 males) aged 60 to 87 years ($M = 71.55$, $SD = 8.53$). Similarly, no significant age effects were found, and scores from the IPC scale evidenced lesser variability than the initial sample. Finally, the third sample had 37 college students (19 females, 18 males) with a mean age of 19.49 years, and 48 older adults (21 females, 27 males) aged 64 to 91 years ($M = 75.13$, $SD = 6.03$). As per earlier samples, no significant age effects were found. The tri-sample study supported Lachman's contention that previously reported inconsistencies of LOC constancy were based upon flawed research, as Lachman's study used a constant design and valid LOC measure. However, Lachman's findings were themselves limited by an absence of sample randomisation, consideration of the possible gender effects, and an absence of commentary regarding any limitations or generalisability concerns.

The Case for Non-Constancy

Non-constancy of LOC has core support from the seminal theory which gave rise to the LOC itself (i.e., SLT). Under SLT, Rotter (1966) described LOC as only possibly, not necessarily, existing as a generalised characteristic of the self across various social roles and situations. Rotter predicted that people's LOC would change with significant life events, as
people would learn which stimuli they may or may not have control over. In support of SLT, results from ULOC studies that favoured non-constancy of LOC include: a moderate positive correlation between chronological age and internality (Bialer, 1961; Knoop, 1981; Penk, 1969; Staats, 1974; Strickland & Shaffer, 1971; Wolk & Kurtz, 1975); and, reduced internal LOC in later life (Bradley & Webb, 1976; Lachman, 1983; Siegler & Gatz, 1985).

In contrast to the LSTC, the process oriented Appraisal Theory (AT) of Lazarus and Folkman (1984) proposed that potentially stressful stimuli instigate a modifiable appraisal of control within the individual. AT logically assumed that the process of modification of stressor appraisal could only occur over time, as perception of stressors would become refined given stressor familiarity, and predictability. Hence implications for LOC are clear; an individual's appraisal of whether an internal or external source controls the effect of a stressor must form a process of refinement and change. Thus, LOC constancy could only occur for relatively constant stimuli, which would only occur over a relatively short time-frame.

In an investigation of health planners' views on LOC constancy, Rodin (1986) concluded that although the merit of older adults' self-management was recognised, modern health-care and social service programs disempowered older adults. Rodin concluded that older adults' LOC internality is reduced as physical health deteriorates, and by their increased exposure to health professionals that prefer deferential patients. Constancy of LOC was discussed as improbable, given older adults' increased reliance on a disempowering health system.

Research advocating LOC constancy has also been questioned on grounds of their underlying design. Coombs and Schroeder (1988) criticised the validity of the last several decades of LOC constancy research, concluding that valid attention to underlying theory of perceived control had been ignored. The authors argued most research of LOC constancy had utilised several-item, researcher-generated surveys that had dubious theoretical support. As a result, a conclusion in support of LOC constancy is less credible than if based upon studies that had utilised reliable and valid surveys. Similarly, Rotter (1991) criticised such ad-hoc measurements that favour LOC constancy, concluding that SLT's prediction of LOC to change with age and situational contexts remained unchallenged. Rotter argued that most
investigations of LOC constancy adopted an incidental focus, and departed from SLT; which precludes the possibility of consistent LOC across time and context. Indeed, the validity of LOC research over several decades would have markedly improved if valid attention to underlying theory of perceived control was incorporated.

With a probable focus on their underlying theory of perceived control constancy (i.e., LSTC), ironic support for LOC non-constancy may be inferred from Lang and Heckhausen's (2001) study. Three sub-studies investigated the association between perceived personal control and subjective well-being. The first study sampled 480 adults aged 20 to 90 years of age, the second sampled 42 older adults aged 70 to 90, and the third study sampled 510 adults between 20 and 84 years of age. Findings from all three studies suggested a broad association between perceived control over development and subjective well-being; represented by life satisfaction ($r = .35$), negative affect ($r = -.13$), and positive affect ($r = .58$). Young adults that perceived they were in control of their development were deemed to gain most benefit, as they perceived more opportunities existed for objective improvements in their quality of life than were perceived by older adults. In addition, older adults with high levels of perceived internal control were associated with lowered subjective well-being. These results may lend stronger support to the non-constancy of LOC, contrary to the researcher's LSTC views (e.g., Heckhausen & Schulz, 1995; Schulz & Heckhausen, 1996). Under the LSTC, Heckhausen had argued that individuals strived to maintain their level of happiness through achieving a stable sense of personal control. However, given the reported association between older adults' internality and lower subjective well-being, older adults may logically strive to reduce their LOC internality to raise their well-being (i.e., promoting LOC non-constancy).

IPC Non-Constancy.

Ryckman and Malikioski (1975) were among the first to investigate the relationship between generalised MLOC and age. Their sample consisted of 100 college students (under 21 years of age) and 383 adults (aged 21 to 79), recruited from a wide variety of telephone book listings. After IPC scale scores were transformed to become comparable
with the I-E scale, the internality sub-scale evidenced non-hypothesised results. College students had lower LOC internality than older adults, and no decline of internality for the 50 to 79 age-band was found. Older adults also scored the lowest levels on the powerful-others sub-scale, prompting the authors to posit their results as evidence against stereotypes of older adults as powerless and dependent upon others. Indeed, "negative stereotypes of the elderly as dottering old codgers who spend much of their time in rocking chairs reliving the past and waiting passively and helplessly for death" (p. 657) certainly deserve reconsideration. Limitations of the study included a strong self-selection bias given a 20% response rate, and a lack of rationale for transforming IPC scores into ULOC proxies. However, the authors discussed their sampling procedures necessitated a cautious interpretation of reported results.

Blanchard-Fields and Irion (1988) examined the possibility of a moderating effect of age upon MLOC and coping. A total of 96 volunteers were sampled, with 24 participants (12 females, 12 males) allocated to each of four age-bands. Adolescents ranged from 14 to 17 years of age ($M = 15.52$, dispersion not reported), young adults from 18 to 25 years ($M = 20.13$), middle-aged adults from 35 to 50 years ($M = 43.88$), and older adults were aged 60 and over ($M = 66.21$). Based on internality of MLOC, there were no significant differences between age-bands. However, powerful-others scores of adolescents ($M = 23.17$, $SD = 7.01$) were significantly higher than middle-aged adults ($M = 14.71$, $SD = 9.66$) and older adults ($M = 14.17$, $SD = 9.08$). Additionally, the chance attributions of adolescents ($M = 19.58$, $SD = 6.94$) and young adults ($M = 17.38$, $SD = 7.16$) were significantly higher than middle-aged adults ($M = 12.63$, $SD = 8.71$). No significant differences between young and older adults were found. Contrary to their initial hypothesis, the researchers concluded that externality decreased with age. The researchers posited their findings to be consistent with "adult cognitive-developmental literature that depicts youthful thinkers as quite vulnerable to the influence of external sources that define reality for them" (p. 200). The authors also indicated that their cross-sectional design was vulnerable to the confound of cohort effects. Additional generalisability would also have been obtained had consideration of gender effects
occurred, rather than attempting to control for gender.

Perhaps Lachman's (1986) reflection on LOC constancy research remains apt, as empirical results still comprise "a set of remarkably inconsistent findings" (p. 34). Lachman also highlighted the rarity of longitudinal data with the literature, though cross-sectional research was advocated as a practical, albeit erratic alternative. Lachman ardently recommended additional LOC research should focus upon age associations, but only if researchers were to pay careful attention to sample composition, and the validity of LOC measurements chosen.

The importance of researching older adult's LOC can only be elevated given the importance of LOC to older adults' well-being, the inconsistency of associations with older adults' LOC, as well as a lack of clear theoretical or empirical evidence for LOC constancy. Additionally, none of the LOC constancy studies identified had considered extending their analysis for the possibility of gender effects.

Does Gender Influence LOC?

The formation of gender identity is of key importance, as gender may form a 'cornerstone' in psychosocial development (Cook, 1985). Although Buss and Finn's (1987) study aimed to consolidate aspects of personality, the authors highlighted that "sex differences are too important to be omitted from any discussion" (p. 437). However, the possibility of gender differences on LOC has not received commensurate focus in research of general associations of LOC, older adults' LOC, or constancy of LOC. The majority of LOC studies have simply included gender as a demographic, without any further analysis or discussion.

ULOC Associations with Gender

As was the case for ULOC constancy research, reports of gender differences on ULOC are characterised by inconsistency, as: males have been reported to have greater externality than females (Hersch & Scheibe, 1967; Österman, Björkqvist, Lagerspetz, Charpentier, Caprana, & Pastorelli, 1999; Strickland, 1965); females have evidenced greater externality than males (Feather, 1968; Hamsher, Geller, & Rotter, 1968); males had greater internality
than females given equal self-esteem (Ryckman & Sherman, 1973); females evidenced constancy of ULOC, with non-constancy for males (Smith & Dechter, 1991); and, older adult males evidenced greater external ULOC than females (Chubb, Fertman, & Ross, 1997).

Following their meta-analysis of 22 LOC studies of gender differences in ULOC, Archer and Waterman (1988) concluded that further research was required to investigate gender differences. Fifteen of the reviewed studies found no significant gender differences, six found that males to had greater ULOC internality than females, and one study found that females had more internal LOC orientation than males.

Krampen, Effertz, Joystock and Müller's (1990) review of gender differences on ULOC concluded that support for gender differences was usually based on low to medium effect sizes, indicating low statistical power with small to medium sample sizes. The researchers supported their earlier view, stating "for most personality variables there is no or only rather inconsistent support for gender differences" (p. 303).

In support, Chubb, Fertman and Ross (1997) stated that "theories of gender differences are in the early stages of development and empirical research is still insufficient" (p. 118). The authors criticised past LOC research for almost exclusively focusing on male participants; extrapolating results to female participants via broad statements. Additionally, as the majority the correlational ULOC research occurred prior to the 1980's, gender differences in LOC were subsequently summarised as equivocal, without a clear pattern of LOG for either gender.

In an extensive meta-analysis of gender differences on perceived control, Ross and Mirowsky (2002) utilised the 1995 United States Survey of Aging, Status, and the Sense of Control (ASOC), as well as 60 studies of ULOC that reported various associations with gender. The authors discussed the prevalent view was for females to have a lower perception of internal LOC than males, and suggested that such a view lacked evidentiary support due to the variety of theoretical bias, methodological designs, and disparate results typical within LOC research. Greater support was found for male and female older adults to have a significant reduction in perceived LOC internality compared to younger cohorts.
Therefore, the importance of researching gender differences on ULOC has been recognised within the LOC literature. However, reported findings are inconsistent and have received criticism for a lack of theoretical basis, as well as inconsistent design and measurement.

IPC Associations with Gender

The first published study of generalised MLOC assessed psychiatric patients' perceptions of control, with a deliberate focus on gender (Levenson, 1973). Functional psychotic, as well as neurotic inpatients participated in the study ($N = 165$). The mean age of participants was 37 years, with 70 females and 95 males. Between group comparisons on gender yielded non-significant results. However, interactions evidenced neurotic males had significantly greater internality scores (means not reported) than neurotic females, and paranoid males scored higher on powerful-others externality than paranoid females. These gender differences prompted the recommendation for future applications of the IPC scale to consider gender in their analyses.

Subsequently, Levenson and Mahler (1975) explored the association between attitudes toward others and MLOC. A sample of 42 first-year psychology undergraduates (19 females and 23 males) was surveyed on MLOC and Machiavellianism (i.e., cunning manipulation of others towards self-serving goals). Female internality was moderately negatively correlated with Machiavellianism ($r = -.56, p < .01$), whereas male scores on the chance sub-scale were positively correlated with Machiavellianism ($r = .45$). The results suggested that when males perceived chance external events as controlling, they may turn to manipulate others to reach their own goals. Whereas females did not need to manipulate others if they perceived they could exercise control upon their immediate environment.

Morelli and Morelli's (1979) study focused on the relationship between MLOC, irrationality and gender. Their sample consisted for 49 male and 89 female students of introductory psychology, with a median age of 18.80 years. Sub-scale scores did not significantly differ across gender. For both females and males, a powerful-others orientation evidenced a consistently weak-negative correlation with several measures of irrationality.
(e.g., outlook realism, reliance on supernatural forces). Additionally, females with high internality were associated with lower irrationality than males. The authors viewed irrationality to form a key precursor of emotional disturbance, which may exacerbate emotion related problems for males with pronounced LOC internality. However, Morelli and Morelli advised caution over result interpretation as a lack of age analysis, and systematic sample stratification limited result generalisability.

Alagaratnam (1984) focused on the possibility of gender differences to clarify inconsistent associations between LOC and mood. A sample of paid undergraduate students were surveyed, comprising 36 females (aged 18 to 26 years) and 36 males (aged 18 to 30 years). As no significant gender differences between IPC scores were found, Alagaratnam concluded the IPC scale "was not contaminated by sex role bias" (p. 470). Furthermore, male internality ($M = 30.19$, $SD = 7.95$) correlated moderately negatively with depression ($r = -.47$, $p < .005$), and males' C scores ($M = 23.81$, $SD = 9.19$) evidenced positive correlations to anxiety ($r = .55$, $p < .0005$). As female MLOC was not related to depression or anxiety, Alagaratnam criticised ULOC research in that "failure to analyse data separately by sex seriously distorts and obscures important relationships" (p.471).

With a similar aim of utilising gender to clarify past LOC associations, Krampen, Effertz, Joystock and Müller (1990) aimed to investigate MLOC associations with intelligence, anxiety, and aggressiveness. Their sample consisted of 137 female and 89 male science students with a mean age of 23.91 years. Only P sub-scale scores (means not reported) evidenced a significant difference across genders, as females had greater powerful-others attribution of control than males. Females also evidenced higher levels of anxiety than males, especially if females' P scores were elevated.

