The Pull Factor: Examining the Significance of Defined Benefit Pension Plan Design on Voluntary Employee Turnover in the US

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Abstract

This research examines the relationship between Defined Benefit Pension (DBP) design elements and pensionable employees' voluntary turnover decisions, a mostly unexamined topic within retirement benefits in the United States (US). It also analyses whether a specific type of organisational commitment known as continuance commitment (CC) explains those relationships to improve human resources manager (HRM) practices. In 2018, an estimated 41.4 million US workers voluntarily left their jobs at a total estimated cost of US $617 billion to organisations, making it a worthy issue to examine. Furthermore, deferred benefits like a DBP are meant to reduce voluntary turnover.

The results of this quantitative research included weighted preference ranking, which found that, when available, the ‘pension subsidised healthcare’, ‘immediate annuity’, and ‘low-risk retirement income’ design elements prompted respondents to consider staying during their voluntary turnover decision the most. In some cases, age or gender significantly moderated respondents’ selection of the healthcare or backloaded annuity design elements. Interestingly, no direct relationship was established statistically between those ranked results and a voluntary turnover decision outcome. CC proved an accurate explanative theory for ranked results.

However, statistical analysis demonstrated that within particular DBP design element’s populations, significant relationships (i.e., *p*-values less than 0.05) existed between specific demographic categories such as age or tenure and the proportional role that a DBP played during VET. Those DBP design element populations included immediate annuity, low-risk retirement income, non-portability, and backloaded annuities. Moreover, this research found statistically significant relationships (i.e., *p*-value less than 0.05) between gender and employees’ VET outcomes within the healthcare and cost of living adjustments (COLA) design element’s populations. CC did not prove an accurate explanative theory for statistical analysis results at the design element level, especially for observed relationships between demographics and DBP-linked VET outcomes.

Keywords: Defined benefit pension, continuance commitment, organizational commitment, voluntary employee turnover, retirement benefits

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Heavily Used Acronyms

CC	Continuance Commitment
COLA	Cost of Living Adjustment
DBP	Defined Benefit Pension
HRM	Human Resources Manager
OC	Organisational Commitment
OPEBs	Other Post-Employment Benefits
VET	Voluntary Employee Turnover

Chapter 1: Introduction

1.1 Background

This research examines the relationship between Defined Benefit Pension (DBP) design elements and pensionable employees' voluntary turnover decisions, a mostly unexamined topic within retirement benefits in the United States (US). It also analyses whether a specific type of organisational commitment known as continuance commitment (CC) explains those observed relationships. CC is a psychological condition where members of an organisation feel compelled to stay at the organisation because the perceived costs of leaving are too high (Meyer & Allen, 1991).

A DBP is a type of deferred retirement compensation that incentivises workers to stay at their pensionable job until qualifying for, or vesting in, their full retirement benefits towards the end of their career (de Thierry et al., 2014; Ippolito, 1991; Lazear & Moore, 1988). Organisations and their Human Resources Managers (HRMs) use deferred compensation to combat voluntary employee turnover (VET) (Munnell et al., 2015; Sarkar, 2018). VET creates inefficiencies, increases costs, and is “a dominant concern for managers and executives” in the 21st century (Lee et al., 2018, p. 1).

1.2 Rationale

The US pension industry includes over 52,000 active DBP plans split between Federal, state, and local governments and US corporations (EBSA, 2019; Fore & Hammond, 2005; Mayo & Caskey, 2020; Turner, 2010). In 2017, the breakdown included over 46,600 corporate DBP plans covering 13.1 million active workers and 21.341 million annuitants and awaiting annuitants (EBSA, 2019, pp. 3-4). Additionally, in the fiscal year 2019, over 5,300 DBPs existed at the state and local government levels, covering approximately 14.7 million active workers and 18.2 million annuitants or awaiting annuitants (Mayo & Caskey, 2020; US Census Bureau, 2020). Thus, DBPs play an integral role in the benefit packages many US employers provide to their employees.

Most US DBP plans evolved independently from one another, which means the type and quality of provisions that compose each plan's benefit package vary widely (EBSA, 2019; Fore & Hammond, 2005; Turner, 2010). Generally, these DBP plans are expensive and risky for organisations to provide (de Thierry et al., 2014; Geddes et al., 2014; Rajnes, 2002; Secunda & Maher, 2016), and each benefit offered comes at a cost and risk. However, little of the current DBP research literature captures the relationships between a DBP's design and employee retention during a voluntary turnover decision (Munnell et al., 2015). Thus, HRMs lack an essential data set when designing or altering DBPs, limiting their usefulness. This research closes some of that information gap.

DBPs are popular among pensionable workers. In 2015, 80% of polled pensionable workers believed their DBP was "important/very important" to overall job satisfaction (SHRM, 2016, p. 3). However, the same poll also noted that only 58% of pensionable employees were "satisfied/very satisfied" with their DBP plan (SHRM, 2016, p. 3). This result is unsurprisingly low because US pension plan generosity declined after the Great Financial Crisis caused by budget constraints (Beshears et al., 2011; Brainard & Brown, 2020; Copeland & VanDerhei, 2009). Consequently, those reduced DBPs appear less effective in retaining workers (Munnell et al., 2015). However, future benefit reductions need not be indiscriminate. Identifying which provisions within DBPs incentivise retention the most means HRMs could avoid those provisions during future cuts while finding cost savings elsewhere.

Understanding how individual DBP design elements retain workers should appeal to employers for other reasons. For example, a DBP's overall retention effect varies among different pensionable workers' demographic categories like age and race (Gustman et al., 1994; Hiltonsmith, 2016; Taylor, 2000). Individual DBP design elements might do the same, which is potentially vital information for HRMs.

Significant DBP design variations complicate studying individual features' retention effects (Bairoliya, 2019; Baldwin, 2020). As a result, most studies compare the overall retention effect to other types of retirement plans (e.g. Bodie et al.'s (1988) seminal work), or no plan at all (Allen et al., 1993; Panis & Brien, 2015). A few studies examine the retention effects of small numbers of DBP design elements through statistical analyses of rare natural experiments (e.g. Backes et al., 2016; Clark et al., 2016; Furgeson et al., 2006) or statistical models based on longitudinal studies (e.g. Bairoliya, 2019; Knapp et al., 2016), or both (e.g. Goldhaber et al., 2017). However, this research is unique. It captures pensionable employees' perspectives on the design elements that made them consider staying the most during their voluntary turnover decision.

1.3 Research Questions

This research sought to identify and examine the relationships between individual DBP design elements and voluntary turnover decisions made by pensionable US employees before fully vesting at normal retirement age. It also sought to determine if CC explained those relationships and improve HR practices for US organisations. The main research question (MQ) used was:

> Which DBP design elements have a significant relationship with voluntary employee turnover decisions by pensionable US workers before fully vesting at normal retirement age?

The sub-questions (SQ) used to support the MQ were:

i. Which DBP design elements significantly relate to retention during US pensionable employees' voluntary turnover decisions?
ii. How do demographic factors like age and tenure moderate the DBP design elements pensionable employees consider during voluntary turnover decisions?
iii. How well does continuance commitment explain those results?
iv. How could these findings improve HRM retirement benefit practices?

SQ1 addresses the central aim and objectives for this research by capturing the employee's perspective about which individual DBP design elements made them consider staying during a VET decision. Analysing this data will contribute to answering the MQ by determining relationships between design elements and retention considerations. Answering SQ2 will provide a picture of the VET decision-making process variables and how DBP design elements fit into the VET decision-making process. The author formulated SQ3 because CC is an HR theory that some organisations use to combat VET. Knowing if it works at the DBP design element level can help HRMs craft better policy. With SQ4, the author can apply the knowledge gained from SQ1, SQ2, and SQ3 and achieve the objective of improving HR practices.

1.4 Structure

The remainder of this dissertation uses the following structure. Chapter Two is a literature review that establishes the research framework and covers pertinent points from research about VET, CC, and DBP design. Chapter Three covers the methodology and research methods used for research design, data collection and statistical analysis. Chapter Four provides the results from the descriptive and statistical analysis needed to answer the research questions. Chapter Five compares the knowledge from the literature review with the critical analytical findings from Chapter Four and places the results in context with the larger body of retirement and HR while answering the research questions. Chapter Six concludes with a summary of key findings, identifies the limitations of this research, and makes future research recommendations.

Chapter 2: Literature Review

2.1 Introduction

This literature review (LR) establishes a theoretical framework for this quantitative research project to understand the relationship between DBP plan design elements and VET decisions. It starts with terminology, transitions into basic DBP plan design. A review of several topics follows: 1) voluntary employee turnover, 2) continuance commitment, 3) DBP design elements and pension quit costs, and 4) moderators of a DBP's effect on VET.

The author used keyword database and internet searches of ProQuest, Science Direct, Gale General OneFile, Google Scholar, and Google. Search terms included permutations of the term 'defined benefit pension plan features', including synonyms like 'provisions'. Numerous searches also included variations of 'voluntary turnover', 'incentives' and 'penalties' coupled with some form of 'organisational commitment' or 'continuance commitment'.

2.2 Terminology

The main terms used in this report are:

Annuity: "a series of payments made at regular intervals that continue until a specified event occurs" (Willmore, 2001, p. 6).

Defined benefit pension (DBP): a type of deferred retirement compensation where a former employer pays a retired worker an annuity for the remainder of their life (US DOL BLS, 2020; US GAO, 2009).

DBP design element: A catch-all phrase for the features, provisions, benefits, incentives, penalties, etc., that compose a DBP plan's structure.

Normal retirement age (NRA): "the age at which an individual can retire and receive full accrued benefits" (Elliott & Moore, 2000, p. 6).

Organisational commitment (OC): "the relative strength of an individual's identification and involvement in a particular organisation" (Mowday et al., 2013, p. 27).

Vesting: “the number of years an individual must work for a particular employer before earning a nonforfeitable retirement benefit” (Elliott & Moore, 2000, p. 6).

- **Full vesting:** Point at which an employee qualifies for full retirement benefits; often the endpoint of gradual or graded vesting (US DOL BLS, 2020).

Voluntary employee turnover (VET): "voluntary cessation of membership in an organisation, by an individual who receives monetary compensation for participation in that organisation" (Lee et al., 2006).

Years of service (YOS): Number of qualifying years an employee has worked in a pension system (Clark, Robert L.; Morrill, Melinda S.; Vanderweide, 2012).

2.3 Defined Benefit Pension (DBP) Plans

The provision of an annuity is inherent to a DBP (Secunda & Maher, 2016) 2016). Annuities are typically derived from a formula that factors some combination of age, YOS at an organisation, and an average of an employee's highest-paid working years (US DOL BLS, 2020; US GAO, 2009). Typically, workers fully vest into DBPs through some combination of age and tenure (de Thierry et al., 2014; US DOL BLS, 2020).

DBPs pull workers to stay until NRA and then push them to retire afterwards (Grefer et al., 2016). Backloaded deferred compensation tied to late-career salaries typically provides the pull function by incentivising an employee to stay for a larger annuity (Grefer et al., 2016; Taylor, 2000). In the US, backloading is often, but not always, coupled to a lack of portability, meaning a DBP cannot follow a worker to a job outside their present pension system (Fore & Hammond, 2005; Foster, 1994). Combining both characteristics penalises would-be mid-to-late-career job changers through lost retirement income, thus, deterring voluntary departure (Allen et al., 1993). In contrast, fully vesting in all the DBP’s benefits, and reaching the point when those benefits start penalty-free (aka NRA), provides a powerful push for employees to retire (Grefer et al., 2016; Knapp et al., 2016; Warner, 2008). This LR concentrates on the pull effect and its impact on VET before full vesting and NRA.