De Man, Hall and Stout (1990) aimed to explore the relationships between gender and MLOC, given inconsistent ULOC associations with gender previously reported. A total of 103 undergraduate students (36 males, 67 females), with an average age of 23.90 years were surveyed. MLOC scores across all IPC sub-scales were unrelated to gender.

The earlier detailed study by Brosschot, Gebhardt and Godaert (1994) also analysed
MLOC for gender differences across their samples of high school teachers, psychology students, health-care centre patients, and blood donors. The 225 females evidenced significantly higher C sub-scale scores ($M = 18.15$, dispersion not reported) than the 225 males ($M = 17.20$). Chance oriented externality evidenced moderate positive correlations to traits such as neuroticism, social inadequacy, anxiety, depression, and sleeping problems. However, the marginal difference in scores prompted a recommendation for confirmatory future research.

In a study to examine the relation between MLOC, gender, depression, and neuroticism, Clarke (2004) administered the IPC scale to a sample of 129 female and 33 male psychology undergraduates aged 17 to 57 years ($M = 27.9$, $SD = 10.3$). Although depression and neuroticism were correlated ($r = .64$, $p < .001$), a one-way MANOVA revealed no significant effects of gender on MLOC, neuroticism, or depression.

Though using a more valid measure of LOC than ULOC, the eight studies of generalised MLOC sampled over 1973 to 2004 continued the theme of inconsistency of gender associations with LOC. The investigations evidenced a general lack of between group gender differences on all sub-scales of generalised MLOC (Levenson, 1973; Morelli & Morelli, 1979; Alagaratnam, 1984; De Man, Hall & Stout, 1990, Clarke, 2004). Powerful-others orientation was greater for males (Levenson, 1973), yet also greater for females (Krampen, Effertz, Joystock & Muller, 1990). Additionally, males had both greater internality and powerful-others externality than females (Levenson, 1973). On the purest measure of externality, chance orientation, females were greater than males (Brosschot, Gebhardt & Godaert, 1994), and both genders have sharply contrasted chance and internality attributions when measured on Machiavellianism (Levenson & Mahler, 1975).

Perhaps such a wide variety of differences may be attributable to Ross and Mirowsky's (2002) earlier discussed views, concerning the role of differential design. Even though each MLOC study sampled utilised the same IPC scale, each study lacked details concerning: sample randomisation or stratification, sample heterogeneity, confound estimation, data collection setting, commentary on study generalisability, and none of the studies explored
MLOC for the possibility of age differences.

Therefore, the validity of gender differences for ULOC and MLOC has yet to be established, as genders have evidenced similarity as well as dissimilarity across attributions of control. Research is therefore required to clarify gender differences on LOC. Such studies should: be based upon sound underlying theory; utilise valid and reliable instruments; have an appropriate design; and, must contain statistically powerful analysis.

Conclusion and Future Directions

The current paper provided a comprehensive review of the research literature on LOC, and provided critical detail relevant for future research.

Specifically, the paper detailed a paradigm shift in generalised LOC measurement where Levenson's (1973) IPC scale was argued to provide a more valid, flexible and richer measure of LOC compared with Rotter's (1966) I-E scale; yet the IPC scale has remained relatively under-applied (Brosschot, Gebhardt, & Godaert, 1994). The importance of LOC was detailed in terms of specific LOC association, and the generally greater merit of an internal LOC orientation over an external attribution of control was detailed. As older adults are becoming a more prominent proportion of the Australian and global population, there is an urgent need for contemporary MLOC research in relation to older adulthood. The LOC literature showed a relatively minor focus on older adult's LOC associations, but continued the beneficial theme of LOC internality; though with reduced certainty. Research on LOC constancy had produced a greater focus older adults' perceptions of control, yet was similarly characterised by inconsistency, and a lack of consideration of possible gender differences. The final section presented a discussion of gender differences on LOC, finding associations were also characterised by inconsistency.

Whether ULOC or MLOC was measured, inconsistency and a lack of focus on possible age or gender differences was found. Furthermore, a lack of generalisable rigour was identified within many MLOC investigations, and most associations with LOC were based upon a series of weak to moderate correlations.

Finally, future research was suggested in order to address the unresolved issues of
generalised MLOC for associations to age and gender. Rationale for future investigations includes the superior validity of the MLOC construct to ULOC, the key role of LOC within psychological functioning, and the equivocal nature of empirical evidence relating LOC to age, constancy and gender.

Additionally, the future research could have theoretical relevance for the body of LOC oriented research, as well as an applied relevance for Australia's older adult population, as LOC may form a crucial aspect of older adult well-being. Such a contemporary view of older adult LOC may specifically aid productivity of proactive social programs, in times of increasing budgetary pressures within the health-care system.

Hypotheses for such future research would relate directly to the relatively unresolved LOC issues aforementioned. In so doing, such research will have an exploratory rather than directional research focus, to discern whether there is: a relative prominence of internality over externality; a general effect of age upon self-reported MLOC perceptions; evidence of LOC constancy across age-bands; and, whether there are discernable gender differences between and within age-bands on MLOC.
References


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Perceived Multi-dimensional Locus of Control over young to older adults:

A contemporary Australian cross-sectional study

Richard Syrkiewicz
Abstract
The locus of control (LOC) construct has empirical associations with many aspects of psychosocial functioning (Rotter, 1992). LOC is particularly important for older adults' well-being, and the effectiveness of health-care systems (Swett & Bishop, 2004). The present study provided a contemporary exploration of multi-dimensional LOC (MLOC), addressing inconsistencies concerning age and gender effects within LOC literature. Levenson's (1973, 1981) Internality, Powerful-Others, and Chance Scale was administered to a total of 126 young adult university students aged between 20 and 35 years ($M = 23.76$, $SD = 4.56$), and 97 older adults aged 60 to 75 years ($M = 68.13$, $SD = 3.60$). Multi-variate analyses showed older adults to have a greater internal LOC than young adults, with simultaneously lower powerful-others LOC. After statistically controlling for older adults' marginal reduction in perceived general health, older adults also scored significantly lower chance based LOC than young adults. No significant differences on gender were observed, before or after controlling for general health. The results suggested that LOC is not a constant trait, and is not affected by gender. Findings also suggest that health-care strategies should consider older adults' LOC, particularly as ill-health was associated with a perception of random-chance. However, the cross-sectional survey design, and self-reported data limited the study's conclusions. Future research was recommended from both theoretical and applied perspectives.

Key words/phrases: Life-span Theory of Control, Multi-dimensional Locus of Control, Older Adults, Social Learning Theory, Well-being.

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Perceived Multi-dimensional Locus of Control over young to older adults:
A contemporary Australian cross-sectional study

Perceived personal control may be defined as "the belief that one has at one's disposal a response that can influence the aversiveness of an event" (Bandura, 1977, p. 90). From a life-span perspective, Lefcourt (1982) asserted that "man must come to be more effective and more able to perceive himself as the determiner of his fate if he is to live comfortably with himself" (p. 3). Personal control is particularly important for older adults, having a substantial influence upon their well-being and the effectiveness of the wider health-care system (Boult, Altmann, Gilbertson, Yu, & Kane, 1996; Seshamani & Gray, 2002; Swett & Bishop, 2003).

Social Learning Theory (SLT; Rotter, 1966) posits personal control to be a basic human motivation that forms part of the locus of control (LOC) construct, which refers to the set of beliefs that reward or punishment is contingent on one's associated behaviour. Under SLT, an internal LOC was characterised by the perception of self-control over reinforcements, whereas an external LOC attributes outcomes of behaviour to external sources (Holt, Clark, & Krueter, 2001). Such a dichotomous view of LOC, as either internal or external, was first measured by the Internal-External Control of Reinforcement Scale (I-E scale; Gore & Rotter, 1963; Rotter, 1966). Essentially, the I-E scale produced a measurement of a uni-dimensional LOC (ULOC), focusing on one's degree of LOC internality or externality.

A Paradigm Shift in Generalised LOC Measurement

Though the most widely used and cited measure of generalised LOC, the I-E scale has also been criticised over its: presumed uni-dimensionality of LOC (i.e., a high score denotes internality, otherwise externality results); social desirability response bias; negatively phrased items; and, its forced-choice format (for discussion, see Clarke, 2004; Blanchard-Fields & Irion, 1988; Gurin, Gurin, & Morrison, 1978; Lefcourt, 1991). Furthermore, Alagaratnam (1984) suggested the I-E scale "suffers from serious psychometric deficiencies that may be largely responsible for literature inconsistencies" (p. 470).

Levenson's (1973) factor analysis found generalised LOC to be comprised of three independent dimensions of internal, powerful-others, and chance attributions of control. The
three dimensions combined to form a multi-dimensional LOC (MLOC), measured by the Internality, Powerful-Others, and Chance Scale (IPC scale). Though a dynamically different measure to the I-E scale, the IPC scale still shared the same definition of internality (I); referring to the extent individuals feel personal control over their circumstances. The IPC scale also has two independent sub-scales of LOC externality that measure the "belief in a basic unordered and random nature of the world, coupled with the expectancy that powerful-others are in control" (Levenson, 1973, p. 15). The powerful-others (P) sub-scale refers to the degree one's life circumstances are controlled by other people (i.e., a defensive external control perception), whereas the chance (C) sub-scale measures the extent to which fate, or luck are deemed controlling (i.e., a non-person oriented, or randomly sourced reinforcement [Levenson, 1974]). Essentially, the "I, P, and C sub-scales were originally designed as a reconceptualisation of Rotter's I-E scale" (Levenson, 1981, p. 17).

Although the IPC scale has support for empirical application, the majority of LOC studies had not utilised the measure (Lefcourt, 1991). As a result, a greater incidence of LOC internality may have been reported as the I-E scale lacks the ability to correctly measure external LOC dimensionality (Lachman, 1986). Furthermore, Lachman (1991) advocated the IPC scale to be more applicable for research of older adults' LOC than the I-E scale.

Similarly, Brosschot, Gebhardt and Godaert (1994) argued the IPC scale to be the most valid measure of generalised LOC; albeit, substantially under-applied. In rationalising the relative lack of IPC scale usage within LOC literature, Clarke (2004) posited an absence of debate on LOC multi-dimensionality prompted the greater empirical focus upon ULOC.

*The Importance of LOC Orientation*

Under SLT, Rotter (1966) argued that a rational individual would develop an internal LOC to maximise their rewards and minimise incidence of punishment. However, Skinner (1971) argued that an external LOC should manifest over the long-term, as people "must abandon their comfortably held myths of freedom and will, and should accept the external sources of control outside their influence" (p. 16). Hence, from a theoretical perspective, LOC has had contrasting seminal views over the need and prevalence for an internal or external LOC.
Internal versus External ULOC.

As most LOC studies purport a dichotomous view of LOC (Lefcourt, 1991), the vast majority ULOC research has focused on discerning associations for LOC internality compared to externality (Weinstein & Quigley, 2006).

Studies of ULOC have attributed a substantial variety of empirical associations with an internal LOC, the majority of which denote greater benefits for the individual than externality. Such benefits of ULOC internality include: an increased ability to delay immediate gratification (Bialer, 1961); greater perceived opportunities (Feather, 1968; Gore & Rotter, 1963; Hamsher, Geller, & Rotter, 1968; Rotter, 1966); lower levels of depression (Beck, 1967; Husaini & Neff, 1980; Rodin, 1986); reduced dysfunctional behaviour (Rotter, Chance, & Phares, 1972); increased life expectancy (Rodin & Langer, 1977; Schulz, 1976); enhanced coping after failure (Lefcourt, Miller, Ware, & Sherk, 1981); reduced anxiety (Lefcourt, 1982); reduced impact of stressors on mental and physical health (Cohen & Edwards, 1989); increased physical and emotional well-being (Baltes & Baltes, 1986; Bandura, 1982, 1997; Perlmutter, Monty, & Chan, 1986; Seligman, 1975); improved emotion-focused coping (Blanchard-Fields & Irion, 1988); and, increased emotional well-being (Bostic & Ptacek, 2001; Klonowicz, 2001; Lang & Heckhausen, 2001).

Furthermore, broad meta-analyses of ULOC have surmised a lower incidence of most mental health problems and mental disorders (Sweeney, Anderson, & Bailey, 1986), as well as greater subjective well-being (DeNeve & Cooper, 1998) for an internal LOC.

However, an internal ULOC may not prove as beneficial as the aforementioned examples suggest. Burger's (1989) meta-analysis of LOC literature found internality was related to: disruptive concern over self-presentation; increased self-blame for failure; increased attention to predictable events; and, the avoidance of challenging goals due to heightened anxiety.

Though the benefits LOC internality have several qualifications, associations with ULOC externality present a less beneficial view. ULOC externality has been associated with many disadvantages, such as: increased belief in obstacles inhibitory to therapeutic change (Beck, 1967); reduced enjoyment of positive experience (Rotter, Chance, & Phares, 1972); more
negative moods and reduced task persistence under stress (Kilpatrick, Dubin, & Marcotte, 1974); greater stress levels, with reduced coping and problem-solving ability (Anderson, 1977); inhibited immunologic function (Rodin & Timko, 1991); increased severity and duration of mood disorders (Daniels & Guppy, 1997); reduced subjective well-being (Klonowicz, 2001); and, greater feelings of helplessness with dependence upon external support (Nelson, Rosenfeld, Breitbart, & Galietta, 2002).

Meta-analyses of ULOC studies have also provided collective support for such a deleterious view of externality. Lefcourt’s (1982) extensive review of over 80 ULOC studies surmised “there is good reason to believe, on the basis of research reviewed, that external control orientation and abnormal personal functioning are correlated” (p. 129). Furthermore, Benassi, Dufour and Sweeney (1988) applied meta-analytic techniques to 97 studies of ULOC and depression conducted over 1973 to 1985. The authors reported ULOC externality and degree of depression were positively related across the studies sampled.

*Internal versus External MLOC.*

Loas et al. (1996) investigated MLOC for associations with by depression, anhedonia, and alexithymia. The IPC scale was administered to a sample of 59 unipolar major depressive inpatients, and 56 non-depressed participants. Externality scores were significantly higher for the depressed inpatients (means not reported), whereas internality did not significantly differ. The authors concluded that externality would inhibit the effectiveness of therapies for depression, unless therapy specifically aimed to reduce MLOC externality.

The Collins and Ffrench (1998) study provided a rare example of MLOC research with an Australian sample (i.e., only two studies were located). MLOC was investigated for associations with dissociation (i.e., non-integrated cognitive activity), and coping strategy (i.e., problem, or emotion focused). Their non-clinical sample consisted of 130 adults aged between 18 and 58 years. Internality was associated with lower levels of dissociation, whereas externality was not related to dissociation or coping strategy. Contrary to their hypothesis, the more integrated cognitive ability for participants with an internal LOC did not extend to a preference for a particular coping strategy.
In an expansion of the Collins and Ffrench (1998) study, Collins and Jones (2003) aimed to generalise the prior findings to a larger, international sample. Utilising an internet survey, 161 Australian and 133 North American adults participated. Based on the P and C sub-scales, Australians' evidenced significantly lower powerful-others (M = 22.16, dispersion not reported) and chance (M = 22.22) LOC than North Americans (P [M = 23.60]; C [M = 23.81]). The 2003 study provided additional support for the association between externality and dissociation, evidencing a weak positive relation between P and C sub-scales (r = .17 to .50). The authors concluded that LOC externality coincided with an elevated stress experience, given tendencies to dissociate and perceive events as uncontrollable.

Clarke's (2004) study provided a novel focus on the influence of neuroticism on the relation between MLOC and depression. The IPC scale was completed by 162 psychology students from New Zealand, aged 17 to 57 years. Although depression and neuroticism were moderately positively correlated (r = .64, p < .001), participants' internal LOC was not related to the P and C sub-scales, depression, or neuroticism. After controlling for both age and gender, aggregate externality (i.e., P and C) showed a moderately positive correlation with both depression and neuroticism (r = .47, p < .001), prompting Clarke to suggest that an external LOC exacerbates depressed emotions and neurotic tendencies.

In a recently published study of MLOC, Weinstein and Quigley's (2006) experiment investigated whether MLOC predicted appraisal ability and cardiovascular reactivity to a novel coping task (i.e., a computer game with markedly increasing difficulty). Two samples of psychology students were utilised: 19 females for the first study, and 22 females for the second; all participants received academic credit and a small monetary stipend. Internality was related to greater pre-task coping, and lower self-reported post-task stress levels; whereas P and C sub-scales were not predictive of either coping or stress ratings. Weinstein and Quigley argued for the merits of internality over externality, in terms of improved coping, reduced stress, and lower physiological demand for difficult tasks.

As earlier discussed, ULOC internality has been associated with greater functionality than externality, yet MLOC studies present a simultaneously richer, inter-related view. Whilst the
vast majority of ULOC and MLOC studies have promoted the merits of internality and detrimental associations of externality, Levenson's (1981) view that "externality is not always bad, to see reinforcements as not contingent upon one's own actions is not necessarily maladjusted" (p. 53) remains in stark contrast. Levenson viewed the possibility that powerful-others or chance may influence one's life to be realistic, if such control attributions reflected the individuals' life experience and developed beliefs.

Overall, the importance of LOC within one's life is clear. Generally positive associations of internality and relatively negative associations of externality are commonly reported, though MLOC research had presented a more complex view of the role of internality. However, a greater emphasis upon robust MLOC research is required to clarify such LOC associations, with consideration of possible effects of gender and age across the life-span.

**The Prominence of Older Adults**

According to Henry (2004), the Australian population is rapidly aging "due to a higher life expectancy and collapse in birth rates following the post-war baby boom" (p. 81), and estimated that 30% of retirees retire due to disability. Furthermore, by the year 2049, an increase of at least 300% in functional disabilities are expected across the global population, (Boulton, Altmann, Gilbertson, Yu, & Kane, 1996). Within the United States almost 75% of adults aged over 65 have at least one chronic illness, with 50% having two chronic illnesses (Swett & Bishop, 2003). The authors also called for greater research of older adults' views, as 25% of the world's population was estimated to be aged over 65 by the year 2050.

On the basis of such population demographics, older adults are expected to present the most significant drain upon future health-care systems (Boulton, Altmann, Gilbertson, Yu, & Kane, 1996; Swett & Bishop, 2003). Over 1996 to 1999, per capita costs for the 65 and over age-band rose by 8% in the United Kingdom, 12% in Canada, 20% in Japan, yet 56% in Australia; necessitating "more research in this area to provide a stronger theoretical framework for the effect of age on health-care demand" (Seshamani & Gray, 2002, p. 293).

**The Importance of Researching Older Adult LOC**

Levenson (1981) also provided an apt call for ongoing research into older adult LOC, that:
“work must continue in the direction of refinements from attribution research, illuminating how man can grapple with the burdens of his life and even his death” (p. 62).

As many chronic diseases amongst Australia’s aging population are substantially preventable (Australian Institute of Health & Welfare [AIHW], 2004), it is crucial that theoretical models related to older adult well-being attract ongoing investigations (National Health and Medical Research Council [NHMRC], 1996, 2005). Given a strong sense of personal control is associated with successful aging and well-being (e.g., Baltes & Baltes, 1986; Collins & Ffrench, 1998; DeNeve & Cooper, 1998; Lachman & Weaver, 1998; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000), such ongoing investigations must also include a focus upon older adults’ LOC.

Additionally, Birren, Lubben, Rowe and Deutchman (1991) viewed the LOC literature as having ignored older adults, and lacked contemporary relevance as most studies were conducted prior to 1975. Also, the majority of older adult LOC research had simply presumed LOC internality would be negatively correlated with physical aging (Lefcourt, 1991), or had extrapolated trends across narrow age-bands. Furthermore, LOC research for older adults has often focused upon older adults’ transition to nursing homes (Svensson, 1984), though only 5% of older adults may encounter institutional living (Marzillier & Hall, 1992).

The greater focus upon younger adults within LOC literature may also evidence researchers’ bias belief that LOC internality provides a greater benefit for young adults (Schulz & Heckhausen, 1996). Additionally, older adults may also have preconceived expectations for control, as researched by Simons, McCallum, Friedlander and Simons’ (2000) study of older adults’ level of “severe disability-free life expectations” (p. 143); results showed non-disability expectations had increased within England, Wales, and the USA, but flattened for Australia.

Apart from the need to investigate older adult Australian’s expectations for disabilities, Faison and Mintzer (2005) urgently recommended increased older adult LOC research due to rising older adult suicide rates, as “a growing public health concern is suicide in elderly persons; efforts must be made to understand suicide in the aging population” (p. 542).

**ULOC Associations for Older Adults.**

Similar to studies of young adults’ LOC, the relatively few studies that had focused upon
older adults' ULOC continue to advocate LOC internality. Older adults' internality has been associated with: greater happiness and activity levels, with improved physical and mental health (Langer & Rodin, 1976); heightened intellectual performance (Birren et al., 1991); and, greater recall of episodic memory (Amrhein, Bond, & Hamilton, 1999).

However, in contrast to younger adults' LOC internality, older adults had evidenced less functional associations with internality, such as: a reduced ability to engage with supporting environments (Birren et al., 1991), and greater self-blame for negative events (Blank, 1982; Lachman, 1991; Lachman & McArthur, 1986; Rodin & Langer, 1980). Thus, older adults' internality may also be related to non-desirable behaviour.

As was the case for ULOC research of young adults, older adults' ULOC externality has similarly evidenced negative associations, such as: increased incidence and severity of depression (Seligman, 1975); greater allocation of control over one's health toward medical professionals (Achterberg & Lawlis, 1979); increased passivity and learned helplessness (Rotter, 1992); reduced subjective well-being (Lang & Heckhausen, 2001); reduced spiritual well-being (Nelson, Rosenfeld, Breitbart, & Galiotta, 2002); and, inhibited coping ability for challenging events (Kellett, 2004).

Though there are fewer examples of older adult ULOC research than for young adults, older adults also express internal and external LOC beliefs. Of concern, older adult internality may have lesser functionality than for young adults', and "the control literature suggests that older persons are more likely to have an external loci of control" (Birren et al., 1991, p. 286).

**MLOC Associations for Older Adults**

Lachman and Leff (1989) examined whether control beliefs were related to individual differences in intellectual aging from a five-year longitudinal sample of 63 older adults with a mean age of 77.52 years (SD = 5.12). Over the five-year period no significant differences in generalised MLOC, intellectual functioning, or their interaction were found.

In a recent study of MLOC and aging, Kunzmann, Little and Smith (2002) examined MLOC for associations to emotional well-being. Both cross-sectional (n = 516) and longitudinal (n = 206) samples from the Berlin Aging Study were analysed, covering a
substantial older adult age range of 70 to 103 years. The cross-sectional sample showed a positive association between internality and positive affect ($r = .37, p < .01$), whereas powerful-others orientation had a weak negative association with positive affect ($r = -.15$) and a positive association with negative affect ($r = .23$); longitudinal results evidenced similar relationships. The authors concluded an internal LOC is associated with high emotional well-being for older adults, whereas a powerful-others attribution may form a risk factor.

Although few studies have measured generalised MLOC with a focus upon an older adult sample, both MLOC and ULOC research generally report LOC externality to be problematic (i.e., as per younger adults). Internality continued to be associated with benefits for older adults, though greater caution over the presumed merits of LOC internality was concluded.

*The Constancy of LOC*

Substantially novel events may be experienced as one reaches older adult-hood, including retirement from full-time employment, deaths of family and friends, greater engagement in life-review activities, physical health decline, and relocation to residential care (Blanchard-Fields & Irion, 1988). Therefore, one could logically presume that perceptions of control may alter with life experience, as "among the most obvious sources of change in the perception of causality are those associated with age" (Lefcourt, 1982, p. 150).

In contrast, research of perceived control has commonly assumed that LOC forms a part of one's personality (Nehrke, Hulicka, & Morganti, 1980; Lang & Heckhausen, 2001), implying that LOC is a relatively stable trait throughout the life-span (Lefcourt, 1991; Phares, 2001).

If LOC was constant, Levenson (1981) posited a key benefit of LOC constancy would be the reduction of negative stereotypes of older adults to be helpless, passive, or fatalistic. Regardless of whether LOC is genetic or learnt, Legerski, Cornwall and O'Neil (2006) argued that the personality view of LOC may prove unstable for particularly novel experiences, as one's LOC would modify as a function of the novel experience and its outcome.

*The Case for Constancy.*

The Life-Span Theory of Control (LSTC; Heckhausen & Schulz, 1995; Schulz & Heckhausen, 1996) addressed one's capacity to influence outcomes within their environment.
The LSTC argues for stability of personal control across the adult life-span, and became the basis to the widely held assumption of LOC constancy (Cloninger, 1996). According to Lang and Heckhausen (2001), the LSTC's core assumption is that individuals aim to elevate happiness and satisfaction via mastering control over tasks and goals; striving to maintain their happiness by maintaining personal control.

Additionally, the view that LOC constancy is promoted by the LSTC is strongly related to the assumed internal orientation of the personal control construct (Rothbaum, Weisz, & Snyder, 1992). Heckhausen and Schulz (1995) stated that “if we assume that generalised or internal control is roughly equivalent to our concept of primary control, these data provide additional support for the stability of perceived control throughout the adult life course” (p. 296). However, Rothbaum, Weisz and Snyder argued that personal control may be fundamentally different to LOC, as primary control targets the external world with the view to change it, whereas secondary control aims to change the self and one's strategies to elevate primary control. Furthermore, in comparison to Levenson's (1973, 1981) MLOC, the personal control construct of the LSTC scarcely approximates the three dimensions of the IPC scale.

In a thorough investigation of MLOC constancy, Lachman (1986) suggested that cross-sectional research of age differences had produced inconsistent findings due to their sample compositions, research design, and differing measurement instruments. Lachman's first sample comprised 100 college students (76 females, 24 males) with a mean age of 21 years, and 96 older adults (79 females, 17 males) aged 60 to 89 years ($M = 69.22$, $SD = 6.88$); no significant age differences were found. The second study sampled 51 college students (25 females, 26 males) with a mean age of 19.45 years, and 48 older adults (25 females, 23 males) aged 60 to 87 years ($M = 71.55$, $SD = 8.53$). Similarly, no significant age effects were found, and IPC scores evidenced lesser variability than the initial sample. Finally, the third sample had 37 college students (19 females, 18 males) with a mean age of 19.49 years, and 48 older adults (21 females, 27 males) aged 64 to 91 years ($M = 75.13$, $SD = 6.03$). As per earlier samples, no significant age effects were found. The tri-sample study supported Lachman's contention that previously reported inconsistencies of LOC constancy were based upon flawed
research, as Lachman's study used a constant design and valid measure of MLOC.

*The Case for Non-Constancy.*

Non-constancy of LOC has core support from the seminal theory which gave rise to the LOC itself (i.e., SLT; Rotter, 1966). Rotter predicted that LOC changes with significant life events, as people would learn which stimuli they may have control over. The process oriented Appraisal Theory (AT) of Lazarus and Folkman (1984) also proposed that potentially stressful stimuli would instigate a modifiable appraisal of control. AT assumed that the process of modification of stressor appraisal could only occur over the long-term, as perception of stressors would become refined given stressor familiarity, and predictability.