2.4 Voluntary Employee Turnover (VET)

VET poses several problems for employers. The first is cost because replacing an employee is expensive (Balsam et al., 2007; Lee et al., 2018). In 2018, an estimated 41.4 million US workers voluntarily left their jobs at a total estimated cost to organisations of US $617 billion (Work Institute, 2019). These costs typically manifest as advertising, recruiting, and training expenses (Hur & Hawley, 2020; Pitts et al., 2011). VET also causes organisational loss of knowledge and experience (Lee et al., 2018; Soria, 2019), which causes disruptions for remaining employees as they train new hires, pass on their knowledge, and assume duties for the departed (Ertas, 2015; Hur & Hawley, 2020). These disruptions decreased organisational productivity, service delivery, and customer service (Bryant & Allen, 2013; Hur & Hawley, 2020; Pitts et al., 2011).

2.5 Organisational Commitment (OC)

OC manifests as a psychological attachment for an organisation (Bryant & Allen, 2013). Employees with higher OC are less likely to voluntarily quit (Sarkar, 2018; Soria, 2019). The Three-Component Model (TCM) is the gold standard for understanding OC and its impact on job satisfaction, VET, and employee citizenship behaviour, among others (Gade, 2003; Jaros, 2017).

The three components in TCM are a mix of intrinsic and extrinsic behavioural forces that include desire (affective commitment), need (continuance commitment), and obligation (normative commitment) (Meyer & Allen, 1991). Meyer and Allen described "affective commitment" as "affective attachment to the organisation", continuance commitment (CC) as the "perceived costs associated with leaving the organisation", and normative commitment as the "obligation to remain with the organisation" (Meyer & Allen, 1991, pp. 63–64). Each component of commitment has repeatedly correlated negatively to voluntary turnover (Meyer et al., 2002).

As viewed through CC, deferred benefits deter VET by increasing the monetary cost of departure (Smith et al., 2011; Swiggard, 2011). However, as Meyer and Allen codified it, CC was not solely focused on monetary losses but potential costs of any nature (Luchak & Gellatly, 2001; Meyer & Allen, 1991). Such costs might include loss of stature by leaving a powerful job or losing employee benefits like health insurance (Meyer & Allen, 1991). Thus, if employees choose to avoid departure costs, they choose to commit themselves to the organisation (Luchak et al., 2008; Meyer & Allen, 1991).

2.6 Relationships: Pensions, Voluntary Employee Turnover (VET), and Continuance Commitment (CC)

Numerous studies have shown that DBPs play a direct role in increasing tenure and limiting VET. One of the most cited and seminal works is Ippolito (1991)'s study of over 6400 workers at 109 firms which found DBPs reduced turnover and increased worker tenure by 20%. In another seminal study, Lazear and Moore (1988) showed that pensionable workers in six different plans were half as likely to turnover than their non-pensionable counterparts. Several other studies have shown mostly similar results to include Allen et al. (1993), Ippolito (1994, 2002), Haverstick et al. (2010), and Schuck and Rabe-Hemp (2018). Haverstick et al. (2010)'s study is noteworthy because it showed a DBP's retention effect grows over time. Whereas the average annual turnover rate for a worker with 0 to 5 YOS was 22% a year, it was only 5.7% by the 10 to 15 year mark and 3% beyond 20 YOS (Haverstick et al., 2010).

Numerous theories exist as to how and why DBPs lead to less VET, including employee self-selection, job satisfaction theory, psychological contract theory, and Transaction Cost Economics (de Thierry et al., 2014; Ippolito, 1991; Joo, 2017; Luchak & Gellatly, 2002). However, Luchak and Gellatly (2001) and Luchak et al. (2008) established a link between DBPs, VET, and CC. The 2001 study found that workers with higher pension value accruals had longer tenure, lower turnover, lower affective commitment, and higher CC (Luchak & Gellatly, 2001; de Thierry et al., 2014). As de Thierry et al. (2014) noted about the study, "workers were staying … not because they loved the organisation… but because the pension costs of leaving were too great" (p. 662). The 2008 study showed that once the employees who stayed for the pension qualified for unreduced benefits, their CC significantly weakened, and they either retired or left voluntarily (Luchak et al., 2008).

Natural experiments appear to confirm the links between changes in a worker's DBP status, lessening CC, and VET. In 2005, when the US state of Rhode Island cut some benefits for yet-to-vest workers that reduced plan value by 43%, the average baseline VET rates rose by 12%, and nearly 4% of non-teachers and 1.7% of teachers immediately quit (Quinby & Wettstein, 2019). For the leavers, the benefit cuts drastically reduced the cost of departing, which is crucial for CC, and so they did.

2.7 Relationships: Design Elements, Continuance Commitment (CC), and Pension Quit Costs

With the links between DBPs, CC, and VET established at the DBP plan level, the question turns to: What should or would those relationships look like at the design element level? Previous research is not much help. Outside the inherent trait of deferred compensation that defines all DBPs, the only design elements Luchak and colleagues mention were non-portability and backloading (Luchak & Gellatly, 2001; Luchak et al.,2008) However, they did not study those elements in detail, just simply noted them in the pensions studied (Luchak & Gellatly, 2001; Luchak et al., 2008).

Fortunately, CC's emphasis on personal turnover costs hints towards what type of DBP design elements should reduce VET. Again, as originally codified, CC included the employee's recognition of departing costs (Meyer & Allen, 1991). One method pensionable employees use to determine those costs is to measure pension quit costs (Ippolito, 2002; Nyce, 2007). They do this by determining the difference between the reduced pension caused by quitting early (aka the quit pension) and the full pension at NRA (aka the stay pension) (Ippolito, 1991; Ippolito, 2002). Larger differences between the two values mean larger capital costs for quitting, making the employee more likely to stay (Allen et al., 1993; Ippolito, 2002; Luchak et al., 2008; Nyce, 2007). Therefore, if CC explains a DBP's moderating effect on VET, then the DBP design elements that create the highest pension quit costs should relate significantly to employees' VET decision.

Keeping the heterogeneity of US pensions in mind, the below list contains relatively widely offered DBP design elements. Some raise 'stay pension' value, while others reduce 'quit pension' value. A few simply reflect the value of a pension but in different forms. The questionnaire outlined in Chapter 3 used the same list.

2.7.1 Immediate Annuities: Some DBPs have no starting age restrictions, meaning annuity payments begin immediately upon retirement (Asch, 2019; US DOL BLS, 2020). For instance, the US military's active-duty pension only requires 20 YOS, contrasted by 20 YOS and reaching age 62 for career reservists (Asch, 2019; Warner, 2008). Immediate start annuities add to stay pension value by providing more payments over longer retirement spans (Benartzi et al., 2011). As a result, they are expensive for employers to provide (Enns et al., 1984).

2.7.2 Pension Subsidised Healthcare: Federally subsidised US healthcare coverage does not start until 65 (Fronstin et al., 2011). In 2016, the average hospitalisation cost US $11,700 (Liang et al., 2020). On average, household healthcare spending rises as they age, from 8.8% for 55-year-old to 15.6% for 75-year-old led households (Foster, 2016). Medical costs in the US rose 639% between 1979 and 2019 (Liang et al., 2020), while the overall inflation rate only rose 285% between 1979 and 2021 (Webster, 2021). Thus, pension subsidised healthcare significantly increases the stay value of a pension.

2.7.3 Non-Portability: Most employees cannot take their accrued pension's value when they quit, thereby freezing the pension's value with their former employer (Fore & Hammond, 2005; Foster, 1994) and reducing quit pension value. In the most extreme example, the US military's pension quit value is zero (Asch, 2019).

2.7.4 Backloaded Annuities: As discussed, annuity formulas tied to late-career salaries provide more considerable annuity potential since the highest-paid years of a person's career are often their final years (Grefer et al., 2016; Haverstick et al., 2010; Taylor, 2000). Thus, if the final pension formula includes a percentage of the average of the three highest-paid years, multiplied by YOS, then pension value increases for those who get paid more towards the end of their career like public servants (Maximus, 2020). Backloading increases stay pension value.

2.7.5 Cost of Living Adjustments (COLA): COLAs fight inflation and maintain annuity purchasing power during a retiree's lifespan (Brainard & Brown, 2018, 2020). Even a 1% annual inflation rate decreases purchasing power by 22% over 25 years (Maximus, 2020). Thus, COLAs add to stay pension value.

2.7.6 Non-Contributory Plan: Some DBPs do not require worker contributions, only employer contributions (Brainard & Brown, 2018; US DOL BLS, 2021). Theoretically, employees receive fewer upfront wages as an offset, but whether salaries reflect this is debatable (Ippolito, 1994; Montgomery et al., 1992). Either way, non-contribution adds value to the stay pension.

2.7.7 Low-Risk Retirement Income: Some pensions are considered ultra-safe, like US Federal pensions (Asch, 2019; Poterba et al., 2007), and corporate and public pension plans with 100% funding (AAOA, 2012). However, the average corporate pension fund is underfunded by 13.75% (Lantz et al., 2020; Wadia et al., 2020), while the average public pension is underfunded by 29% (Aubry et al., 2020). This underfunding introduces risk into a supposedly risk-free retirement benefit (Munnell et al., 2006; Zelinsky, 2004). As a result, a DBP's fiscal health creates a premium that adds to stay pension value.

2.7.8 No Social Security (SS): Approximately 25% of state jobs eliminate SS contributions and funnel them into a DBP's trust fund (Quinby et al., 2020). As a result, retirees typically will not receive SS payments (Brainard & Brown, 2018). This penalises late-career leavers with no previous SS work history. For retirees, though, their annuities must reflect replacement payments for SS (Quinby et al., 2020), raising the stay pension value.

2.7.9 Survivorship: US law requires that all DBPs provide a survivor's benefit option for spouses and/or minor children (Clark et al., 2019). This provision is financed by reducing the pensioner's monthly annuity like a life insurance premium (Clark et al., 2019). While benefit provision is mandatory, the retiree can decline it for a larger annuity (Clark et al., 2019). Employees with chronic medical issues and families value survivorship provisions (Davis & Fraser, 2012). Survivorship adds to stay pension value.

2.7.10 Other Post-Employment Benefits (OPEBs): Although typically funded from separate trust funds, OPEBs are linked to a DBP's NRA and bundled into a retirement benefits package (GASB, 2017; Norcross & Gonzalez, 2018; Rezaee, 2006). Examples include long-term care insurance and life insurance (US DOL BLS, 2020), which add to stay pension value.

2.7.11 Lump-Sums: Some DBP plans offer a one-time partial or complete present value lump-sum payment at retirement, replacing a portion or all of an annuity (Purcell, 2009). They are popular (Banerjee, 2013), especially among retiring employees with bequest motives, chronic health issues, or access to a spouses' annuity (Benartzi et al., 2011; Clark et al., 2019; Pratt, 2018). Thus, lump-sums add to stay pension value.

2.7.12 Basic Annuity: Every DBP provides an annuity option; it is the defining feature (Secunda & Maher, 2016). Thus, without advanced features like backloading, basic annuities still represent a valuable source of fixed retirement income that would be expensive for individuals to replicate through the private insurance market (Pratt, 2018). The US government estimated that to build an insurance annuity for the same price as a pension fund's; a person would take between a 17% and a 41% reduction on their annual payments, depending on their age and gender (Pratt, 2018). Basic annuities represent the value of the 'stay pension'.

2.8 Moderators

Both age and tenure moderate a DBP's effect on VET. Younger workers in pensionable jobs are more likely to leave voluntarily than older workers, and vice versa (Haverstick et al., 2010; Kirkman, 2017; Llorens, 2015). Also, as previously mentioned, less tenured pensionable workers are more likely to quit than more tenured workers, and vice versa (Haverstick et al., 2010; de Thierry et al., 2014).

2.9 Conclusion

This LR established a framework to understand the impact of DBP design on VET through CC and highlighted several key aspects. First, VET creates costs and disruptions for employers. Second, DBPs reduce VET, most likely by creating CC among pensionable employees. Third, although little is known about the impact of individual DBP design elements on VET, CC theory indicates the elements that impose the highest quit costs should relate to VET decisions. Finally, age and tenure moderate a DBP's effect on VET and are expected to moderate design element relationships with VET. These key aspects provided the basis for the duelling hypotheses tabulated in Table 1 (next page), setting up the analysis discussed in Chapter 4.