In accord with SLT and AT, ULOC findings that favour non-constancy of LOC include: a moderate positive correlation between chronological age and internality (Bialer, 1961; Knoop, 1981; Penk, 1969; Staats, 1974; Strickland & Shaffer, 1971; Wolk & Kurtz, 1975); and, reduced internal LOC in later life (Bradley & Webb, 1976; Lachman, 1983; Siegler & Gatz, 1985).

Furthermore, Coombs and Schroeder (1988) criticised the validity of the last several decades of LOC constancy research, concluding that valid attention to underlying theory of perceived control had been ignored. The authors argued that most research of LOC constancy had utilised several-item, researcher-generated surveys that had dubious theoretical support. Similarly, Rotter (1991) criticised such ad-hoc measurements that favour LOC constancy, concluding that SLT's prediction of LOC non-constancy remained valid.

Ryckman and Malikioski (1975) were among the first to investigate the relationship between generalised MLOC and age. Their sample consisted of 100 college students (under 21 years of age) and 383 adults (aged 21 to 79), recruited from a wide variety of telephone book listings. College students had lower LOC internality than older adults, and no decline of internality for the 50 to 79 age-band was found. Older adults also scored the lowest levels on the powerful-others sub-scale, prompting the authors to view their results as evidence against of older adult stereotypes. Indeed, "negative stereotypes of the elderly as dottering old codgers who spend much of their time in rocking chairs reliving the past and waiting passively and helplessly for death" (p. 657) certainly deserved reconsideration.
Blanchard-Fields and Irion (1988) examined the possibility of a moderating effect of age upon MLOC and coping. A total of 96 volunteers were sampled, with 24 participants (12 females, 12 males) allocated to each of four age-bands; adolescents ranged from 14 to 17 years of age \((M = 15.52, \text{dispersion not reported})\), young adults from 18 to 25 years \((M = 20.13)\), middle-aged adults from 35 to 50 years \((M = 43.88)\), and older adults were aged 60 and over \((M = 66.21)\). There were no significant differences between age-bands on LOC internality. However, powerful-others scores of adolescents' \((M = 23.17, SD = 7.01)\) were significantly higher than both middle-aged adults' \((M = 14.71, SD = 9.66)\) and older adults' \((M = 14.17, SD = 9.08)\). Contrary to their initial hypothesis, the researchers concluded that externality decreased with age, and argued that their findings were consistent with "adult cognitive-developmental literature that depicts youthful thinkers as quite vulnerable to the influence of external sources that define reality for them" (p. 200).

Perhaps Lachman's (1986) reflection on LOC constancy research remains apt, as empirical results still comprise "a set of remarkably inconsistent findings" (p. 34). Lachman also highlighted the rarity of longitudinal data with the literature, though cross-sectional research was advocated as a practical, albeit erratic alternative.

The need for research of older adults' LOC is elevated given the associations of LOC with older adults' well-being; the inconsistency of associations with older adults' LOC; and, the lack of clear theoretical or empirical evidence for LOC constancy. Additionally, none of the LOC constancy studies identified considered the possibility of gender effects.

**Does Gender Influence LOC?**

The formation of gender identity is of key importance, as gender may form a 'cornerstone' in psychosocial development (Cook, 1985). However, the majority of LOC studies have simply included gender as a demographic, without any further investigation.

**ULOC Associations with Gender.**

As was the case for ULOC constancy research, reports of gender differences on ULOC are characterised by inconsistency, as: males have been reported to have greater externality than females (Hersch & Scheibe, 1967; Österman, Björkqvist, Lagerspetz, Charpentier,
Caprana, & Pastorelli, 1999; Strickland, 1965); females have evidenced greater externality than males (Feather, 1968; Hamsher, Geller, & Rotter, 1968); males had greater internality than females given equal self-esteem (Ryckman & Sherman, 1973); females evidenced constancy of ULOC, with non-constancy for males (Smith & Dechter, 1991); and, older adult males have evidenced greater ULOC externality than females (Chubb, Fertman, & Ross, 1997).

In their meta-analysis of 22 LOC studies of gender differences in ULOC, Archer and Waterman (1988) found fifteen studies reported non-significant gender differences, six found that males to had greater ULOC internality than females, and one study found that females had a greater internal LOC orientation than males. Given such inconsistency, the authors highlighted the need for future studies of gender associations with LOC.

In an extensive meta-analysis of gender differences on perceived control, Ross and Mirowsky (2002) utilised the 1995 United States Survey of Aging, Status, and the Sense of Control (ASOC), as well as 60 studies of ULOC that considered the influence of gender. The authors discussed the prevalent conclusion was for females to have a lower perception of internal LOC than males, and suggested that such a view lacked evidentiary support due to the variety of theoretical bias, methodological designs, and disparate results that are typical within LOC research. Greater support was found for male and female older adults to have a significant reduction in perceived LOC internality compared to young adults.

Therefore, the importance of researching gender differences on ULOC is recognised within the LOC literature. However, reported findings are inconsistent and have received criticism for a lack of theoretical basis, as well as inconsistent design and measurement.

**MLOC Associations with Gender.**

Alagaratnam (1984) focused on the possibility of gender differences to clarify inconsistent associations between LOC and mood. A sample of paid undergraduate students were surveyed, comprising 36 females (aged 18 to 26 years) and 36 males (aged 18 to 30 years). As no significant gender differences between IPC scores were found, Alagaratnam concluded the IPC scale "was not contaminated by sex role bias" (p. 470).

De Man, Hall and Stout (1990) aimed to explore the relationships between gender and
MLOC, given the inconsistent ULOC associations previously reported. A total of 103 undergraduate students (36 males, 67 females), with an average age of 23.90 years were surveyed. MLOC scores across all IPC sub-scales were unrelated to gender.

The earlier detailed study by Brosschot, Gebhardt and Godaert (1994) also analysed MLOC for gender differences. The 225 females evidenced significantly higher C sub-scale scores ($M = 18.15$, dispersion not reported) than the 225 males ($M = 17.20$). Chance oriented externality also evidenced moderate positive correlations to traits such as neuroticism, social inadequacy, anxiety, depression, and sleeping problems.

In a study to examine the relation between MLOC, gender, depression, and neuroticism, Clarke (2004) administered the IPC scale to a sample of 129 female and 33 male psychology undergraduates aged 17 to 57 years ($M = 27.9$, $SD = 10.3$). Although depression and neuroticism were correlated ($r = .64$, $p < .001$), a one-way MANOVA revealed no significant effects of gender on MLOC, neuroticism, or depression.

Perhaps such a wide variety of differences may be attributable to the earlier discussed views of Ross and Mirowsky (2002), concerning the role of differential design. Even though each MLOC study sampled utilised the same IPC scale, all lacked details concerning: sample randomisation, stratification, and heterogeneity; confound estimation; data collection setting; commentary on study generalisability; and, none of the studies explored MLOC for the possibility of age differences.

Therefore, the validity of gender differences upon LOC has yet to be established, as both genders have evidenced similarity and dissimilarity across attributions of control. Future studies must: have sound underlying theory; utilise valid and reliable instruments; have an appropriate design; and, must contain statistically powerful analyses.

The Present Study

The preceding account of research on LOC has provided justification for present research. Specifically, the discussion detailed a paradigm shift in generalised LOC measurement, where Levenson's (1973) IPC scale was argued to provide a more valid, flexible and richer measure of LOC compared with Rotter's (1966) I-E scale; yet the IPC scale has remained relatively
under-applied (Brosschot, Gebhardt, & Godaert, 1994). The importance of LOC was detailed in terms of specific LOC associations, and the greater merit of an internal LOC orientation over an external perception of control. As older adults are becoming a more prominent proportion of the Australian and global population, there is an urgent need for contemporary MLOC research in relation to older adulthood. The LOC literature showed a relatively minor focus on older adult's LOC associations, but continued the beneficial theme of LOC internality; though with relatively greater caution. Research on LOC constancy had produced a greater focus older adults' perceptions of control, yet was similarly characterised by inconsistency, and a lack of consideration of gender differences. Where gender differences were considered, the reported associations were also characterised by inconsistency.

Though MLOC has greater validity than ULOC, a lack of generalisable rigour was identified within many MLOC investigations, and most associations with LOC were based upon a series of weak to moderate correlations rather than statistically robust analyses.

The current study aimed to address these unresolved issues concerning generalised MLOC for associations to age and gender. Rationale for the study included the superior validity of the MLOC construct to ULOC, the key role of LOC within psychological functioning, and the equivocal nature of empirical evidence relating LOC to age, constancy and gender.

Additionally, the current research has theoretical relevance for the body of LOC oriented research, and an applied relevance for Australia's older adult population as LOC may form a crucial aspect of older adult well-being. Such a contemporary view of older adult LOC may specifically aid productivity of pro-active social programs, in times of increasing budgetary pressures within the health-care system.

Hypotheses for the present research related directly to the earlier detailed unresolved issues from LOC research. Given the degree of inconsistency and lack of focus on older adults within the LOC research literature, the current research had an exploratory rather than directional research focus, to discern whether there was:

(i) evidence of age effects between age-bands on MLOC; and,

(ii) discernable gender differences between and within age-bands on MLOC.
Method

Design

The current study utilised a between-subjects, cross-sectional survey design. Three dependent variables were measured from participant's self-reported responses to Levenson's (1973) IPC sub-scale (i.e., their internal, powerful-others, and chance LOC; see Appendix A).

Participants' chronological age and gender formed the independent variables. In addition, participants' general health was measured via a further demographic question, and was used to discern the effect of general health upon MLOC.

Participants

The current study utilised a proportionally-stratified sample of 223 volunteer participants, comprising 110 females and 113 males. To allow for the assessment of possible age-band effects, both young adults ($n = 126$) and older adults ($n = 97$) were surveyed. Young adults formed a convenience sample, whereas older adult participants were randomly selected. Participants were expected to exhibit sufficient heterogeneity in measured variables to facilitate significant results. Statistical power was planned using Power and Precision (Version 2.0, 2000), and was deemed sufficient for the possible analyses ($1 - \beta > 0.80$; defined by Cohen, 1988). Inputs for estimating effect probability were based upon a minimum of 25 cases per cell, and the results from prior research that had used the IPC scale (i.e., Levenson, 1981; Blanchard-Fields & Iron, 1988; Collins & Ffrench, 1998; Collins & Jones, 2003).

Young adults were aged from 20 to 35 years inclusively ($M = 23.76, SD = 4.56$), and were sourced from Edith Cowan University, Western Australia. To maximise the generalisability of the young adult sample, undergraduate students were recruited from both social psychology ($n = 65$) and business-finance ($n = 61$) courses. Three psychology students were excluded from the study as their ages (i.e., 43, 51, and 53) were outside the age-bands required. Initial estimations that courses would have contrasting gender compositions were confirmed, as the psychology sample had more females (44 females and 21 males), whereas the finance sample had fewer females (22 females and 39 males). Overall, the combined student sample had approximately equal gender representation (i.e., 66 females and 60 males), as well as a multi-
disciplinary curriculum. Furthermore, Dalziel (1996) advocated the involvement of students in the research process, as “acting as a subject is an important basis from which students can better design their own research in later undergraduate and postgraduate years” (p. 120). The current research also adhered to ethical issues for utilising student samples (Stuart, 2001), as all participants were informed of the voluntary nature of participation, the purpose of the study, response confidentiality via anonymity, and the study did not involve any coercion or deception.

The older adult sample was aged from 60 to 75 years inclusively ($M = 68.13$, $SD = 3.60$), and was sourced from The Positive Aging Foundation’s (PAF) volunteer database known as the Positive Aging Research Group (PARG). To improve cross-sample comparability and generalisability: 75 females and 75 males received the survey; potential participants had completed their final year of secondary education; and, potential participants were randomly selected within the 60 to 75 age-band. As per the young adult sample, PARG volunteers also resided within the Perth metropolitan area, and were not residing within a structured care environment. Of 150 mailed surveys, a return of 97 responses (44 females and 53 males) provided a sound response rate of 64.67% (Gay, 1987), without the need for follow-up reminders.

Various research relating to older adults provided guidance for age-band definition, including: older adults having been described as at least 65 years of age, with physically impaired older adults listed as over 85 years (Blythe, 1979); young adults as 18 to 25 years, and older adults above 60 years (Blanchard-Fields & Irion, 1988); seniors described as individuals above 50 years, and psycho-geriatric clients as aged 65 or over (Marzillier & Hall, 1992); elderly adults as 60 years and above (Ross & Mirowsky, 2002; Simons, McCallum, Fridlander, & Simons, 2000); the elderly, as aged 65 and over (Swett & Bishop, 2003); and, young adults as 24 to 44 years, with older adults as aged 65 to 74 (Harrison & Britt, 2004). Hence, a young adult age-band of 20 to 35 years with an older adult age-band of 60 to 75 years had empirical support, and provided both matched age-band breadth as well as face-validity. In addition, the Seattle Longitudinal Study (Schaie, 1996) was consulted, given its extensive research since 1956 of age-based effects on adult personality and mental abilities. Schae
posited cognitive abilities peaked in one's early 50's, and only significantly decline above 75 years of age. Hence, the current study's older adult age-band reasonably excluded participants with marked cognitive decline, minimising non-systematic error.

**Materials**

All materials used within the study were within the public domain, supported by relevant literature, and deemed appropriate given the project's scope. Participant information letters for potential older adult PARG participants were utilised (see Appendix B), as well as an information letter for potential student participants (see Appendix C).

**Internality, Powerful-Others, and Chance (IPC) Survey.**

The survey questionnaire (see Appendix A), incorporated the IPC scale (Levenson, 1973) statements in exact wording and order. As the IPC scale was freely and readily available within the public domain through published literature (Levenson, 1981) and research websites (IPIP, 2006), permission was not required for replicated usage.

The IPC scale consists of a 24-item set of expectancy-belief statements measured via 6-point Likert-type (Likert, 1936) responses, ranging from 'disagree strongly' to 'agree strongly'. Dimensions of MLOC are measured by the Internal (I), Powerful-others (P), and Chance (C) sub-scales. The IPC scale was followed by three demographic questions on age, gender, and perceived general health.

Although the IPC scale contains statements that reflect a wide variety of situations, Levenson (1974) reported internal consistency via Kuder-Richardson (K-R 20) coefficients as moderately high: I (.64), P (.77), and C (.78); with Spearman-Brown split-half reliabilities of .62 (I), .66 (P), and .64 (C). Subsequently, Levenson (1981) reported similar consistency: I (r = .64 to .67), P (r = .73 to .79), and C (r = .73 to .79). Recently, the International Personality Item Pool (IPIP, 2006) supported the reliability of the IPC scale, reporting similarly favourable sub-scale correlations: I (r = .71), P (r = .81), and C (r = .72).

Levenson's (1974) test-retest analysis also evidenced reliable correlations over a seven week test-retest interval: I (r = .66), P (r = .62), and C (r = .73). Sound reliability was further reported from Levenson's (1981) seven week test-retest across sub-scales (r = .60 to .73), with
satisfactory contiguous split-half reliability ($r = .62$ to $.66$).

On construct validity, Levenson (1974) found significant low-order correlations between $P$ and $C$ to $I$ ($r = -.25$ to $.19$), and $P$ to $C$ ($r = .41$ to $.46$). In a review of 16 studies that sampled non-clinical adults, the $I$ sub-scale has evidenced a mean range of $32.98$ to $40.40$, a $P$ range of $14.64$ to $24.00$, and $C$ range of $12.00$ to $23.80$ (Levenson, 1981). In accord, the Collins and Ffrench (1998) study observed similar scores from their broadly aged sample of Australian adults: $I$ ($M = 34.89$, $SD = 4.91$), $P$ ($M = 22.12$, $SD = 5.38$), and $C$ ($M = 21.62$, $SD = 6.05$).

**Procedure**

Adhering to the ethical guidelines of the Australian Psychological Society (APS, 1999), potential older adult participants received information letters (see Appendix B) that detailed: the purpose of the current research; their rights to anonymity and confidentiality; and, the voluntary nature of participation without penalty for non-participation. If older adults required further details, the information letters also included contact details of the researcher, their research supervisor, and an independent person.

Access to the older adult PARG members was facilitated by Curtin University's Centre for Research on Ageing (CRA), which acted as an intermediary between the researcher and PARG members. Information letters were provided from both the researcher and CRA perspective, then were mailed by an independent mail-house nominated by CRA. Both information letters and the survey were mailed with a pre-addressed reply-paid envelope to facilitate the return of responses.

Potential student participants were approached within lecture theatres at pre-arranged appointments with their lecturer. As was recommended by Edith Cowan University's Faculty of Community Services, Education and Social Sciences Research Ethics Sub Committee, all potential student participants received an information letter once the researcher verbally explained the survey process and purpose of the research. After the student participants were briefed, the survey was distributed and collected by the researcher.

For both the older adult and young adult samples, consent to participate was deemed to be evidenced via a returned survey. For older adults, all completed surveys were returned.
within three-weeks, and student participants returned their survey within 15 minutes.

Scoring of the IPC scale was based upon Levenson's (1981) detailed procedure (see Appendix D). In Levenson's measure the sub-scale dimensions were obtained from eight of the 24 items within the total IPC scale, with a possible scoring range of 0 to 48. A high score for the I sub-scale was indicative of an individual that believes they have substantial personal control over their life, whereas a high score for the P or C sub-scales of LOC externality respectively indicate that other people, or random factors, are deemed to control one's life.

Results

Overview

Data was analysed using the Statistical Package for the Social Sciences (SPSS, version 13.0). The independent factor of participant age was recoded from continuous to dichotomous levels (i.e., age-bands), and gender was also dummy encoded (i.e., female = 1, male = 2).

Given the measurement of multiple dependent variables, careful attention was paid to the choice of a multi-variate analysis, or a series of uni-variate analyses. Apart from the need to minimise Type-1 error inflation, a multi-variate analysis may be superior to multiple uni-variate tests as additional effects may be revealed (Tabachnick & Fidell, 2001). Moreover, Levenson (1981) argued "for the dependent variables of internal, powerful-others, and chance orientations multi-variate analyses are most appropriate" (p. 22).

As inequality of group sizes may violate the homogeneity of variance assumption and elevate result ambiguity (Overall & Spiegel, 1969, cited in Tabachnick & Fidell, 2001), the current analysis utilised a conservative approach; each cell mean was given an equal weight regardless of cell size (i.e., the SSTYPE3 method within SPSS). Such an unweighted-means approach was undertaken as neither a random-loss deletion, nor a weighted-means approach would have improved generalisability of the unequal cell sizes. Additionally, the unweighted-means approach has greater power than the random deletion of cases, and is the preferred approach where computational aids are available (Tabachnick & Fidell, 2001).

With a main effect alpha set at .05, a 2 x 2 between-subjects Multi-variate Analysis of Variance (MANOVA), and a Multi-variate Analysis of Covariance (MANCOVA) were utilised.
Exploratory Data Screening

There were no cases of missing data from any of the surveys, and no uni-variate outliers were found. Internal consistency and construct validity of the IPC sub-scales were then tested for research viability. The reliability of the IPC scale was sound given Spearman-Brown split-half reliability coefficients of .61 (I), .71 (P), and .62 (C) (Murphy & Davidshofer, 2005). In addition, the IPC scale displayed adequate construct validity, given negative Pearson correlation between internality to combined externality (r[223] = -.15, p < .01), and positive association between both externality sub-scales (r[223] = .59, p < .01). Furthermore, Cronbach’s alphas for internality (.71), powerful-others (.65), and chance (.60) sub-scales evidenced viability for research application (Sattler, 2005).

A number of assumptions underlie the usage of the MANOVA test, specifically relating to: cell-sizes; uni-variate and multi-variate normality; linearity; homogeneity of variance-covariance matrices; and, non-multicollinearity or singularity (Coakes, Steed, & Dzidic, 2006; Tabachnick & Fidell, 2001). Firstly, the current study's cell sizes supported a MANOVA test, given more numerous cases than dependent variables, and the ratio of the smallest cell's cases to the largest was sound (i.e., not above 1 to 1.5; Coakes, Steed, & Dzidic, 2006).

Dependent variables were then independently tested for uni-variate normality against each level of the independent factors. For samples above 100 cases the Kolmogorov-Smirnov (K-S) statistic was applied, whereas the Shapiro-Wilk (S-W) statistic tested factors below 100 cases (Tabachnick & Fidell, 2001). From an age-band perspective, both older adults' powerful-others orientation, $S-W(97) = .954, p = .002$, and young adults' chance LOC, $D(126) = .108, p = .001$, appeared to deviate from normality. However, visual examinations of histograms, trended normality plots, and box plots supported uni-variate normality for the aforementioned concerns. Additionally, the six other cell-wise perspectives suggested uni-variate normality from both K-S and S-W statistics, as well as their visual plots. Perhaps most crucial for a MANOVA, multi-variate normality was observed as no multi-variate outliers under Mahalanobis distance were found, $\chi^2 (3, N = 223) = 16.20, p > .001$.

Testing for dependent variable linearity determined whether uni-variate tests or a
stepdown-\textit{F} version of MANOVA were applicable (Coakes, Steed, & Dzidic, 2006). Earlier detailed bivariate correlations between sub-scales and within-cell scatter-plots evidenced sufficient relatedness, yet correlations were not high enough to require the stepdown-\textit{F} test. Moreover, although Bartlett’s test of sphericity found all sub-scales were suitable for linear combination, $\chi^2 (5, N = 223) = 150.32, p < .001$, a stepdown-\textit{F} was not utilised given a lack of theoretical rationale for ordering the dependent variables.

Homogeneity of uni-variate variance was indicated for all sub-scales via Levene’s test, and Box’s $M$ indicated homogeneity of multi-variate variance-covariance matrices were not violated, $F(18, 141033) = 1.31, p = .17$. Finally, multi-collinearity towards singularity was not observed, as the within-cell correlation matrix was above .0001 with a log-determinant above -9.21 (Coakes, Steed, & Dzidic, 2006).

Hence, a multi-variate analysis of the three IPC sub-scales was justified based upon adherence to MANOVA assumptions, and usage of the test would not simply increase the degrees of freedom (i.e., otherwise weakening the analysis).

\textit{Exploratory Hypotheses for Age and Gender}

A MANOVA was used to discern whether there were any age or gender differences on a linear combination of the IPC sub-scales, as well as their interaction. Reported multi-variate effects utilised Pillai’s Trace criterion, as both acceptable power and robustness to assumption violations was provided (Coakes, Steed, & Dzidic, 2006). Additionally, all reported effects evidenced adequate power ($1 - \beta > 0.88$; for further discussion, see Cohen, 1988); indicating that any significant results are unlikely to have been found by chance.

A multi-variate main effect for age-band was observed, $F(3, 217) = 10.99, p < .0001$, partial $\eta^2 = .13$, with no effect for gender, $F(3, 217) = 0.16, p = .92$, and no interaction between age-band and gender, $F(3, 217) = 3.00, p = .29$. Hence, only age-bands were associated with differences in MLOC; both gender, and age-bands within genders had non-generalisable differences. Males and females had similarly high internality levels (i.e., scores approximated 37 out of 48), and moderate LOC externality (i.e., $P$ and $C$ scores approximated 20 out of 48).

With Bonferroni adjustments to minimise Type-1 error (i.e., an alpha of .017), uni-variate
F-tests assessed which IPC sub-scales contributed to the age-band main effect. A simple-main effect was found between participants' age-band and LOC internality, \( F(1, 219) = 20.75, p < .0001 \), partial \( \eta^2 = .09 \); and age-band had an effect upon participants' powerful-others orientation, \( F(1, 219) = 10.18, p = .002 \), partial \( \eta^2 = .05 \). However, no effect between age-band and chance LOC was evidenced, \( F(1, 219) = 3.52, p = .09 \). Hence, participants' age had a direct effect upon their perception of internal control, and simultaneously affected their belief that powerful-others exerted control within their lives.

An examination of estimated marginal means for participant age-bands indicated that older adults had greater LOC internality (\( M = 38.48, SD = 5.80 \)) than young adults (\( M = 34.97, SD = 5.57 \)). Older adults also evidenced lower powerful-others externality (\( M = 16.84, SD = 9.89 \)) than young adults (\( M = 20.65, SD = 7.88 \)). Collectively, both age-bands showed high LOC internality, and relatively low powerful-others attributions.

**Exploratory Hypotheses for Age and Gender - Controlled for Health Effects**

As participant demographics included information concerning their perceived general health, a MANCOVA analysis was conducted to isolate the influence of health. To present a more naturalistic view of participants' LOC beliefs, an adjustment for general health differences was analysed separately; the two sets of results were then compared to isolate health effects.

A weak negative correlation for chronological age and health (\( r[223] = -.25, p < .01 \)), and an independent samples t-test, \( t(122) = 3.52, p = .001 \), confirmed the association between age and general health. As participants aged their health marginally reduced.

Before health could be considered as a covariate for a MANCOVA test, several additional assumptions to MANOVA were tested, including: the independence of group design; covariate normality; linearity between the covariate and dependent variables; and, homogeneity of regression slopes (Tabachnick & Fidell, 2001). All of these assumptions were adequately met.

In controlling for the health, reported MANCOVA effects were also based upon Pillai's Trace criterion, and all effects evidenced slightly enhanced power over the MANOVA test (\( 1 - \beta > 0.92 \); further reducing non-systematic error terms). The MANCOVA analysis evidenced a main effect of health on centroid MLOC, \( F(3, 216) = 5.239, p = .002 \), partial \( \eta^2 = \).
.07; albeit with a weak association (i.e., partial $\eta^2 < .20$; Tabachnick & Fidel, 2001).

Furthermore, a uni-variate effect between health and powerful-others LOC, $F(1, 218) = 6.92, p = .009$, partial $\eta^2 = .04$; and health on chance LOC, $F(1, 218) = 12.89, p < .0001$, partial $\eta^2 = .06$, were observed. As participants’ aged, their marginal reduction in general health had an effect upon composite MLOC, as well as the P and C sub-scales of LOC externality.

Similar to MANOVA results, a multi-variate main effect of age-band on composite MLOC, $F(3, 216) = 5.24, p = .002$, partial $\eta^2 = .07$, was found; with no effect of gender, or the interaction between age-band and gender. As was the case under the MANOVA test, inclusive of health effects, both males and females had high levels of internality (i.e., scores approximated 37) and moderate externality (i.e., scores approximated 20 for both the externality sub-scales).

The greatest effect of controlling for health was the observation of uni-variate effects for all three IPC sub-scales: I ($F[1, 218] = 23.67, p < .0001$, partial $\eta^2 = .10$); P ($F[1, 218] = 14.41, p < .0001$, partial $\eta^2 = .06$); and, C ($F[1, 218] = 7.70, p = .006$, partial $\eta^2 = .03$). In particular, the removal of general health effects produced a simple main effect of age-band on chance LOC (i.e., not observed under MANOVA).

MANCOVA based estimated marginal means indicated that older adults continued to have greater LOC internality ($M = 38.68, SD = 5.82$) than young adults ($M = 34.82, SD = 5.47$). On sub-scales of LOC externality, powerful-others orientation of older adults ($M = 16.38, SD = 8.79$) was lower than young adults' ($M = 21.01, SD = 7.28$), and older adults' chance LOC ($M = 18.17, SD = 9.68$) was also below young adults' ($M = 21.66, SD = 8.99$).