Table 1 Thirteen sets of hypotheses for statistical anaysis as part of this research methods

No.	Dependent Variable	Independent Variable	Duelling Hypotheses
1	VET Decision	Immediate Annuity	$H1_0$: If present, immediate annuities do not significantly relate to a VET decision.
			$H1_1$: If present, immediate annuities significantly relate to a VET decision.
2	VET Decision	Healthcare	$H2_0$: If present, pension subsidized healthcare does not significantly relate to a VET decision.
			$H2_1$: If present, pension subsidized healthcare significantly relates to a VET decision.
3	VET Decision	Non-Portability	$H3_0$: If present, non-portability does not significantly relate to a VET decision.
			$H3_1$: If present, non-portability significantly relates to a VET decision.
4	VET Decision	Backloaded Annuity	$H4_0$: If present, backloaded annuities do not significantly relate to a VET decision.
			$H4_1$: If present, backloaded annuities significantly relate to VET decision.
5	VET Decision	COLA	$H5_0$: If present, COLAs do not significantly relate to a VET decision.
			$H5_1$: If present, COLAs significantly relate to a VET decision.
6	VET Decision	Non-Contribution	$H6_0$: If present, non-contribution does not significantly relate to a VET decision.
			$H6_1$: If present, non-contribution significantly relates to a VET decision.
7	VET Decision	Low-Risk Retirement Income	$H7_0$: If deemed present by employees, low-risk retirement income does not significantly relate to a VET decision.
			$H7_1$: If deemed present by employees, low-risk retirement income significantly relates to a VET decision.
8	VET Decision	No Social Security	$H8_0$: If present, no SS does not significantly relate to a VET decision.
			$H8_1$: If present, no SS significantly relates to a VET decision.
9	VET Decision	Survivorship	$H9_1$: Survivorship does not significantly relate to a VET decision.
			$H9_1$: Survivorship significantly relates to an employee's VET decision.
10	VET Decision	Other Post-Employment Benefits	$H10_0$: If present, OEPBs do not significantly relate to a VET decision.
			$H10_1$: If present, OEPBs significantly relate to an employee's VET decision.
11	VET Decision	Lump-Sum	$H11_0$: If present, lump sums do not significantly relate to a VET decision.
			$H11_1$: If present, lump sums significantly relate to a VET decision.
12	VET Decision	Basic Annuity	$H12_0$: If present, basic annuities do not significantly relate to a VET decision.
			$H12_1$: If present, basic annuities significantly relate to VET decision.
13	Design Element Selection	Demographic Category	$H13_0$: Ranked selection of XXX design element is not significantly moderated by XXX demographic category.
			$H13_1$: Ranked selection of XXX design element is significantly moderated by XXX demographic category.

Chapter 3: Methodology

3.1 Scope of Work

For the convenience to the readers, the author provides an overall research design of this study in Table 2 that summarises all components within the scope of work for this project. Each component is detailed in Sections 3.2 onward.

Table 2

Location	Online, Facebook & email	US members
Organisation	Personal finance Facebook groups and email distros	Specifically dedicated to pension issues or pensionable jobs
Participants	U.S. pensionable workers and retirees	Population ~3700 Sample size n=313 Ideal sample size (90%/ +/- 5%): 253 Ideal sample size (95%/ +/-5%): 349
Method (s) of sampling	Self-selection sampling	Inclusion criteria: former/current pensionable worker or pensionable retiree
Method of data collection	Survey strategy, online self-administered questionnaire tool	• Demographic questions • 3 x screening questions • Rank top 3 DBP design elements that impacted a VET decision • Weighted assessment of overall importance • Demographic data from the time of the decision
Method of data analysis	Tukey's Exploratory Data Analysis (EDA) method & Chi-square non-parametric test	• Visual display (graphs/charts) to gain insight & spot linkages • Analyse individual variables first, comparative and interdependence follows • Chi-Square to establish significance of linkages
Data type	Quantitative	Categorical nominal & ordinal (ranked)
Heuristic strategy	Deductive	Continuance commitment (CC) and pension quit cost framework
Philosophical paradigm	Positivist	Hypotheses testing

3.2 Research Paradigm

This research project used a positivistic research paradigm. Positivism states that one independently observable reality exists and that observed phenomena in this reality can be tested to determine truth (Proctor et al., 2017; Saunders et al., 2019). Positivism employs the scientific method to state hypotheses and then test them to determine if they are falsifiable (Casula et al., 2020; Fox, 2008; Saunders et al., 2019). In this manner, previous knowledge is refined to make present knowledge more accurate and granular

(Fox, 2008; Saunders et al., 2019). The relationship between DBPs and the VET decisions of pensionable US workers was the studied phenomenon in this research. Explaining the relationship between individual DBP design elements and VET decisions was the granular level knowledge this research sought to produce.

3.3 Research Strategy

The author used the quantitative research methodology for this project. Quantitative research is most associated with positivism and includes objectively gathering data, analysing it, and determining its validity in search for causal effect or establishing fact (Lee, 1992; Queirós et al., 2017; Saunders et al., 2019). To that end, quantitative research examines links and relationships between multiple variables by collecting and analysing numerical data (Saunders et al., 2019). Since this research examined the relationship between DBP design elements and VET (SQ1) to determine if CC explains those effects (SQ2), choosing the quantitative research methodology made sense.

Quantitative research typically uses the deductive research approach (Saunders et al., 2019). The deductive approach involves collecting and analysing data to test pre-established theories using hypotheses (Casula et al., 2020; Saunders et al., 2019). This research used the deductive approach with CC as the pre-established theory for the framework, which helped produce the hypotheses.

The author employed a survey strategy which is a method of collecting data from large, often random, samples of people through self-reporting (Price et al., 2015). Survey strategies are used in quantitative research because they excel at capturing people's opinions in a standardised, numerical format that is easily analysed (Queirós et al., 2017; Saunders et al., 2019). Additionally, surveys can focus on narrow topics while obtaining a wide range of responses (Ang, 2014; Saunders et al., 2019). The author deemed a strategy designed to collect a wide range of responses as crucial for creating a robust data set to analyse.

3.4 Research Quality

Quantitative research usually relies on two measures of quality: validity and reliability (Saunders et al., 2019). Whereas validity is concerned with the accuracy of research and the measurement tool(s) employed, reliability concerns the consistency of the measurement tools employed (Adams et al., 2013; Price et al., 2015). Both measures are discussed further.

3.4.1 Validity

As one measure of validity, the author adapted data collection and analysis techniques from employment benefits research. Researchers often adopt or adapt formats from prior studies (Saunders et al., 2019). This author chose employee benefit research methods because that field also assesses whether benefits contribute to OC and retention (Nemeckova, 2017; Peart, 2006; Sinclair et al., 2005). Moreover, employment benefits are also diverse and organisation dependent, creating similar challenges to studying DBPs at multiple employers (Pek-Greer et al., 2016; Sinclair et al., 2005; Stonebraker, 1981). Thus, asking similar questions about similar subjects, obtaining similar answer formats, and analysing them with similar techniques as previous studies helped establish some validity.

The author also used face validity, content validity, and a type of criterion validity known as concurrent validity. Face validity simply refers to whether the measurement device appears logical and accurately covers the material it proposes to study (Price et al., 2015; Taherdoost, 2016). Methods for establishing face validity include reviewing the measurement tool by subject matter experts and pilot testing (Saunders et al., 2019; Taherdoost, 2016). In this case, the author used both measures by implementing two pilot tests and soliciting expert feedback from his thesis advisor and a former pension fund administrator. The author's final questionnaire incorporated recommended improvements.

Content validity concerns whether the questions in a research tool will capture all the data required to answer the research questions (Adams et al., 2013; Saunders et al., 2019). While the above-mentioned adaptation of questions from employee benefits research played a role in this stage, the researcher also used close consultation with his thesis advisor to ensure data captured could be analysed using descriptive and inferential statistics.

Concurrent validity is a type of criterion validity where researchers ask questions during the study, knowing they should interact with answers from other questions in a manner consistent with the literature (Price et al., 2015; Taherdoost, 2016). For example, the moderators of VET (age and tenure) led the researcher to insert an age question before the main discriminating question. This step allowed him to assess whether the discriminator functioned as the literature stated it should.

3.4.2 Reliability

Reliability refers to consistency, specifically, consistency in the results that a measurement tool provides (Price et al., 2015; Saunders et al., 2019). Some actions taken to determine the validity of this research also played a role in determining its reliability. The multiple pilot tests proved vital because they demonstrated repeatability, meaning the measurement tool was used twice and returned similar results (Adams et al., 2013; Taherdoost, 2016). While not as robust as a complete series of test-retest results (Price et al., 2015), the two pilot tests demonstrated large portions of the questionnaire could return results consistently from the same group of pilot test respondents.

3.5 Data Collection Method

3.5.1 Questionnaire

This research used a questionnaire as its data collection tool because questionnaires quickly collect large amounts of easily comparable numerical data on respondents' opinions, behaviours, and actions by asking a standard set of questions (Boyer et al., 2002; Price et al., 2015; Queirós et al., 2017). Given the time constraints of the NMIT master's program and the need for a robust data set for statistical analysis, the author decided an electronically delivered questionnaire was the best type to use. The author built and administered the survey through SoGoSurvey.

Self-report questionnaires can suffer from systematic bias based on survey construction (Kalton & Schuman, 1982; Price et al., 2015), response bias based on respondents' desire to look good for the researcher (Furnham, 1986; King & Bruner, 2000), and non-response bias which overvalues respondents' answers versus the alternative potentials from non-respondents (Saunders et al., 2019). Low response rates to online questionnaires often exacerbate non-response bias (Boyer et al., 2002).

The author minimised systematic bias by adapting question formats from previous studies, writing neutrally worded questions, soliciting feedback from pilot test participants, and randomising answer presentation – all of which are recommended measures from research textbooks (Saunders et al., 2019; Price et al., 2015; Adams et al., 2013). To minimise the desire to look good for the researcher, the author anonymised participation in the questionnaire and stated as much on the start page, another recommended practice (Frambach et al., 2013). Efforts to mitigate non-response bias and low response rates are discussed in section 3.5.3.

The questionnaire used rank order questions as the primary collection measure. Rank order questions allow respondents to express a preference in relation to the other items on a list and are particularly useful in expressing what respondents value (Jacoby, 2011; Stonebraker, 1981). Furthermore, when rankings are tallied, the item with the most votes from the most people can legitimately be labelled as the most preferred (Stonebraker, 1981). This distinction was crucial for a research project that needed respondents to express the relative importance of several different DBP design elements on their VET decision.

3.5.2 Questionnaire Design

The questionnaire included an opening page that explained the study, provided several definitions, and obtained participant consent. Respondents answered a series of demographic and screening questions before the ranking questions. Demographic questions mirrored previous studies (e.g. Nemeckova, 2017; Stonebraker, 1981), but answer categories conformed to the US's Bureau of Labor Statistics (BLS) Current Population Survey because of the standard answer categories it created for economic studies (US Bureau of Labor Statistics, n.d.). Screening questions ensured only pensionable employees who had made a VET decision (Proctor et al., 2017), and had some literacy about their pension plan, proceeded to the ranking questions.

Before the ranking questions, most respondents had to select which design elements were in their pension. This ensured that only those design elements available to the respondent appeared in the subsequent ranking questions. With ~50K unique pensions in the US, this was the best way to make the questionnaire one size fits all.

The respondents' primary task was to rank the top three DBP design elements that made them most consider staying during their VET decision. Responses were limited to three to avoid answer fatigue (Saunders et al., 2019; Adams et al., 2013) and to force scarcity into respondents' decision making, mirroring HRM choices under budget constraints. After ranking, the respondents answered four questions: one each about age and tenure at the time of their VET decision, their VET decision outcome (Q24), and the role (as a percentage) their pension played in their ultimate decision (Q26). Q24 and Q26 were designed to measure the potential for CC in a respondent's decision-making process.