In comparison to MANOVA results, the MANCOVA analysis showed older adults' scores on LOC internality marginally increased, whereas young adults' internality scores reduced. Furthermore, on both measures of externality, older adults' scores increased, whereas young adults' scores decreased. Hence, the gap between older adult and young adult LOC sub-scales widened after removing the effects of health differences with age. In percentage terms, the absolute distance between sub-scale mean scores showed a 9.97% increase for internality (i.e., from 3.51 under MANOVA, to 3.86 under MANCOVA); a 21.52% increase for powerful-
others (i.e., 3.81 to 4.63); and, a 49.14% increase for chance LOC (i.e., 2.34 to 3.49). Hence, the removal of health effects only marginally increased the effect of age-bands on LOC internality, yet produced a substantially greater difference on externality sub-scales.

**Summary**

Overall, the MANOVA analysis evidenced older adults to have greater LOC internality than young adults', and older adults had simultaneously lower powerful-others externality than young adults' scores. After statistically controlling for older adults' marginal deterioration in general health under MANCOVA, older adults retained higher internality and lower externality than young adults. A comparison between MANOVA and MANCOVA results showed the marginal reduction in older adults' general health reduced their LOC internality, and increased their externality (i.e., most notably on chance LOC). Whether the observed marginal deterioration in general health of older adults was retained (i.e., via MANOVA) or statistically controlled (i.e., via MANCOVA), there were no statistically significant effects of gender, or the interaction between age-bands and gender.

**Discussion**

**Overview**

A causal explanation for the observed results was inhibited by the present study's exploratory framework. Although causality was beyond the investigation's aim, the findings may have several justifiable influences. The findings also have direct implications for the body of LOC literature, LOC related theories, and older adults within contemporary society.

**The Constancy of LOC?**

The current study did not provide statistical support for LOC constancy, as age-band effects were observed for both the LOC internality, and powerful-others sub-scales. After controlling for the covariate effect of a marginal decline in general health with age, the age effects were extended to all IPC sub-scales; further supporting LOC non-constancy.

Though the aforementioned age effects were statistically generalisable, the observed age-band scores relative to the range of possible scores must also be considered. From a possible score of 48 for each sub-scale, both young and older adult LOC internality was relatively high
(i.e., a range of 35 to 38 respectively, with and without health effects). Additionally, both young and older adults had moderate externality on the powerful-others and chance sub-scales (i.e., a range of 17 to 23). Given such an overview, the internality and externality of both age-bands may be qualitatively categorised as high for internality, and moderate on externality of LOC. Thus, from a quantitative perspective (i.e., focusing on statistical significance), non-constancy of LOC was supported; however, a broader qualitative overview implied substantial similarities between age-bands (i.e., supporting LOC constancy). Overall, the present study provides statistical support for LOC non-constancy, but must also recognise the similarity of the age-bands on LOC from a categorical perspective.

In terms of empirical support for past MLOC research, the current study's high levels of internality and relatively lower levels of externality most closely approximates Ryckman and Malikioski's (1975) observations, where college students had lower LOC internality and higher powerful-others externality than older adults sampled. In turn, the current study also supports their assertion that the negative stereotype of older adults to be "waiting passively and helplessly for death" (p. 657) is highly inaccurate given the MLOC beliefs of older adults. The current study's observations also support the earlier detailed Australian study of Collins and Ffrench (1998), where mean internality scores approached 35, and externality scores approximating 22 were reported. However, the Collins and Ffrench study had sampled adults aged between 18 to 58 years of age, and would therefore exclude the present study's older adult age-band (i.e., 60 to 75 years of age). Though the current study contrasted Blanchard-Fields and Irion's (1988) finding of non-significant differences on age and LOC internality, their report of decreased externality with age was observed. The researchers' conclusion that young adults are vulnerable to the influence of external sources may also explain their greater MLOC externality within the current research.

In designing the current study, careful attention was paid to Lachman's (1986) criticisms of earlier LOC constancy research. Lachman contended that previous age effects on LOC were caused by flawed research design, and the usage of non-scientific measurement instruments. However, the present study's observation of age effects on internality and powerful-others sub-
scales, as well as the chance sub-scale under MANCOVA, did not support Lachman's investigation of LOC constancy that found no effects of age on any IPC sub-scale. After following a similar cross-sectional design to Lachman's study, and the researcher's recommendation for LOC constancy research to be based upon underlying theories of control (i.e., such as the SLT), the present study's findings also contradict Lachman's extensive criticisms. Not only was the IPC scale based upon SLT principles (Levenson, 1981), but the current study's results also support the SLT prediction that LOC would significantly change with age (Rotter, 1991). The design, measurement, adherence to SLT, and results of the present study must therefore challenge Lachman's explanation of the causes of inconsistent age effects on LOC within the associated research literature.

Additional support for SLT's prediction for significant LOC non-constancy may also be derived from its underlying assumption that novel experiences and varied event outcomes would logically modify one's LOC (Legerski, Cornwall, & O'Neill, 2006; Rotter, 1992). As young adults would generally be expected to have fewer life-experiences than older adults, they would also be expected to have significantly different MLOC beliefs. Therefore, only older adult participants may have had sufficient life-experience to promote LOC stability.

Such a view was also argued by Lefcourt (1982), as sufficient life-experience is likely to be required before an individual can accurately appreciate the extent to which their immediate environment can be personally controlled under a variety of circumstances. Lefcourt argued that young adults may not have experienced the sufficiently wide array of personal, social, and work-place encounters required to form a stable LOC belief. As a result, significant non-constancy of LOC is expected under a life-span perspective of the role of life-experience.

Additional support for LOC non-constancy to have been evidenced from the current study can be ironically gleaned via the LSTC; the most often cited theory in favour of LOC constancy (Cloninger, 1996). The LSTC (Heckhausen & Schulz, 1995; Schulz & Heckhausen, 1996) theorised LOC constancy across the adult life-span, due to the LSTC's assumption that primary control equated to LOC internality. Secondly, individuals were assumed to strive to maintain their high level of LOC internality which they were assumed to have developed during young
adulthood; ensuring ongoing well-being and happiness. Results from the present study support the assumption of high levels of LOC internality in both young and older adults, but lend greater support to the logical extension that rational individuals would continue to maximise their well-being (i.e., as older adults' LOC internality reached a level significantly above young adults' internality). Although limited support is provided for the LSTC in terms of the need to maintain a high level of LOC internality (i.e., a possible by-product of well-being maximisation), the current study does not support the LSTC's central assertion of absolute constancy of LOC across the life-span. Furthermore, the present study's older adult participants also evidenced significantly lower LOC externality (i.e., a neglected dimension of LOC under the LSTC's sole focus upon LOC internality).

Overall, greater support for LOC non-constancy is forwarded by the current study, given: a statistically significant effect of age upon internality and externality of LOC; greater theoretical justification for the present study's findings from SLT; the logical view that one's LOC is developed with life-experience; and, the contradiction of key LSTC assumptions.

Influences of Age Effects on MLOC

The contemporary Australian society from which participants were sourced may have influenced their MLOC, given SLT forms the basis of the MLOC construct (Levenson, 1981). The external social environment was not perceived to be a strong source of perceived control by either age-band; in particular, older adult Australians perceived they could exert significantly more control over their lives than external social factors. If principles of social learning were influential, such influences are likely to have reinforced participants' greater belief in the effectiveness of their own resources and capabilities (i.e., LOC internality). Older adults may have had greater exposure to such influences over their longer life-time, manifesting in greater internality, and lower externality of LOC than young adults. A variety of social contexts may have promoted such beliefs, providing a greater accumulation of evidence on the effectiveness of their actions upon their immediate environment compared to external factors (e.g., older adults' greater exposure to work and social environments compared to university students).

A further influence upon older adults' MLOC may have arisen from their residential status.
As all older adult participants resided outside of structured care, they may have a greater level of independence than older adults residing within such an environment (Svensson, 1984). Additionally, older adult participants may have elevated their scores on LOC internality via a comparison to their older adult cohorts within structured care (i.e., a 'benchmarking' approach). Furthermore, older adult participants would be more likely to own their current residence than young adults sampled. Logically, one would not expect the majority of university students to own their home; rather they may be living with their parents, or have entered a formal rental agreement with a landlord (i.e., a relatively powerful-other). Therefore, the residential status of older adult participants may have influenced their greater levels of LOC internality, and their lack of perceived influence by external factors of control.

Apart from greater independence, older adult participants would also be expected to have better health than structured care residents, as admittance to such care is usually due to poor physical health (Marzillier & Hall, 1992). Furthermore, older adult participants' perception of their weak deterioration in general health contrasts expectations for a marked decline in older adult health and functionality (e.g., Henry, 2004). Support for the pronounced healthiness of the older adult sample may also be forwarded from meta-analyses of LOC research, which have reported elevated levels of general health for individuals with high LOC internality and relatively subdued externality (e.g., Bostic & Ptacek, 2001; Sweeney, Anderson, & Bailey, 1986). Therefore, it is likely that older adults' perceived general health may have had a causal influence upon their MLOC. However, as young adults had higher scores on general health than older adults', with lower LOC internality and higher externality, the expected relationship between better health and MLOC from LOC literature did not extend to young adults. Hence, the effects of MLOC upon general health, or general health upon MLOC, are more complex than the linear relationship suggested by LOC research literature.

Overall, it is likely that both young and older adults' social learning experiences, residential status, and general health had influenced the observed effect of age-band on MLOC scores. Such influences were unlikely to have been caused by chance, rather the inherent differences within the participants as a function of their respective ages.
Implications of Age Effects on MLOC

Both theoretical and applied implications may follow from the significantly higher LOC internality and lower externality of older adults compared to young adults, as well as from the categorically high levels of internality and moderate externality for both age-bands.

In terms of the relative merits of LOC internality versus externality, the majority of LOC research literature has associated an internal LOC with substantial benefits, and an external LOC with reduced functionality (e.g., Bostic & Ptacek, 2001; DeNeve & Cooper, 1998; Klonowicz, 2001; Lang & Heckhausen, 2001; Sweeney, Anderson, & Bailey, 1986; Weinstein & Quigley, 2006). Therefore, the high levels of internality for young and older adults from the current study may have positive ramifications within their lives; though such a positive view of internality should be cautioned by Burger's (1989) meta-analysis that reported an internal LOC to be associated with: disruptive concern over self-presentation, increased attention to predictable events, and the avoidance of goal formation due to severe anxiety. Furthermore, high levels of older adult internality has been associated with: a reduced ability to engage with supporting environments (Birren et al., 1991), and greater self-blame for negative events (Blank, 1982; Lachman, 1991; Lachman & McArthur, 1986; Rodin & Langer, 1980). Though the benefits of LOC internality must be cautioned, the positive aspects of the current study's results are further promoted by the observation of subdued levels of externality for both age-bands; as externality has been widely associated with: increased severity of depression (Seligman, 1975); a belief that others are responsible for treating ill-health (Achterberg & Lawlis, 1979); increased passivity (Rotter, 1992); reduced subjective well-being (Lang & Heckhausen, 2001); and, inhibited coping (Kellett, 2004).

Per capita health-care costs for older adults are likely to remain an ongoing concern within Australia (Seshamani & Gray, 2002). Given that a greater volume of LOC research has associated LOC internality with improved physical and mental health, the pronounced LOC internality of older adult participants may have substantially positive implications for Australia's financially challenged health-care system (for further discussion, see Boult, Altmann, Gilbertson, Yu, & Kane, 1996; Seshamani & Gray, 2002). By recognising and building upon
the strengths of older adults, such as their strong sense of internal control, strategies to benefit older adults and the wider health-care system may have greater impact. If older adults believe they can control their immediate environment, they may also believe they have substantial control over future outcomes relating to their own health and well-being.

Such strategies for ill-health prevention may delay the onset and reduce the impact of physical health deterioration for older adults. However, the strategies would need to be communicated in an empowering manner, in accordance with older adults' strong belief in self-determination. In turn, the financial pressures predicted to burden the Australian health-care system (Swett & Bishop, 2003) may be lower than recent predictions suggest (e.g., Henry, 2004). Such strategies to improve older adult general health and well-being are particularly poignant as most chronic diseases within Australia are substantially preventable (AIHW, 2004).

As discerned via the comparison between the MANOVA and MANCOVA results, the observed marginal decrease in older adults' general health both reduced their LOC internality, and increased their LOC externality. Thus, limited support is provided for Rodin's (1986) assertion that older adult ULOC internality reduces as general health deteriorates. The current study also widened Rodin's focus on ULOC, having simultaneously measured a greater increase in LOC externality with the reduction of older adults' general health. Hence, health promotion strategists should be aware that older adults with impaired general health, are likely to have experienced a reduction in their LOC internality, and an increase in their perception of LOC externality; particularly a greater belief in being controlled by fate or chance. Effective health-care strategies may need to reduce older adults' perception that their physical health status is a function of fate, and possibly non-controllable. Without recognising all the changes in older adults' MLOC due to a reduction in their general health, both health promotion and ill-health prevention strategies may have reduced effectiveness.

Older adults' pronounced LOC internality within the current study not only challenges negative stereotypes relating to older adults' passivity (e.g., Ryckman & Malikioski, 1975), but also contrasts seminal behaviourist literature (e.g., Skinner, 1971). Contrary to theorised expectations, LOC externality did not gain prominence over the life-span; older adults did not
overwhelmingly "accept the external sources of control outside their influence" (p. 16). Older adults displayed only moderate externality, which was significantly lower than young adults' acceptance of external control.

Thus, the age effects observed within the present study make a unique contribution to the body of LOC literature, and associated theoretical points of view. The current observations may also aid under-resourced health-care systems; positively affecting the functionality of young and older adults.

**Gender Similarity on MLOC**

There were no statistically significant differences between females and males on MLOC; each gender reported high levels of LOC internality (scores approximated 37 out of 48), and moderate LOC externality (scores approximated 20 out of 48 for both sub-scales). Both genders perceived similar sources of control within their immediate environment regardless of their age, or levels of perceived general health.

As the majority of reviewed LOC literature has neglected to investigate the possibility of gender effects on LOC, the present study's lack of gender effects may serve to lessen the gravity of this omission. However, it must also be recognised that finding a lack of gender differences has both theoretical and applied implications regarding gender equality.

In terms of support for ULOC research, the present study's lack of gender effect on MLOC most closely approximates the Archer and Waterman (1988) meta-analysis, where 70% of reviewed studies reported a lack of gender difference on ULOC. Compared to the relatively fewer investigations of MLOC for gender associations, results from the current study are also in accord with Levenson's (1973) seminal research, that reported a lack of gender associations with IPC sub-scales, and Alagaratnam's (1984) view that the IPC scale "was not contaminated by sex role bias" (p. 470); particularly as the present study had sufficient statistical power to highlight any such 'bias'. The current study also supports Clarke's (2004) research of New Zealand college students that similarly observed non-significant gender differences.

Although the formation of gender identity is of crucial importance for an individual's psychosocial development (Cook, 1985), the differences within one's gender identity may not
manifest in MLOC. Alternatively, the generalised nature of the IPC scale may have reduced its sensitivity to psychosocial differences of gender.

As the relatively few LOC investigations for gender effects had reported inconsistent results for age and gender differences (Ross & Mirowsky, 2002), the results of the present study's analysis of gender should be viewed as a contemporary addition to the body of LOC research, as well as wider research on the impact of gender upon perception.

Limitations of the Current Research

Based on the current study's non-experimental design, the independent variables of age and gender could not be attributed with causality. Furthermore, the current study was limited by the exclusive reliance upon quantitative measures and analysis. The inclusion of a qualitative component, such as in-depth interviews, would have contributed greater depth to the current study's account of the influence of age and gender upon MLOC.

A further limitation of the present study may have arisen from the sampling of university students (Sears, 1996); such convenience sampling may not represent the LOC beliefs of non-university students. The lower levels of LOC internality and greater externality of young adults compared to older adults may have reflected the young adults' university environment. Although student participants were surveyed several weeks before any academic assessments were due (i.e., in the second week of commencing their courses), all students were enrolled in a second year program, and may have recalled the effects of earlier external assessments. If the students had not developed sufficiently strong academic skills, they may have expressed a greater perception of external control than non-university young adults. Thus, the second year students may not have developed "the belief that one has at one's disposal a response that can influence the aversiveness of an event" (Bandura, 1977, p. 90); where the response may form academic skill, and the aversive event being lower than expected grades. As such, students' lower levels of LOC internality and higher externality may have reflected their particular social learning environment (Rotter, 1992).

Similar to the generalisability concerns applied to the young adult sample, the LOC perceptions of the PARG members may not accurately reflect the wider population of older
adults. As PARG aims to promote the research of older adults’ perceptions, roles, and contributions to modern society; such a positive outlook on aging, and implied belief in the value of older adult research, may have biased the participants’ responses. The PARG members may also have had: greater familiarity with psychological constructs such as LOC; responded more willingly than non-PARG members (i.e., given the 65% response rate); and, they may have a more positive attitude toward aging than non-PARG members. Additionally, self-selection bias may have arisen from the exclusive reliance upon volunteers across both the young and older adult samples.

The current study’s results may also have been biased by other confounds that the non-manipulation of the student sample, and stratified-random selection of PARG members may not have adequately dispersed. As earlier discussed, several additional confounds or covariates may affect one’s LOC perceptions, such as: mental health; education; income; self-rated happiness; subjective well-being; marital status; degree of medical care; cultural background; activity levels; goal orientation; social interaction; cognitive ability; and, coping styles. However, in utilising a relatively large and proportionally-stratified sample the current study may have normalised any non-systematic error from such confounds (Gay, 1987).

Though the present study included an analysis of general health effects, participants’ general health was discerned in a limited manner; via a single self-reported demographic question. If greater detail on participants’ health was ascertained, then greater clarity on the health effects of age, and the influence health on MLOC would have been obtained.

Due to imposed time constraints and limitations to project size, a longitudinal design was not possible. In attempting to discern possible age effects, a longitudinal design would have better matched individuals’ differences across samples to highlight any influence of age and gender. However, Lachman (1986) suggested that cross-sectional designs do not detract from LOC research, as only cross-sectional designs have reported increases, decreases, as well as stability of internal LOC across age-bands. Lachman highlighted that longitudinal studies of LOC had only reported decreases, or marginal stability of LOC internality; limited by their smaller samples and substantial survivorship bias.
The final limitation identified within the current study relates to the measurement of the central independent variable of age. Though the choice of young adult and older adult age-bands had strong empirical and logical support, the present study excluded 36 to 59 year old adults, as well as older adults above 75 years of age. By doing so, the generalisability of the implied trends may be limited. If the 36 to 59 age band had been included, then three points of observation would have been measured, facilitating a more reliable detection of trends.

*Future Directions*

Future research could further contribute to the LOC literature by: sampling of a wider demographic of young and older adults, with induced and non-induced participation to aid generalisability; considering additional potential confounds; utilising a thorough assessment of participant health; employing a longitudinal design; and, representing of a wider range of ages across the adult life-span. Such refined research would substantially clarify and extend the current body of knowledge. Furthermore, given the lack of MLOC research for the possibility of age and/or gender effects, such future MLOC research is also required to validate the present study's observations.

Future research should also be cautioned to avoid the earlier detailed flaws within past LOC studies, concerning a lack of: adherence to underlying theory and valid LOC scales (Lachman, 1986); sample randomisation, stratification, and sample heterogeneity; confound estimation; usage of statistically powerful analysis; and, commentary concerning the study's generalisability. Additionally, a future qualitative exploration of the rationale of young and older adults' attributions of LOC is recommended. Such qualitative analysis would further the explanation of the MLOC effects currently observed, expanding the relatively narrow quantitative focus upon group mean differences.

The current study may also serve to prompt future LOC researchers to utilise generalisable MLOC scales. Measures such as the IPC scale provide greater depth and validity of LOC measurement than the ULOC scales that have dominated LOC research (Lefcourt, 1991; Rotter, 1991). Calls for a greater MLOC focus within LOC research (e.g., Clarke, 2004) are furthered by the present study's results, as usage of a ULOC scale would
have produced a myopic focus upon LOC internality. The moderate levels of LOC externality, and health effects on MLOC sub-scales would not have been observable using a dichotomous ULOC measure (i.e., as pronounced LOC internality would negate externality). Therefore, it is recommended that future research of LOC should utilise a simultaneous, multi-dimensional measurement of LOC. Indeed, the over-use of ULOC scales (Brosschot, Gebhardt, & Godaert, 1994) may also prompt replication of earlier ULOC studies; clarifying MLOC within the context of earlier investigations. Such a replicative-review by future researchers would probably reduce the many inconsistencies reported within ULOC literature (for discussion, see Lachman, 1986), and would help re-iterate the importance of LOC within contemporary society.

The current study's statistical control of the observed decrease in general health with age led to a greater difference in MLOC scores between age-bands, most notably for chance LOC. Hence, the marginal decline in general health marginally reduced age-band effects, raising questions for future research. For example, future investigations may discern: the extent of decline in older adult general health required to support LOC constancy (i.e., a lack of age-band effects); and, the duration and type of ill-health that may most influence MLOC.

As earlier discussed, the NHMRC (1996, 2005) recommended ongoing investigation of factors that are associated with older adults' well-being. Given the high levels of older adults' LOC internality observed within the current study, future research of the factors that influenced their internality is also warranted, as high levels of LOC internality have been widely associated with improved well-being (e.g., Baltes & Baltes, 1986; Bandura, 1982, 1997; Bostic & Ptacek, 2001; Collins & Ffrench, 1998; DeNeve & Cooper, 1998; Klonowicz, 2001; Lachman & Weaver, 1998; Lang & Heckhausen, 2001; Perlmutter, Monty, & Chan, 1986; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Seligman, 1975; Sweeney, Anderson, & Bailey, 1986; Weinstein & Quigley, 2006). By the same logic, factors that may reduce LOC internality, or promote LOC externality, should also promote research of older adults' well-being.

The present study deliberately avoided surveying older adults that were residing within structured care programs (e.g., nursing homes, and aged care residences), as prior LOC studies have received criticism for such convenience sampling (for review, Svensson, 1984).
Moreover, the majority studies that attracted such criticism had also applied ULOC scales to their non-generalisable samples (i.e., as approximately 95% of older adults reside outside of formal care; Marzillier & Hall, 1992). Though such criticisms are valid, there is still a need for future MLOC research to clarify the effect of residential status on LOC. Research may clarify how various types and levels of formal care influence MLOC, as well as any interaction between age and gender.

Schulz and Heckhausen (1996) argued that an excessive focus upon young adults' LOC was motivated by the biased belief that LOC internality has greater benefits for young adults. The current study's finding that older adults had significantly higher internality may prompt a re-appraisal of the relative benefits of LOC internality with age; furthered by Schulz and Heckhausen's LSTC assumption that internality is motivated by well-being maximisation. Hence, older adults' higher levels of internality may provide greater benefits for older adults than young adults, and may prompt additional research relating to older adult LOC.

Future research of older adults' LOC may also include a focus on the influence of MLOC upon suicidal ideation, particularly as Faison and Mintzer (2005) have recently reported a substantial increase in older adult suicide rates. The present study's observation of older adults' high levels of LOC internality may influence suicide rates, as high levels of perceived personal control may not necessarily promote the positive associations generally found within LOC literature (for discussion, see Birren et al., 1991; Blank, 1982; Lachman, 1991; Lachman & McArthur, 1986; Rodin & Langer, 1980). For example, older adults' strong belief in self-determination may provide the impetus required to complete a suicide (i.e., rather than seeking external support), particularly under circumstances of pronounced isolation, intense grief, and severe ill-health. In particular, research to explore the MLOC of older adults with a history of suicidal ideation may substantially benefit the individual, and our wider society.

In addition, after reviewing the body of ULOC and MLOC research literature, only two studies involving Australian participants were found (i.e., Collins & Ffrench, 1998; Collins & Jones, 2003), and neither study had a focus upon older adults' MLOC. Therefore, Australia's older adults have not received adequate research attention on their perspectives of control,
highlighting the relevance of additional research to investigate their perceptions.

Conclusion

In accordance with its initial aim, the present study provided a contemporary exploration of LOC to address identified limitations within the LOC research literature. As both ULOC and MLOC studies have reported inconsistent findings for age and gender associations with perceived control, the current study focused on discerning possible age or gender effects on generalised MLOC to clarify, extend, and update LOC literature. The current study also utilised a robust design, with statistically powerful analyses of a reliable and valid MLOC scale.

The observed age effects were discussed to have been influenced by participants' social experiences, degree of independence, and levels of general health. The lack of gender differences on MLOC may also have been influenced by social learning; supporting both seminal MLOC research and its underlying principles of SLT. Though categorical similarities on LOC between age-bands were acknowledged, quantitative support for LOC constancy was not evidenced. Additionally, both LSTC assumptions and earlier LOC literature supported non-constancy via the implied role of well-being. Furthermore, a marginal reduction in older adults' general health was associated with increased perception of random control, and strengthened age-effects on MLOC.

The findings of the current study have both theoretical and applied relevance. Theoretical implications relate to the: confirmation of LOC multi-dimensionality; greater support for LOC non-constancy (i.e., under a MLOC framework); support for seminal assumptions of SLT; and, additional support for gender equality. Applied implications include: a positive outlook for young and older adults' well-being; reduced pressures upon the health-care system; the need for health promotion strategies to recognise older adults' LOC internality, and their association of reduced general health with fate; and, the current observations challenge ageist views regarding older adults' assumed passivity and helplessness.
References


Appendix A

Multi-dimensional Locus of Control Survey

Multi-dimensional Locus of Control Questionnaire

General Instructions:

For each of the following statements please CIRCLE the answer that best represents your opinion. Please give accurate answers - and remember the responses are completely anonymous and confidential.

Example Questions:

eg1. As the sun rises it often gets brighter outside.

eg2. White is usually darker than black.
Questionnaire Items:

1. Whether or not I get to be a leader depends mostly on my ability.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Agree</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

2. To a great extent my life is controlled by accidental happenings.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Agree</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

3. I feel like what happens in my life is mostly determined by powerful people.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Agree</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

4. Whether or not I get into a car accident depends mostly on how good a driver I am.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Agree</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

5. When I make plans, I am almost certain to make them work.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Agree</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

6. Often there is no chance of protecting my personal interest from bad luck happenings.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Agree</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

(nb - questions 7 to 12 overleaf)
7. When I get what I want, it’s usually because I’m lucky.

Strongly Disagree Slightly Disagree Slightly Agree Agree Somewhat Strongly Agree

8. Although I might have good ability, I will not be given leadership responsibility without appealing to those in positions of power.

Strongly Disagree Slightly Disagree Slightly Agree Agree Somewhat Strongly Agree

9. How many friends I have depends on how nice a person I am.

Strongly Disagree Slightly Disagree Slightly Agree Agree Somewhat Strongly Agree

10. I have often found that what is going to happen will happen.

Strongly Disagree Slightly Disagree Slightly Agree Agree Somewhat Strongly Agree

11. My life is chiefly controlled by powerful-others.

Strongly Disagree Slightly Disagree Slightly Agree Agree Somewhat Strongly Agree

12. Whether or not I get into a car accident is mostly a matter of luck.

Strongly Disagree Slightly Disagree Slightly Agree Agree Somewhat Strongly Agree

(nb - questions 13 to 18 overleaf)
13. People like myself have very little chance of protecting our personal interests when they conflict with those of strong pressure groups.