A minority of military respondents in the military's dominant pension program, Hi-36, skipped the design element selection and went straight to ranking ten pre-determined design elements. This closely mirrored the employment benefit studies' data collection methods (e.g., Stonebraker, 1981). The result provided the author with a test group of scores to compare against the larger group's outcomes.

3.5.3 Administering the Questionnaire and Sampling

The author administered the questionnaire online from 6-14 March 2021 using self-selection sampling. Self-selection is a type of volunteer sampling where researchers advertise their study and rely on subjects to volunteer (Price et al., 2015; Saunders et al., 2019). The need for self-selection sampling was primarily due to the time constraints of the NMIT master's program. As a result, this research is not representative of all US pensionable workers (Saunders et al., 2019).

At best, the sample is representative of the population among which the questionnaire was advertised. That population ultimately grew to ~3700 pensionable workers and retirees from personal finance Facebook groups and email distribution lists. The author chose that size to increase response rates while still meeting the minimum requirement for sample quality. Using a sample size calculator (Qualtrics, 2021), the author calculated a 3700-person population with a 90% confidence level, .5 standard deviation, and a +/- 5% margin of error required 253 respondents. The sample size for a 95% confidence level (all other factors being constant) was 349. Ultimately, 315 people participated in the questionnaire, with 313 completing it.

To boost response rates and overcome non-response bias, the author advertised the questionnaire several times by inviting all current and former pensionable workers to participate without emphasising the study's emphasis on VET. When advertising, the author appealed for respondents of colour to participate, knowing they were underrepresented in DBP and retirement research (Rhee, 2013)(Rhee, 2013). Ultimately, though, the 313 respondents' demographics trended heavily white (85%), majority female (54%), and well-educated (65% with advanced degrees); all of which were on trend for the population of ~3700 in which teachers and government workers made up most pensionable members.

3.6 Data Analysis

The author used Tukey's Exploratory Data Analysis (EDA) method for initial analysis, including cleaning and classifying the data; visually displaying it to spot potential linkages; and then examining linkages through comparative and interdependence analysis (Saunders et al., 2019). The author used the SoGoSurvey software, which displayed data both graphically and numerically. All data collected was categorical, with the majority being nominal (descriptive) data and the minority being ordinal (ranked) data

(Saunders et al., 2019; Adams et al., 2013). The author coded the categorical data during the cleaning process to prepare for statistical analysis, eliminating incomplete responses.

Mode is the only way to measure the frequency of values with categorical data (Hair, Joe F. et al., 2015; Saunders et al., 2019). The author analysed the mode for the demographic category questions as part of graphical analysis. However, for the ranked data, mapping mode held little value. Weighted scores were far more critical.

Since the Hi-36 plan respondents (N=33) all had the same DBP design elements, their ranked preference scores were automatically weighted and tabulated by SoGoSurvey software. The remaining respondents (N=97) required different procedures since each design element had a different number of respondents. Therefore, comparing the tabulated weighted score for respondents with healthcare access (N=51) to those with low-risk retirement income access (N=45) was meaningless. Thus, the author devised two separate scoring efficiency calculations which allowed inter-element comparison:

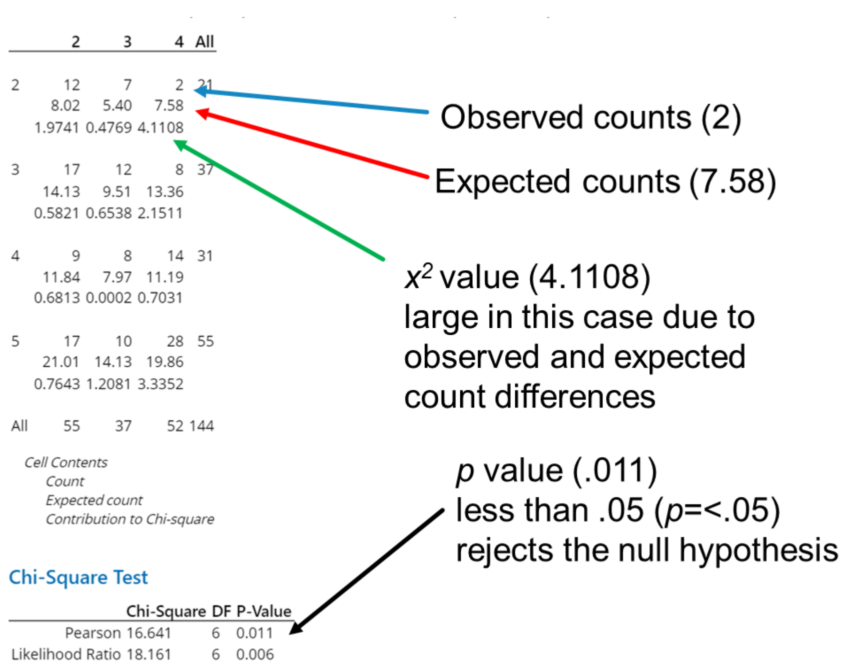
1) Voter efficiency score (V_e)
    a. $V_e = W_d / N$
        i. W_d = sum of a design element's weighted score
        ii. N = number of respondents with access
2) Element efficiency score (E_e)
    a. $E_e = W_d / W_t$
        i. W_d = sum of a design element's weighted score
        ii. W_t = total possible weighted point score
            1. N x 3 points (1st place vote weighted score)

Once complete, scores were graphed and visually displayed for comparative analysis, which informed statistical analysis efforts.

Categorical data is non-parametric (Saunders et al., 2019). Chi-square is a non-parametric test for independence between two categorical variables (Ali & Bhaskar, 2016; Altman & Bland, 2009; McHugh, 2013). Importantly, Chi-square does not require normally distributed data for testing (Saunders et al., 2019), making it well suited for self-selection questionnaire data which is why the author employed it (McHugh, 2013).

Pearson's Chi-square tests two variables' independence (or lack thereof) from each other and requires duelling, mutually exclusive hypotheses (McHugh, 2013; Adams et al., 2013). The null hypothesis (H_0) hypothesises that the variables are independent, while the alternative (H_1) hypothesises that they are not (Adams et al., 2013). Data is organised into contingency tables, with one variable's categories occupying the rows and the other's occupying the columns (Saunders et al., 2019; McHugh, 2013). Calculations are then run (in this case using Minitab – see appendix C for formulas), which displays three values per intersecting cell: 1) observed counts between the two variables, 2) an expected count assuming the counts occurred randomly, 3) a Chi-square (X^2) value that judges the size of the difference between observed and expected (random) counts. Figure 1 provides an example.

Figure 1 Chi-Square Calculation Example



Larger Chi-square cell values mean larger differences between observed and expected counts. Those Chi-square values are summed and run through a probability calculation to determine the probability that the observed values did not occur by chance, which is expressed as a *p*-value between 1 (100 percent random) and 0 (0 percent random) (McHugh, 2013). Accepted *p*-values for significance in most studies, including this one, is less than .05 ($p<.05$), meaning there is a less than a 5% chance the observed values occurred at random (Hair et al., 2015; Saunders et al., 2019). If a *p*-value of <.05 is observed, then the null hypothesis (that the variables are independent) is rejected, and the alternative (that the variables are not independent) is accepted (McHugh, 2013). Importantly, results are only considered reliable if more than 80% of cells have expected counts of five or more (McHugh, 2013). If they do not, a researcher can combine a variable's categories until large enough expected counts are achieved (Saunders et al., 2019), which the author did for most calculations.

By scanning the Chi-square values of each cell, a researcher can determine which portion of the two variables' categories produced the most significant effect (McHugh, 2013). For example, in Figure 1, the Chi-square value with the green arrow is the largest, meaning the two respondents who voted for row category two and fell within category five of the columns contributed the most to the Chi-square and *p*-value. In this case, those two votes *underrepresented* because they were less than the expected count (7.58 votes) by a wide margin. Had the observed counts been well over the expected count, those votes would have *overrepresented* (McHugh, 2013). The author uses this language in Chapter 4.

3.7 Ethics

The questionnaire included an informed consent and acknowledgement statement on the welcome page. Respondents confirmed consent by continuing to Q1 (see Appendix A). The informed consent stated the research was anonymous but that results would be used for academic purposes. SoGoSurvey's anonymisation process strips everything, including metadata. The closeout page provided the author's email address so that respondents could request of copy of the study. Appendix B contains the approved ethics letter for this research.

Chapter 4: Findings

4.1 Demographics

Seven respondents screened-out at Q1, which asked if they had ever worked a US pensionable job. The remaining N=306 respondents answered a series of demographic questions (Q2-Q7), which showed most were between 35 and 54 years old, female, white, married, well educated, and current pensionable employees. Figures 2 and 3 show current age and gender results since they will be discussed more in this chapter, while Appendix D holds all demographic question results.

Figure 2 N=306 Respondents' Current Age

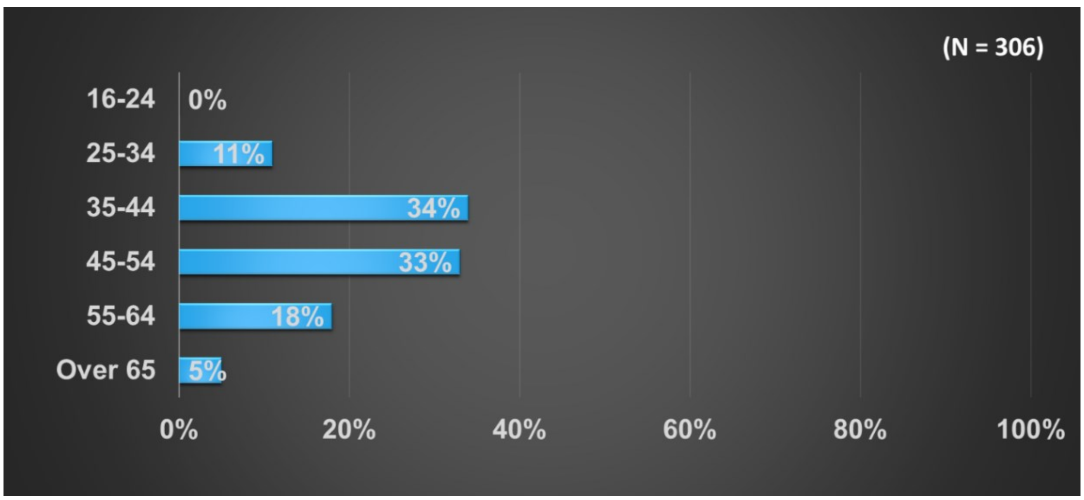
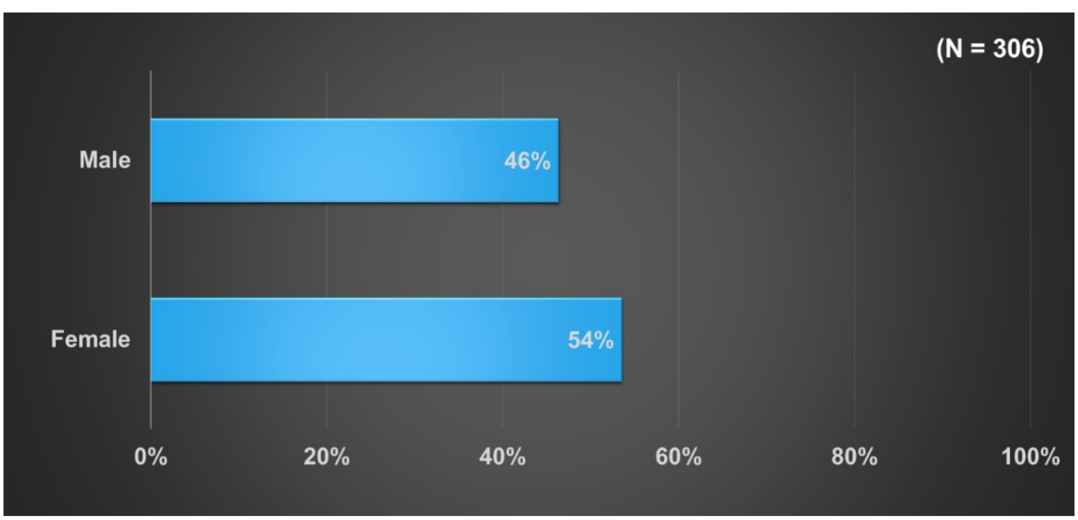


Figure 3 N=306 Respondents' Gender



4.1.1 Demographics and Consideration of Voluntary Employee Turnover (VET)

Q8 asked respondents if they had ever seriously contemplated VET before fully vesting at NRA. Half of the respondents (153 of 306) had not and screened-out. Q8 results were Chi-square tested against Q2-Q7's demographic results using the working hypotheses (WH) in Table 3. The null hypotheses for current age (Q2) and gender (Q3) were both rejected, and the alternatives accepted, meaning both significantly moderated serious VET contemplation. Respondents 44 and younger considered VET far more than 55 and older respondents, who considered VET far less. Females considered VET more, and males considered it less.