Strongly Disagree Slightly Disagree Slightly Agree Somewhat Agree Strongly Agree

14. It’s not always wise for me to plan too far ahead because many things turn out to be a matter of good or bad fortune.

Strongly Disagree Slightly Disagree Slightly Agree Somewhat Agree Strongly Agree

15. Getting what I want requires pleasing those people above me.

Strongly Disagree Slightly Disagree Slightly Agree Somewhat Agree Strongly Agree

16. Whether or not I get to be a leader depends on whether I am lucky enough to be in the right place at the right time.

Strongly Disagree Slightly Disagree Slightly Agree Somewhat Agree Strongly Agree

17. If important people were likely to decide they didn’t like me, I probably wouldn’t make many friends.

Strongly Disagree Slightly Disagree Slightly Agree Somewhat Agree Strongly Agree

18. I can pretty much determine what will happen in my life.

Strongly Disagree Slightly Disagree Slightly Agree Somewhat Agree Strongly Agree

(nb - questions 19 to 24 overleaf)
19. I am usually able to protect my personal interests.

<table>
<thead>
<tr>
<th>Strongly</th>
<th>Disagree</th>
<th>Slightly</th>
<th>Slightly</th>
<th>Agree</th>
<th>Somewhat</th>
<th>Strongly</th>
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<tbody>
<tr>
<td>Disagree</td>
<td>Somewhat</td>
<td>Disagree</td>
<td>Agree</td>
<td></td>
<td>Somewhat</td>
<td>Agree</td>
</tr>
</tbody>
</table>

20. Whether or not I get into a car accident depends mostly on the other driver.

<table>
<thead>
<tr>
<th>Strongly</th>
<th>Disagree</th>
<th>Slightly</th>
<th>Slightly</th>
<th>Agree</th>
<th>Somewhat</th>
<th>Strongly</th>
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<tbody>
<tr>
<td>Disagree</td>
<td>Somewhat</td>
<td>Disagree</td>
<td>Agree</td>
<td></td>
<td>Somewhat</td>
<td>Agree</td>
</tr>
</tbody>
</table>

21. When I get what I want, it is usually because I worked for it.

<table>
<thead>
<tr>
<th>Strongly</th>
<th>Disagree</th>
<th>Slightly</th>
<th>Slightly</th>
<th>Agree</th>
<th>Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagree</td>
<td>Somewhat</td>
<td>Disagree</td>
<td>Agree</td>
<td></td>
<td>Agree</td>
</tr>
</tbody>
</table>

22. In order to have my plans work, I make sure they fit in with the desires of people who have power over me.

<table>
<thead>
<tr>
<th>Strongly</th>
<th>Disagree</th>
<th>Slightly</th>
<th>Slightly</th>
<th>Agree</th>
<th>Strongly</th>
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</thead>
<tbody>
<tr>
<td>Disagree</td>
<td>Somewhat</td>
<td>Disagree</td>
<td>Agree</td>
<td></td>
<td>Agree</td>
</tr>
</tbody>
</table>

23. My life is determined by my own actions.

<table>
<thead>
<tr>
<th>Strongly</th>
<th>Disagree</th>
<th>Slightly</th>
<th>Slightly</th>
<th>Agree</th>
<th>Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagree</td>
<td>Somewhat</td>
<td>Disagree</td>
<td>Agree</td>
<td></td>
<td>Agree</td>
</tr>
</tbody>
</table>

24. It is chiefly a matter of fate whether I have a few friends or many friends.

<table>
<thead>
<tr>
<th>Strongly</th>
<th>Disagree</th>
<th>Slightly</th>
<th>Slightly</th>
<th>Agree</th>
<th>Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagree</td>
<td>Somewhat</td>
<td>Disagree</td>
<td>Agree</td>
<td></td>
<td>Agree</td>
</tr>
</tbody>
</table>

(nb - demographic questions overleaf)
Demographic Information:

- Age: _____ (please write approximate age; e.g., 42).

- Gender: Male □ (please tick correct box: ☐).
  Female □

- To the best of my knowledge I am in good health.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Agree</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

Thankyou very much for completing this questionnaire!

Please place your completed responses into the pre-paid, pre-addressed envelope provided, and mail the envelope at your earliest convenience.

Your help is very much appreciated.

Note: The items in this questionnaire are based upon Levenson's (1973) generalised Multi-dimensional Locus of Control Scale. Where appropriate, permission to reproduce these items has been granted.
Appendix B

Information Letters for Potential Positive Aging Research Group (PARG) Participants

PARG Participant Information Letter & Invitation to Participate

Faculty of Community Services, Education and Social Sciences - School of Psychology

Good day to you, my name is Richard Syrkiewicz and I am currently enrolled as an Honours in Psychology student at Edith Cowan University (ECU). This survey has been sent to you on my behalf by the Positive Ageing Foundation (PAF) according to your volunteered membership within the Positive Ageing Research Group (PARG).

I am currently studying the Honours in Psychology 4th year at the University and greatly appreciate your volunteered time in completing the attached brief questionnaire. The survey concerns the psychological construct of 'locus of control' - essentially I wish to know where you perceive control to be exerted from in your life. Specifically, the research project is entitled: Perceived Multi-dimensional Locus of Control over Young to Older Adult Males and Females: A Contemporary Australian Cross-sectional View. Your responses will fall within the older adult age-band.

This is an important area of research that may have both theoretical and practical application through the better understanding of your opinions - I believe society can only benefit from a better understanding of your important views. The results of the study will be anonymous as you are not identifiable from your responses; the only information required are the specific questions relating to locus of control as well as your age, and gender. At no stage will I be made aware of your identity or would try to gain such information.
Information gathered from the survey will be used to complete an Honours thesis which will be posted within the University library collection, and may subsequently be used within a journal article to further the field of psychology. Please note, the project has received ethical approval at ECU from the Ethics Committee of the Faculty of Community Services, Education, and Social Sciences.

The questionnaire requires you to circle which option applies to you personally. Upon completion please return the completed questionnaire in the reply paid envelope provided for you, so it will be sure to promptly return to me so that your responses can form part of the research.

If you have any further questions, please do not hesitate to ask for clarification. You may contact myself on 6304 2701, or my supervisor, Dr. Eyal Gringart on 6304 5631. If you would prefer to contact someone independent of this study, please phone the School of Psychology 4th Year Coordinator Dr. Julie Ann Pooley on 6304 5591.

My sincere thanks for your time - I will be certain to put the information you provide to good use.

Yours sincerely,

Richard Syrkiewicz.
Dear PARG member

The Positive Ageing Foundation of Australia has joined with the Curtin University of Technology’s Centre for Research into Aged Care Services and we are now the Centre for Research on Ageing. Through the new Centre we will continue to be involved in research that improves the quality of life for older people.

Researchers from Edith Cowan University are investigating whether there is an effect of age upon 'locus of control'. Locus of control describes whether you believe internal or external factors control events in your life and it may impact on such things as why some people exercise and others do not. Most previous work in this area has been conducted with younger people. It is hoped that this study will lead a better understanding of the possible effect of age on an individual’s perception of control.

Enclosed in this letter is a brief questionnaire related to the above project. The questionnaire should take about 15 minutes to complete. If you would like to be involved in this research project, please complete the questionnaire and place it in the reply paid envelope and drop it in the mail. If you have any questions about the project, please phone Richard Syrkiewicz on 6304 2701 or Dr Eyal Gringart on 6304 5631.

Thank you for continuing to support research related to improving the quality of life for older Australians

Yours most sincerely,

[Signature]

Dr Peta Williams
Research Fellow
Centre for Research on Ageing
Curtin University of Technology
18 May 2006
Appendix C

Information Letter for Potential Student Participants

Student Participant Briefing

Good afternoon, my name is Richard Syrkiewicz and I am here as a 4th year Honours in Psychology student from Edith Cowan University. I would greatly appreciate your volunteered time in completing a brief questionnaire concerning the locus of control (LOC) psychological construct. Your LOC concerns where you may perceive control to be exerted from in your life.

Specifically, the research project is entitled: Perceived Multi-dimensional Locus of Control of Young to Older Adult Males and Females: A Contemporary Australian Cross-sectional View. Your responses will generally fall within the young adult age-band, and will be used to ascertain group mean differences across the multi-dimensional locus of control questionnaire to follow.

Please note that your responses on the questionnaire will be anonymous as you are not identifiable from your responses, the only information required are the specific questions relating to locus of control, as well as age, and gender. Participating in this research is not a compulsory part of your course and does not provide course credit, but will improve your experience of the research process - one that you will be engaged in if you proceed into a 4th year program.

Information gathered from the survey will be used to complete an Honours thesis which will be posted within the University library collection, and may subsequently be used within a journal article in the field of psychology.

I'll now distribute the survey to those wishing to participate - thank you very much for your time.

You may retain this cover sheet if you wish. In 5-10 minutes I will collect the questionnaire sheets.
## Appendix D

IPC Scale Scoring

(Levenson, 1981)

<table>
<thead>
<tr>
<th>Scale</th>
<th>Items</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal</td>
<td>(1, 4, 5, 9, 18, 19, 21, 23)</td>
<td>High score indicates that the participant expects to have control over his or her life.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low score indicates that the participant does not expect to have control over his or her life.</td>
</tr>
<tr>
<td>Powerful-Others</td>
<td>(3, 8, 11, 13, 15, 17, 20, 22)</td>
<td>High score indicates that the participant expects powerful-others to have control over his or her life.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low score indicates that the participant expects powerful-others do not have control over his or her life.</td>
</tr>
<tr>
<td>Chance</td>
<td>(2, 6, 7, 10, 12, 14, 16, 24)</td>
<td>High score indicates that the participant expects chance or luck to have control over his or her life.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low score indicates that the participant expects chance forces do not have control over his or her life.</td>
</tr>
</tbody>
</table>
"To score the scales, we add the subject's responses to each item - from strongly disagree to strongly agree (from -3 to +3) - and add a constant of 24 to the total to eliminate negative values. The range on each scale is from 0-48. A word of caution about interpretation is necessary. High scores on each sub-scale are interpreted as indicating high expectations of control by the source designated. Low scores reflect tendencies not to believe in that locus of control. We cannot interpret a low I scale score as indicating that a subject believes in chance; we can say only that this subject does not perceive him or herself as determining the outcomes. Empirically, one could score high or low on all three scales; that is, a person could say he or she was personally in control yet also say that life is a series of random events controlled by powerful-others. Rarely has such a profile been obtained. Before one could interpret such a seemingly inconsistent profile one would have to give serious consideration to the presence of confounding factors (e.g., acquiescence response set or random responding)” (Levenson, 1981, p. 18).

I, P, and C Scales:

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Agree</th>
<th>Slightly Somewhat</th>
<th>Strongly Agree</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Whether or not I get to be a leader depends mostly on my ability.

   -3  -2  -1  +1  +2  +3

2. To a great extent my life is controlled by accidental happenings.

   -3  -2  -1  +1  +2  +3

3. I feel like what happens in my life is mostly determined by powerful people.

   -3  -2  -1  +1  +2  +3

4. Whether or not I get into a car accident depends mostly on how good a driver I am.

   -3  -2  -1  +1  +2  +3
<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Agree</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. When I make plans, I am almost certain to make them work.</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td></td>
</tr>
<tr>
<td>6. Often there is no chance of protecting my personal interest from bad luck happenings.</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td></td>
</tr>
<tr>
<td>7. When I get what I want, it's usually because I'm lucky.</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td></td>
</tr>
<tr>
<td>8. Although I might have good ability, I will not be given leadership responsibility without appealing to those in positions of power.</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td></td>
</tr>
<tr>
<td>9. How many friends I have depends on how nice a person I am.</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td></td>
</tr>
<tr>
<td>10. I have often found that what is going to happen will happen.</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td></td>
</tr>
<tr>
<td>11. My life is chiefly controlled by powerful-others.</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td></td>
</tr>
<tr>
<td>12. Whether or not I get into a car accident is mostly a matter of luck.</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td></td>
</tr>
<tr>
<td>13. People like myself have very little chance of protecting our personal interests when they conflict with those of strong pressure groups.</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td></td>
</tr>
<tr>
<td>14. It's not always wise for me to plan too far ahead because many things turn out to be a matter of good or bad fortune.</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td></td>
</tr>
</tbody>
</table>
15. Getting what I want requires pleasing those people above me.

-3  -2  -1  +1  +2  +3

16. Whether or not I get to be a leader depends on whether I am lucky enough to be in the right place at the right time.

-3  -2  -1  +1  +2  +3

17. If important people were likely to decide they didn’t like me, I probably wouldn’t make many friends.

-3  -2  -1  +1  +2  +3

18. I can pretty much determine what will happen in my life.

-3  -2  -1  +1  +2  +3

19. I am usually able to protect my personal interests.

-3  -2  -1  +1  +2  +3

20. Whether or not I get into a car accident depends mostly on the other driver.

-3  -2  -1  +1  +2  +3

21. When I get what I want, it is usually because I worked for it.

-3  -2  -1  +1  +2  +3

22. In order to have my plans work, I make sure they fit in with the desires of people who have power over me.

-3  -2  -1  +1  +2  +3

23. My life is determined by my own actions.

-3  -2  -1  +1  +2  +3

24. It is chiefly a matter of fate whether I have a few friends or many friends.

-3  -2  -1  +1  +2  +3
Appendix E

Journal of Personality and Social Psychology Instruction to Authors: Research Report Only

Submit manuscripts to the appropriate section editor.

**Attitudes and Social Cognition:**

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