Table 3 Chi-Square Results for Q8 (VET Contemplation) vs. Q2 (Current Age) and Q3 (Gender)

Working Hypotheses			
WH_0: Serious VET contemplation is not moderated by XXX demographic category.			
WH_1: Serious VET contemplation is moderated by XXX demographic category.			
Chi-Square Tests Results Level of Significance .05			
Question No.	**Dependent Variable**	**Independent Variables (Q2 & Q3)**	**Pearson X^2 *p*-value**
8	Seriously Contemplated VET	Q2 Current Age	$<.001$
		Q3 Gender	.003

4.2 Voluntary Employee Turnover (VET) Respondents

Q9 asked the N=153 remaining respondents if they had considered their pension during their VET decision; nine had not and screened-out. On average, the remaining N=144 respondents were younger, more female, whiter, less married, similarly educated, and more actively employed than the larger group of N=306 respondents. Nearly half of the 144 respondents belonged to a state or local government pension plan. Complete demographic details are in Appendix D. Figures 4 and 5 show the differences in age and gender between the N=306 group and the remaining N=144 respondents.

Due to a lack of pension literacy, N=14 respondents chose not to rank design elements. However, all N=144 respondents answered the final four questions in the questionnaire: one each about age (Q23) and tenure (Q25) at the time of their VET decision; VET decision outcome (Q24); and the size of the role (as a percentage) their pension played during VET when considering staying (Q26). Table 4 displays complete questions and results. Highlighted cells hold the highest value for each question.

Figure 4 Current Age N=306 vs. N=144

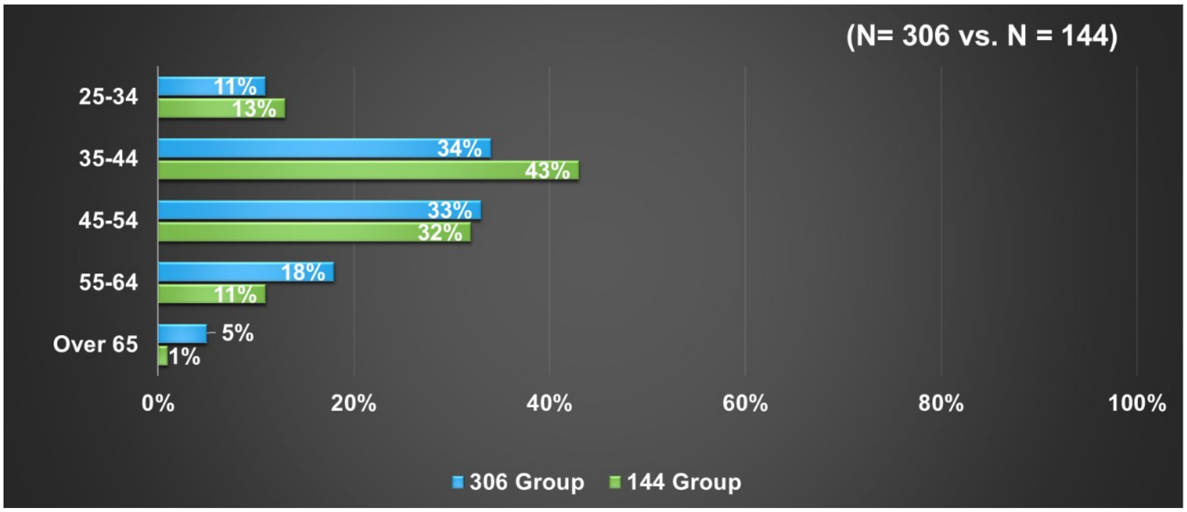
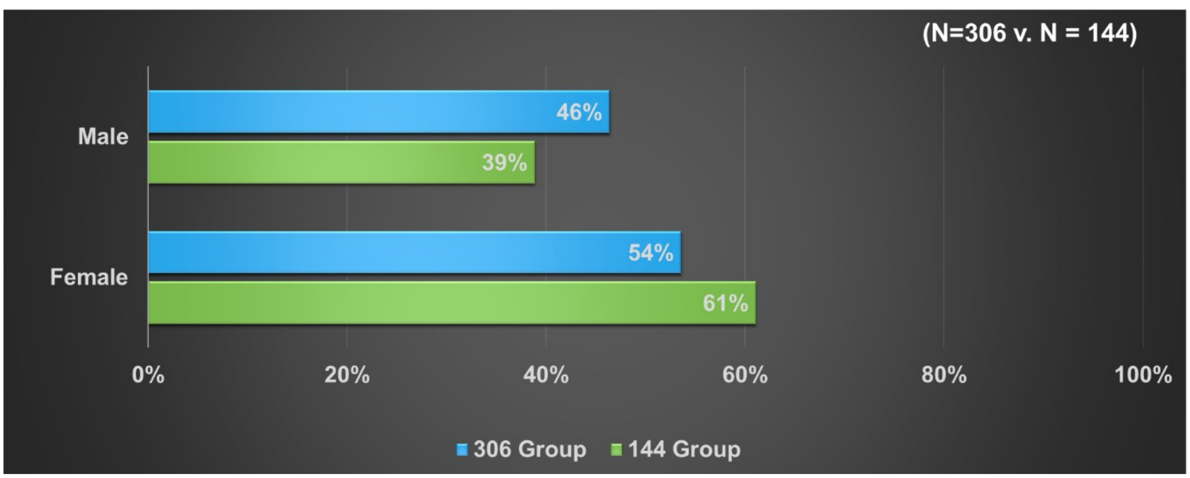


Figure 5 Gender N=306 vs. N=144



The majority of the 144 respondents made their VET decision between 5 and 14 years of tenure (Q23) and between 25 and 44 years of age (Q25). Two-thirds of them decided to stay at their pensionable job (Q24). Nearly two-thirds of respondents signalled that their pension made up between 61% and 100% of the reason(s) why they considered staying (Q26).

Table 4 N=144 Final Four Questions (23-26) and Answers

Question No.	Variable	Items	Frequency (Respondents)	Percentage (%)
23	[1]Tenure at VET decision	0-4	14	10%
		5-9	41	28%
		10-14	37	26%
		15-19	23	16%
		20-24	20	14%
		Over 25	9	6%
24	[2]Decision outcome	Stayed	96	67%
		Left	16	11%
		Undecided	32	22%
25	[3]Age at decision	16-24	1	1%
		25-34	50	35%
		35-44	55	38%
		45-54	32	22%
		55-64	6	4%
		Over 65	0	0%
26	[4]Size of DBP's role during VET	20% or less	5	3%
		21% to 40%	16	11%
		41% to 60%	37	26%
		61% to 80%	31	22%
		81% to 100%	55	38%
[1]Q23. How many years had you worked within the pension system when you reached the voluntary departure decision point?				
[2]Q24. What was the outcome of your decision?				
[3] Q25. What was your age at the time of your decision?				
[4]Q26. In total, when compared to all the other reasons that made you consider staying at your pensionable job, how large a role did your pension play?				

4.2.1 Final Four Questions and Demographic Correlations

Q23 through Q26's results were Chi-square tested against each other and the demographic questions Q2-Q7. Table 5 displays Q26 (size of DBP's role) and Q24's (VET decision outcome) significant results. Based on *p*-values of less than .05 ($p<.05$), the null WHs were rejected, and the alternatives accepted for tenure at VET decision (Q23) and age at VET (Q25). Both significantly moderated the size of a DBP's role in a respondent's VET decision (Q26). The test results show that younger and less tenured respondents placed less emphasis on their DBP during their decision (Q26), while older and more tenured respondents placed more emphasis on their pension (Q26). Current age (Q3) also significantly moderated VET decision outcome (Q24). In that case, younger respondents overrepresented in the 'departed pensionable job or undecided' category, while older respondents overrepresented in the 'stayed' category. A detailed breakdown of all Chi-square tests is in Appendix C.

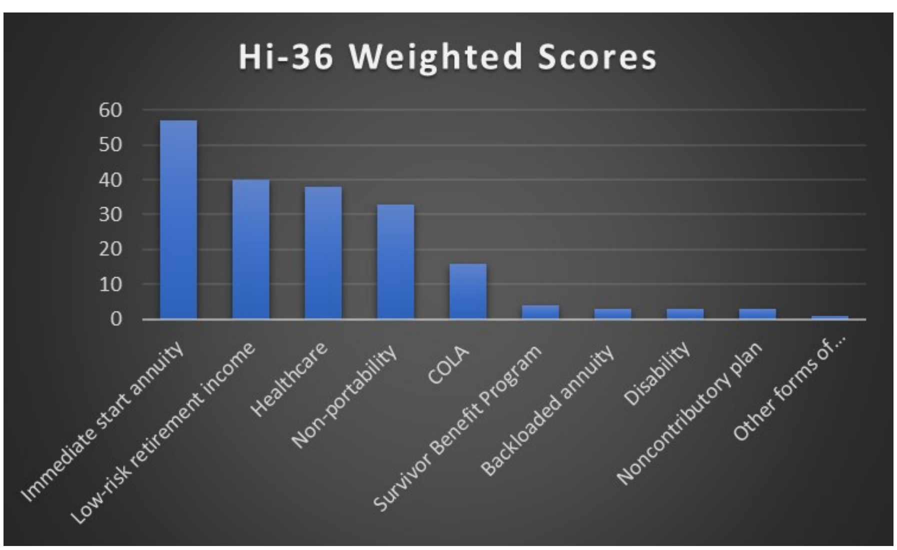
Table 5 Chi-Square Results Q26 & Q24 vs. Demographics

Working Hypotheses			
WH_0: XXX demographic category does not moderate a DBP's role in VET decision making (or outcome).			
WH_1: XXX demographic category moderates a DBP's role in VET decision making (or outcome).			
Chi-Square Tests Results Level of Significance .05			
Question No.	**Dependent Variable**	**Independent Variables (Q2-Q7, Q10, Q23, Q24, & Q25)**	**Pearson X^2 *p*-value**
26	Size of DBP's Role in VET *Grouped (1-2, 3, 4, 5)*	Q23 Tenure at VET *Grouped (1-2, 3, 4-6)*	.011
	Size of DBP's Role in VET *Grouped (1-2, 3, 4, 5)*	Q25 Age at VET *Grouped (1-2, 3, 4-6)*	.009
24	Decision Outcome *Grouped (1, 2-3)*	Q2 Current age *Grouped (1-2, 3, 4-6)*	.020

4.3 Results of Ranked and Weighted Data Analysis

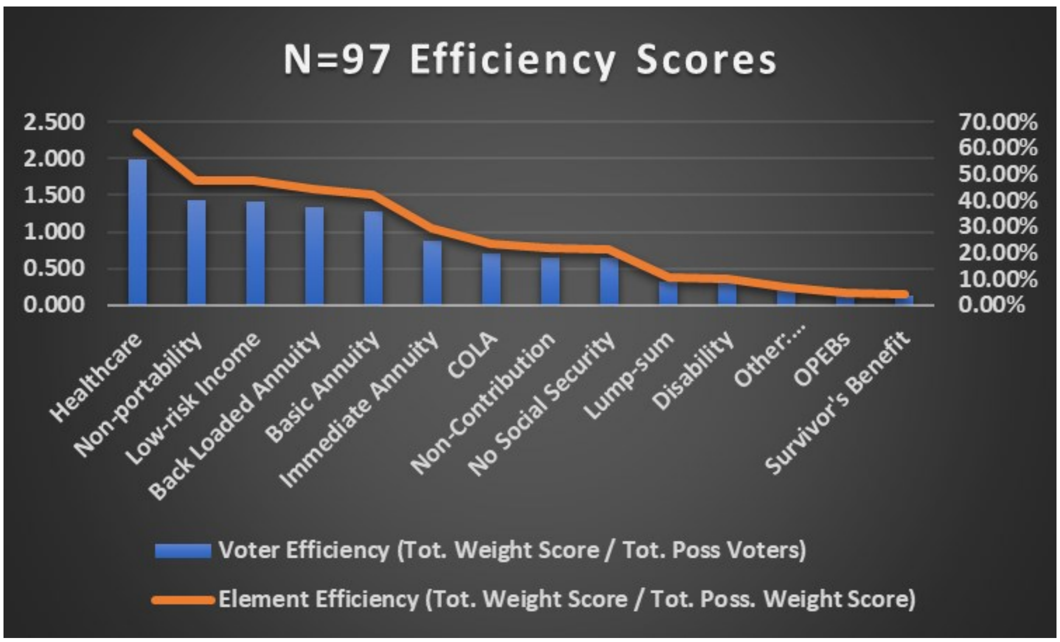
Figure 6 displays the ranked and weighted results from the military Hi-36 respondents (N=33) who routed separately through the ranking section as described in Chapter 3. These respondents ranked the immediate start annuity design element 1st by a wide margin, meaning it made them consider staying during VET the most. Low-risk retirement income (2nd) and subsidised post-employment health insurance (3rd) followed distantly.

Figure 6 N=33 Hi-36 Respondents' Weighted Design Element Rankings



The other respondents (N=97) only ranked the features available in their pensions. The author applied the design element (E_e) and voter efficiency (V_e) formulas from section 3.6 in Chapter 3 to determine which design elements made them consider staying the most. Figure 7 displays these efficiency scores in descending order. Pension subsidised healthcare finished a clear first. Healthcare captured precisely two-thirds of its theoretically available E_e and V_e points, while no other element captured even half. Non-portability (2nd) and low-risk income (3rd) followed distantly.

Figure 7 N=97 DBP Design Element (E_e) and Voter Efficiency (V_e) Scores



The author combined the two groups (N=130) to create a more robust data set. Table 6 shows the combined weighted scores and efficiency calculation results. Figure 8 displays the scores graphically. While healthcare remained 1st, its score was less efficient. Still, it remained the only design element with a V_e score higher than 50%. Immediate annuity jumped to second place, followed closely by low-risk income, basic annuity, and non-portability.

Figure 8 N=130 DBP Design Element (E_e) and Voter Efficiency (V_e) Scores

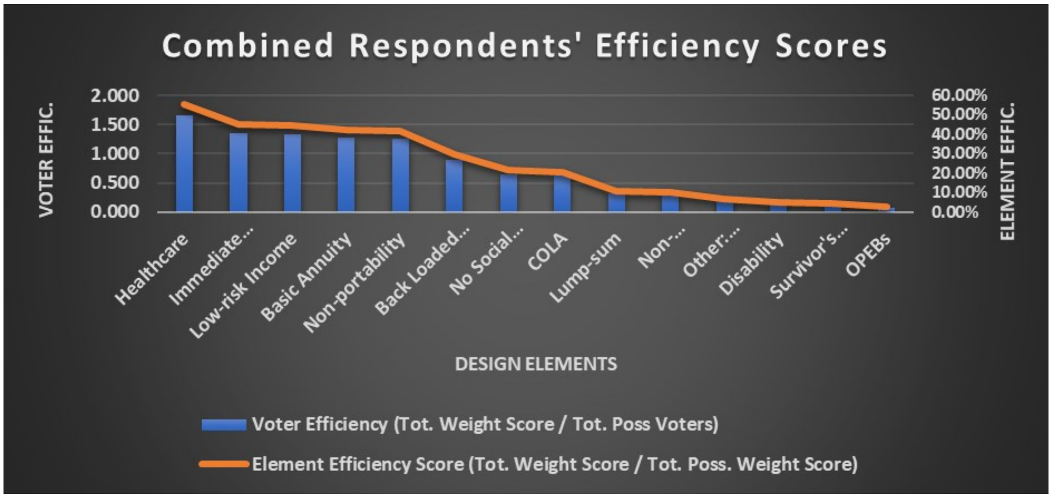


Table 6 N=130 Combined Weighted Scores and Efficiency Calculations

Design Element	Total Voter Count	Total Eligible Voters	Total Weighted Score	Total Possible Weighted Score	V_e (Tot. Weight Score / Tot. Poss Voters)	E_e (Tot. Weight Score / Tot. Poss. Weight Score)
Healthcare	66	87	145	261	1.667	55.56%
Immediate Annuity	35	59	80	177	1.356	45.20%
Low-risk Income	47	78	104	234	1.333	44.44%
Basic Annuity	5	11	14	33	1.273	42.42%
Non-portability	39	82	103	246	1.256	41.87%
Back Loaded Annuity	30	94	84	282	0.894	29.79%
No Social Security	5	14	9	42	0.643	21.43%
COLA	33	84	52	252	0.619	20.63%
Lump-sum	6	34	11	102	0.324	10.78%
Non-Contribution	8	53	16	159	0.302	10.06%
Other: Tenure/Money	10	97	20	291	0.206	6.87%
Disability	5	46	7	138	0.152	5.07%
Survivor's Benefit	8	130	17	390	0.131	4.36%
OPEBs	3	61	5	183	0.082	2.73%

4.4 Design Element Statistical Analysis

Design element analysis below follows the order of their efficiency scores. Only healthcare, immediate annuity, low-risk income, non-portability, backloaded annuity, and

COLA had enough votes and voters for statistical analysis. Each of those design elements' weighted scores or dichotomous counts (Y/N) were Chi-square tested against Q26 (size of role) and Q24 (VET decision outcome) using their duelling hypotheses from Chapter 2. The tables below list results with a note on whether dichotomous counts (Y/N) or weighted groupings were used for the test.

Design element results were also Chi-square tested against Q3-Q7's demographic results along with Q23 (tenure at VET) and Q25 (age at VET) to determine moderation of ranked selections as hypothesised in Chapter 2 (hypothesis 13). Only significant test results from those tests are listed.

Also, the author tested Q26 and Q24 results from each design element's population against their answers to Q3-Q7, Q23, and Q25's demographic questions to determine whether a combination of a design element's availability and demographics impacted VET decisions and outcome. The author used working hypotheses (WHs) listed in each section. Only significant test results from those tests are listed. Appendix C holds complete calculations for all test results listed in each table.

4.4.1 Design Element #1: Pension Subsidised Healthcare – Hypotheses 2

Chi-square testing for healthcare yielded the results in Table 7.

Table 7 Pearson Chi-square results for healthcare variable

Design Element: Healthcare (N=87) Significance Threshold *p*=.05		
Dependent Variable (Design Element)	**Independent Variables (Q3-Q7, Q10, Q23 – Q26)**	**Pearson X^2 *p*-value**
Hypotheses 2		
Healthcare *Weighted (1, 2, 3, 0)*	**Q24 VET Outcome** *Grouped (1, 2-3)*	.325[1]
Healthcare *Counts (Y/N)*	**Q26 Size of Role** *Grouped (1-2, 3, 4-5)*	.341[2]
Hypotheses 13		
Healthcare *Counts (Y/N)*	**Q25 Age at VET** *Grouped (1-2, 3-6)*	.005
Outcome Testing		
Q24 VET Outcome *Grouped (1, 2-3)*	**Q3 Gender**	.026
[1] 1 of 8 cell(s) with expected counts less than 5 [2] 1 of 6 cell(s) with expected counts less than 5		

Healthcare's hypotheses:

No.	Dependent Variable(s)	Independent Variable(s)	Duelling Hypotheses
2	VET Decision	Healthcare	$H2_0$: If present, pension subsidized healthcare does not significantly relate to an employee's VET decision.
			$H2_1$: If present, pension subsidized healthcare significantly relates to an employee's VET decision.

Because the *p*-values were greater than .05 (*p*>.05), null hypothesis 2 was accepted. Healthcare did not relate to VET decision outcome (Q24) or a DBP's proportional role during VET (Q26) at a statistically significant level.

Healthcare's hypotheses 13:

No.	Dependent Variable(s)	Independent Variable(s)	Duelling Hypotheses
13	Healthcare	Q25 Age at VET decision	$H13_0$: Ranked selection of healthcare is not significantly moderated by a respondent's age at their VET decision.
			$H13_1$: Ranked selection of healthcare is significantly moderated by a respondent's age at their VET decision.

Based on a *p*-value less than .05 (*p*<.05), the null hypothesis 13 was rejected and the alternative accepted, meaning age at VET decision (Q25) significantly moderated respondents' ranked selection of healthcare. 34 and younger respondents overrepresented, and 35 and older respondents underrepresented in the 'did not vote for healthcare' category.

Healthcare's WHs for 'outcome testing' were:

No.	Dependent Variable(s)	Independent Variable(s)	Duelling Hypotheses
WH	Q24 VET Decision Outcome	Q3 Gender	WH_0: Gender does not significantly moderate VET decision outcome for healthcare's population.
			WH_1: Gender significantly moderates VET decision outcome for healthcare's population.

Based on a *p*-value less than .05 (p<.05), the null WH was rejected and the alternative accepted, meaning a respondent's gender (Q3) significantly moderated VET decision outcome (Q24) for healthcare's population. Results show that males underrepresented and females overrepresented in the 'left their job or undecided' category.

4.4.2 Design Element #2: Immediate Annuity – Hypotheses 1

Chi-square testing for the immediate annuity design element yielded the results in Table 8.

Table 8 Pearson Chi-square results for immediae annuity variable

<table>
<tr><th colspan="3">Design Element: Immediate Annuity (N=59)
Significance Threshold p=.05</th></tr>
<tr><th>Dependent Variable (Design Element)</th><th>Independent Variables (Q3-Q7, Q10, Q23 – Q26)</th><th>Pearson X^2 p-value</th></tr>
<tr><td colspan="3">Hypotheses 1</td></tr>
<tr><td>Immediate Annuity
Weighted (1, 2, 3, 0)</td><td>Q24 VET Outcome
Grouped (1, 2-3)</td><td>.143[1]</td></tr>
<tr><td>Immediate Annuity
Counts (Y/N)</td><td>Q26 Size of Role
Grouped (1-2, 3, 4-5)</td><td>.439[2]</td></tr>
<tr><td colspan="3">Hypotheses 13</td></tr>
<tr><td colspan="3">No valid test results</td></tr>
<tr><td colspan="3">Outcome Testing</td></tr>
<tr><td rowspan="2">Q26 Size of Role
Grouped (1-2, 3, 4-5)</td><td>Q23 Tenure at VET
Grouped (1-3, 4-6)</td><td>.01[2]</td></tr>
<tr><td>Q25 Age at VET
Grouped (1-2, 3-6)</td><td>.029[2]</td></tr>
<tr><td colspan="3">[1] 5 of 8 cell(s) with expected counts less than 5
[2] 1 of 6 cell(s) with expected counts less than 5</td></tr>
</table>

Immediate annuity's hypotheses:

<table>
<tr><th>No.</th><th>Dependent Variable(s)</th><th>Independent Variable(s)</th><th>Duelling Hypotheses</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">VET Decision</td><td rowspan="2">Immediate Annuity</td><td>$H1_0$: If present, immediate annuity do not significantly relate to an employee's VET decision.</td></tr>
<tr><td>$H1_1$: If present, immediate annuity significantly relates to an employee's VET decision.</td></tr>
</table>

Because the *p*-values were greater than .05 (*p*>.05), the null hypothesis 1 was accepted. Immediate annuity did not relate to VET decision outcome (Q24) or a DBP's proportional role during VET (Q26) at a statistically significant level.

Immediate annuity's WHs for 'outcome testing' were:

<table>
<tr><th>No.</th><th>Dependent Variable(s)</th><th>Independent Variable(s)</th><th>Duelling Hypotheses</th></tr>
<tr><td rowspan="2">WH</td><td rowspan="2">Q26 Size of Role</td><td rowspan="2">Q23 Tenure at VET
Q25 Age at VET</td><td>WH_0: Tenure (or age) at VET decision point does not significantly moderate the size of a pension's role during a VET decision for immediate annuity's population.</td></tr>
<tr><td>WH_1: Tenure (or age) at VET decision point significantly moderates the size of a pension's role during a VET decision for immediate annuity's population.</td></tr>
</table>

Based on *p*-values less than .05 (*p*<.05), the null WHs for both Q23 (tenure at VET) and Q24 (age at VET) were rejected, and the alternatives accepted, meaning they significantly moderated the proportional role a DBP played during a VET decision (Q26) for immediate annuity's population. For tenure (Q23), respondents with 15 years or more underrepresented in Q26's 40% or below category and overrepresented in the 61% and above category. For age (Q25), 34 and younger respondents overrepresented in Q26's 40% or below category and underrepresented in the 61% and above category, while the 35 and older respondents did the opposite.

4.4.3 Design Element #3: Low-Risk Retirement Income – Hypotheses 7

Chi-square testing for low-risk retirement income yielded the results in Table 9.

Table 9 Pearson Chi-square results for low-risk retirement income variable

Design Element: Low-Risk Retirement Income (N=78) Significance Threshold *p*=.05		
Dependent Variable (Design Element)	**Independent Variables (Q3-Q7, Q10, Q23 – Q26)**	**Pearson X^2 *p*-value**
Hypotheses 7		
Low-Risk Income *Weighted (1, 2, 3, 0)*	**Q24 VET Outcome** *Grouped (1, 2-3)*	.216[1]
Low-Risk Income *Counts (Y/N)*	**Q26 Size of Role** *Grouped (1-2, 3, 4-5)*	.991
Hypotheses 13		
No significant or valid test results		
Outcome Testing		
Q26 Size of Role *Grouped (1-2, 3, 4, 5)*	**Q23 Tenure at VET** *Grouped (1-2, 3, 4-6)*	.036[2]
	Q25 Age at VET *Grouped (1-2, 3-6)*	.013
[1] 2 of 8 cell(s) with expected counts less than 5 [2] 2 of 12 cell(s) with expected counts less than 5		

Low-risk retirement income's hypotheses:

No.	Dependent Variable(s)	Independent Variable(s)	Duelling Hypotheses
7	VET Decision	Low-Risk Retirement Income	$H7_0$: If deemed present by employees, low-risk retirement income does not significantly relate to an employee's VET decision.
			$H7_1$: If deemed present by employees, low-risk retirement income significantly relates to an employee's VET decision.

Because the *p*-values were greater than .05 (*p*>.05), the null hypothesis 7 was accepted. Low-risk retirement income did not relate to VET decision outcome (Q24) or a DBP's proportional role during VET (Q26) at a statistically significant level.

Low-risk retirement income's WHs for 'outcome testing' were:

No.	Dependent Variable(s)	Independent Variable(s)	Duelling Hypotheses
WH	Q26 Size of Role	Q23 Tenure at VET Q25 Age at VET	WH_0: Tenure (or age) at a VET decision point does not significantly moderate the size of their pension's role during a VET decision for low-risk retirement income's population.
			WH_1: Tenure (or age) at a VET decision point significantly moderates the size of their pension's role during a VET decision for low-risk retirement income's population.

Based on *p*-values less than .05 (p<.05), the null WHs for tenure at VET (Q23) and age at VET (Q25) were rejected, and the alternatives accepted, meaning they significantly moderated the proportional role a DBP played during a VET decision (Q26) for low-risk retirement income's population. For tenure (Q23), test results show respondents with 15 years or more underrepresented in Q26's 40% or below category and overrepresented in the 61% to 80% category. For age (Q25), 34 and younger respondents overrepresented in Q26's 40% or below category and underrepresented in the 61% to 80% category, while the 35 and older respondents did the opposite.

4.4.4 Design Element #5: Non-portability – Hypotheses 3

Chi-square testing for non-portability yielded the results in Table 10.

Table 10 Pearson Chi-square results for non-portability variable

Design Element: Non-Portability (N=82) Significance Threshold *p*=.05		
Dependent Variable (Design Element)	**Independent Variables (Q3-Q7, Q10, Q23 – Q26)**	**Pearson X^2 *p*-value**
Hypotheses 3		
Non-Portability *Counts (Y/N)*	**Q24 VET Outcome** *Grouped (1, 2-3)*	.310
	Q26 Size of Role *Grouped (1-2, 3, 4, 5)*	.560
Hypothesis 13		
No significant or valid test results		
Outcome Testing		
Q26 Size of Role *Grouped (1-2, 3, 4-5)*	**Q23 Tenure at VET** *Grouped (1-3, 4-6)*	.004[1]
[1] 1 of 8 cell(s) with expected counts less than 5 [2] 2 of 12 cell(s) with expected counts less than 5		

Non-portability's hypotheses:

No.	Dependent Variable(s)	Independent Variable(s)	Duelling Hypotheses
3	VET Decision	Non-Portability	$H3_0$: If present, non-portability does not significantly relate to an employee's VET decision.
			$H3_1$: If present, non-portability significantly relates to an employee's VET decision.

Because the *p*-values were greater than .05 (*p*>.05), null hypothesis 3 was accepted. Non-portability did not relate to VET decision outcome (Q24) or a DBP's proportional role during VET (Q26) at a statistically significant level.

Non-portability's WHs for 'outcome testing' were:

No.	Dependent Variable(s)	Independent Variable(s)	Duelling Hypotheses
WH	Q26 Size of Role	Q23 Tenure at VET	WH_0: Tenure at VET decision point does not significantly moderate the size of a pension's role during a VET decision for non-portability's population
			WH_1: Tenure at VET decision point significantly moderates the size of a pension's role during a VET decision for non-portability's population

Based on *p*-values less than .05 (*p*<.05), the null working hypothesis for tenure at VET (Q23) was rejected and alternative accepted, meaning it significantly moderated the proportional role a DBP played during a VET decision (Q26) for non-portability's population. Tenure (Q23) test results show respondents with 15 years or more underrepresented in Q26's 40% or below category and overrepresented in the 81% to 100% category.

4.4.5 Design Element #6: Backloaded Annuity – Hypotheses 4

Chi-square testing for backloaded annuity yielded the results in Table 11.

Table 11 Pearson Chi-square results for backloaded annuity variable

Design Element: Backloaded Annuity (N=94) Significance Threshold *p*=.05		
Dependent Variable (Design Element)	**Independent Variables (Q3-Q7, Q10, Q23 – Q26)**	**Pearson X^2 *p*-value**
Hypotheses 4		
Backloaded Annuity *Counts (Y/N)*	**Q24 VET Outcome** *Grouped (1, 2-3)*	.098
	Q26 Size of Role *Grouped (1-2, 3, 4, 5)*	.333
Hypothesis 13		
Backloaded Annuity *Counts (Y/N)*	**Q3 Gender**	.002
	Q25 Age at VET *Grouped (1-2, 3-6)*	<.001
Outcome Testing		
Q26 Size of Role *Grouped (1-2, 3, 4, 5)*	**Q23 Tenure at VET** *Grouped (1-3, 4-6)*	.021

Backloaded annuity's hypotheses:

No.	Dependent Variable(s)	Independent Variable(s)	Duelling Hypotheses
4	VET Decision	Backloaded Annuity	$H4_0$: If present, backloaded annuity do not significantly relate to an employee's VET decision.
			$H4_1$: If present, backloaded annuity significantly relates to an employee's VET decision.

Because the *p*-values were greater than .05 (*p*>.05), the null hypothesis 4 was accepted. Backloaded annuity did not relate to VET decision outcome (Q24) or a DBP's proportional role during VET (Q26) at a statistically significant level.

Backloaded annuity's hypotheses 13 were:

No.	Dependent Variable(s)	Independent Variable(s)	Duelling Hypotheses
13	Backloaded Annuity	Q3 Gender Q25 Age at VET	$H13_0$: Ranked selection of the backloaded annuity design element is not significantly moderated by a respondent's gender (or age at VET).
			$H13_1$: Ranked selection of the backloaded annuity design element is significantly moderated by a respondent's gender (or age at VET).

Based on *p*-values less than .05 (*p*<.05), the null hypothesis 13 was rejected, and the alternative accepted for both Gender (Q3) and age at VET (Q25), meaning both significantly moderated respondents' ranked choice of backloaded annuity. Gender (Q3) test results showed an overrepresentation of males in the 'no vote' category and an underrepresentation of them in the 'voted for backloaded annuity' category. Females were the opposite. Age at VET (Q25) test results showed 34 and younger respondents overrepresented in the 'no vote' category and underrepresented in the 'voted for backloaded annuity' category, while older respondents did the opposite.

Backloaded annuity's WHs for 'outcome testing' were:

No.	Dependent Variable(s)	Independent Variable(s)	Duelling Hypotheses
WH	Q26 Size of Role	Q23 Tenure at VET	WH_0: Tenure at VET decision point does not significantly moderate the size of a pension's role during a VET decision for backloaded annuity's population
			WH_1: Tenure at VET decision point significantly moderates the size of a pension's role during a VET decision for backloaded annuity's population

Based on *p*-values less than .05 (*p*<.05), the null hypothesis WH was rejected and alternative accepted, meaning tenure at VET (Q23) significantly moderated the proportional role a DBP played during a VET decision (Q26) for backloaded annuity's population. Test results show an underrepresentation of respondents with 15 years or more tenure in Q26's 40% or below category and overrepresentation of those same respondents in the 81% to 100% category.

4.4.6 Design Element #8: Cost of Living Adjustment (COLA) – Hypotheses 5

Chi-square testing for COLA yielded the results in Table 12.

Table 12 Pearson Chi-square results for COLA variable

Design Element: COLA (N=84) Significance Threshold *p*=.05		
Dependent Variable (Design Element)	**Independent Variables (Q3-Q7, Q10, Q23 – Q26)**	**Pearson X^2 *p*-value**
Hypotheses 5		
COLA *Counts (Y/N)*	**Q24 VET Outcome** *Grouped (1, 2-3)*	.231
	Q26 Size of Role *Grouped (1-2, 3, 4, 5)*	.449
Hypothesis 13		
No significant or valid test results		
Outcome Testing		
Q24 VET Outcome *Grouped (1, 2-3)*	**Q3 Gender**	.026

COLA's hypotheses:

No.	Dependent Variable(s)	Independent Variable(s)	Duelling Hypotheses
5	VET Decision	COLA	$H5_0$: If present, COLAs do not significantly relate to an employee's VET decision.
			$H5_1$: If present, COLAs significantly relate to an employee's VET decision.

Because the *p*-values were greater than .05 (*p*>.05), the null hypothesis 5 was accepted. COLA did not relate to VET decision outcome (Q24) or a DBP's proportional role during VET (Q26) at a statistically significant level.

COLA's WHs for 'outcome testing' were:

No.	Dependent Variable(s)	Independent Variable(s)	Duelling Hypotheses
WH	Q24 VET Decision Outcome	Q3 Gender	WH_0: Gender does not significantly moderate VET decision outcome for COLA's population.
			WH_1: Gender significantly moderates VET decision outcome for COLA's population.

Based on a *p*-value less than .05 (*p*<.05), the null working hypothesis was rejected and alternative accepted, meaning gender (Q3) significantly moderated respondents' VET decision outcome (Q24) for COLA's population. The test results show males underrepresented and females overrepresented in the 'left job or undecided' category.

4.5. Conclusion

Three trends emerged from these findings. First, healthcare's V_e (1.667) and E_e (56%) scores mean that it made respondents consider staying during their VET decision the most, even after results were merged between the N=97 and N=33 groups. That said, immediate annuity was the N=33 groups' clear first choice, which moved to second when results were combined. Second, despite the ranking results, no relationships of statistical significance (i.e., *p*-values less than .05) were found between the six ranked design elements tested, and respondents' VET decision outcomes (Q24), or the proportional role their DBP played in their reasons for staying during VET (Q26). Third, statistically significant relationships (i.e., *p*-values less than .05) were found between gender (Q3), tenure at VET (Q23) or age at VET (Q25) with either VET decision outcome (Q24) or a DBP's proportional role (Q26). These trends will be discussed further in Chapter 5.

Chapter 5: Discussion

5.1 Introduction

With the data collected and analyzed, it is now possible to answer the SQs by comparing the findings in Chapter 4 with the academic literature discussed in Chapter 2. Doing so will provide an overall answer to the MQ.

5.2 Design Element Ranking and Selection

Based on its V_e (1.667) and E_e (56%) scores from the N=130 group, pension subsidized healthcare was the design element that made respondents consider staying during their VET decision the most. That presumes a respondent had access to healthcare through their defined benefit pension package, and not all did. As Chapter 4 showed, only N=87 of N=130 of respondents did. For comparison, backloaded annuity had the largest population for a non-mandatory (by US law) DBP design element with a population of N=94 out of N=130. The mandatory survivor's benefit had N=130.

The healthcare result is not surprising. As noted in the LR, healthcare is expensive in the US, and costs have exploded over recent decades (Liang et al., 2020). For this reason, in 2017, healthcare was ranked the number one overall preferred employment benefit in the US (Jones, 2017). As a result, pension subsidized healthcare stands to save retirees tens to hundreds of thousands of dollars as they age in retirement (Hoffman & Jackson, 2013).

Based on its V_e (1.356%) and E_e (45%) scores, the immediate annuity design element made respondents consider staying during their VET decision the second most. Its position on the final N=130 rankings was driven in large part by the Hi-36 military members. As noted in Chapter 2, immediate payout annuities are expensive for employers like the US military to provide (Enns et al., 1984) and are lucrative for retirees because they pay out more money over longer periods than other forms of annuities (Benartzi et al., 2011). This ranking result is also not surprising since the vast majority of US military personnel who stay until the 20-year full vesting mark 'retire' shortly after and usually go on to second careers that allow the 'retiree' to collect two paychecks (Enns et al., 1984; Sharp & Biderman, 1966; Warner, 2008). In other words, they know how lucrative of a benefit it is.

Low-risk retirement income's third-place finish (V_e=1.333) is unconventional since it is not an intentional design element but a by-product of good pension fund governance. Theoretically, DBP plans are supposed to provide risk-free or low-risk retirement income to their members (Jennings & Reichenstein, 2003). That is not the case for many pension funds whose funding ratios decreased severely over the past two decades (Aubry et al., 2018). Pension scholars have noted a clear separation between the worst and best-funded pension plans in the US (J.-P. Aubry et al., 2020; J.-P. Aubry & Wandrei, 2020). As a result, low-risk retirement income, which the questionnaire defined as "ultra-safe like US Federal pensions as well as corporate and public pension funds at or above a 100% funding ratio," proved important to respondents during VET.

As discussed in Chapter 2, Meyer and Allen's (1991) original codification of continuance commitment (CC) included an employee's recognition of the costs associated with voluntary departure. The specific mechanism that some researchers believe pensionable workers use to calculate those costs is pension quit costs (Ippolito, 1991, 2002; Nyce, 2007; Luchak et al., 2008). CC and pension quit cost the framework explained most of the rankings accurately, save one. The 'non-contributory DBP plan' design element's low rank (V_e=.302) stood out. The lack of votes may reflect an acknowledgement of wage offsets mentioned in Chapter 2 (Ippolito, 1994; Montgomery et al., 1992) or a general reflection of non-contribution's increasing rarity (Brainard & Brown, 2018). In either case, it was worth noting.

5.2.1 Hypotheses 13: Design Element Selection Moderators

Chapter 4 noted three Hypotheses 13 results in which age at VET (Q25) moderated respondents' ranked selections for healthcare, and both gender (Q3) and age at VET (Q25) moderated backloaded annuity selection. Table 13 displays the accepted hypotheses and their statistically strong correlations (i.e., *p*-values less than .01). Chi-square analysis showed many 34 and younger respondents did not select healthcare, while older respondents did. Moreover, a significant percentage of men and 34 and younger respondents did not vote for a backloaded annuity, while women and 35 and older respondents did.

Table 13 Pearson Chi-square results for DBP design element selection

Demographic Moderators of DBP Design Element Selection			
Independent Variable (Moderator)	**Dependent Variable (DBP Design Element)**	***p* Value**	**Accepted Hypothesis & Drivers**
Age at VET (Q25)	Healthcare	.005	$H13_1$: Ranked selection of the healthcare design element is significantly moderated by age at VET
			34 & younger overrep'd in 'no vote' category
Gender (Q3)	Backloaded annuity	.002	$H13_1$: Ranked selection of the backloaded annuity design element is significantly moderated by gender
			Males underrep'd the 'yes vote' category
Age at VET (Q25)	Backloaded annuity	<.001	$H13_1$: Ranked selection of backloaded annuity is significantly moderated by age at VET
			34 & younger underrep'd in the 'yes vote' category

The Hypotheses 13 results add a level of context that ranking alone missed. Some results reflect demographic trends in the US not directly addressed in pension literature. For instance, the implementation of the Affordable Care Act in the US demonstrated that younger, healthier Americans often deemphasize healthcare insurance since they have less need for it (Deloitte LLP, 2014). Whereas other results, like older workers' emphasis on backloaded annuities, are well-documented in pension literature because the older workers are so much closer to retirement than younger workers (Luchak & Gellatly, 2001; Yang, 2005). The gender-based results are new findings unsupported by literature and discussed in more detail in upcoming sections.

5.3 Statistical Analysis and Hypotheses Testing

5.3.1 Design Element Hypotheses Testing

Chapter 4 established a lack of statistically significant correlations between the six ranked and tested design elements and a DBP's proportional role in a respondent's reasons for staying during a VET decision (Q26). It did the same for a respondent's VET decision outcome (Q24). These Chi-square tests results answered the design elements' hypotheses. As Table 14 shows, null hypotheses were accepted for each of the six design elements tested, and none rejected. The possibility that random chance produced the

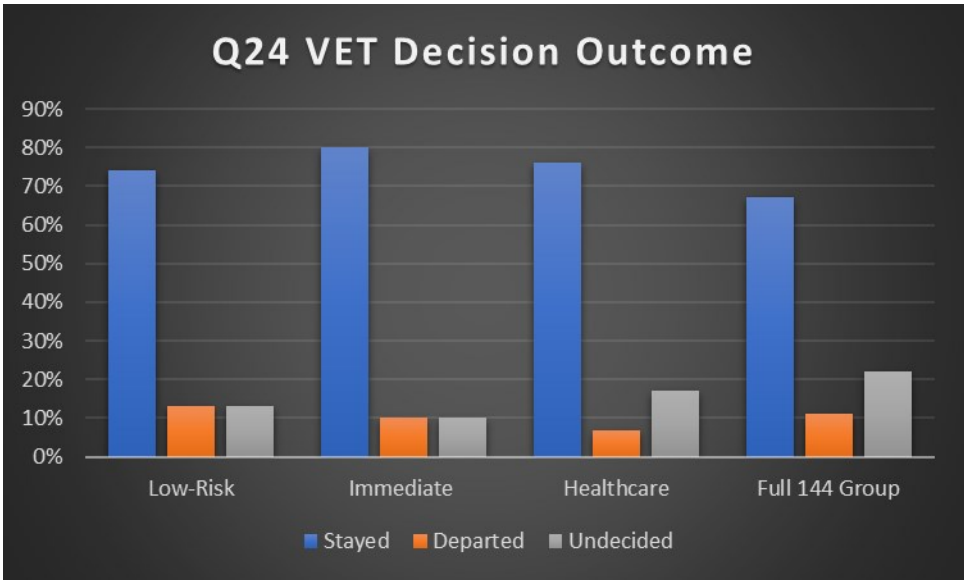
Q24 and Q26 results, instead of the design elements, was not eliminated because no tests produced probability values less than 5%. Thus, each design element and the results of Q24 and Q26 were deemed independent.

Table 14 Accepted hypotheses from design element statistical analysis

Rank No.	Dependent Variable(s)	Independent Variable(s)	Accepted Hypotheses
1	Q24 (VET decision outcome) Q26 (size of DBP's role)	Healthcare	$H2_0$: If present, pension subsidized healthcare does not significantly relate to an employee's VET decision.
2	Q24 (VET decision outcome) Q26 (size of DBP's role)	Immediate Annuity	$H1_0$: If present, immediate annuities do not significantly relate to an employee's VET decision.
3	Q24 (VET decision outcome) Q26 (size of DBP's role)	Low-Risk Retirement Income	$H7_0$: If deemed present by employees, low-risk retirement income does not significantly relate to an employee's VET decision.
5	Q24 (VET decision outcome) Q26 (size of DBP's role)	Non-Portability	$H3_0$: If present, non-portability does not significantly relate to an employee's VET decision.
6	Q24 (VET decision outcome) Q26 (size of DBP's role)	Backloaded Annuity	$H4_0$: If present, backloaded annuities do not significantly relate to an employee's VET decision.
8	Q24 (VET decision outcome) Q26 (size of DBP's role)	COLA	$H5_0$: If present, COLAs do not significantly relate to an employee's VET decision.

The lack of statistically observable relationships between the six ranked design elements and either VET decision outcome (Q24) or a DBP's proportional role in VET (Q26) was somewhat unexpected given the results of the rankings and LR. Healthcare's dominant V_e and E_e results made it seem like a relationship between it, and either Q24 or Q26 was possible. One potential answer for this lack of correlation may be that multiple variables produce Q24 and Q26's results. If so, then the Chi-square test would not detect them since it only tests relationships between two variables (Saunders et al., 2019; McHugh, 2013). As Figure 9 shows, Q24's results skew heavily in favour of staying at a pensionable job for both the large (N=144) group and the smaller populations of healthcare (N=87), immediate annuity (N=59), and low-risk retirement income's (N=78). This might be an indication of multiple variables contributing to one effect.

Figure 9 Q24 Results: N=144 vs. Low-Risk Income, Immediate Annuity, & Healthcare Populations



5.3.2 Demographic Working Hypotheses Testing

Another plausible explanation for the lack of design element relationships could be that other, more dominant contributors to retention during VET crowd out the design elements. As noted in Chapter 4, several working hypotheses (WHs) were employed to compare demographic answers from each design element's population to its Q24 (VET decision outcome) and Q26 (size of DBP's role) answers. These tests produced several findings of statistical significance (i.e., *p*-value less than .05). As a result, several null WHs were rejected, and the alternatives accepted, meaning the variables were not considered independent from each other. Table 15 catalogues those results along with the main demographic drivers that drove the Chi-square test results.

Table 15 Review of accepted working hypotheses

Demographic Moderators on DBP's Role in VET or VET Outcome for Design Element's Population				
Design Element Population	**Independent Variable (Moderator)**	**Dependent Variable**	***p value***	**Accepted Hypothesis & Drivers**
Healthcare (N=87)	Gender (Q3)	VET decision outcome (Q24)	.026	WH1: Gender significantly moderates VET decision outcome for healthcare's population. Men stayed more; Women departed or undecided more
Immediate annuity (N=59)	Tenure at VET (Q23)	Size of DBP's role in stay reasoning (Q26)	.010	WH1: Tenure at VET decision point significantly moderates the size of a pension's role during a VET decision for immediate annuity's population. 15 yrs or more overrep'd 61% & above category
Immediate annuity (N=59)	Age at VET (Q25)	Size of DBP's role in stay reasoning (Q26)	.029	WH1: Age at VET decision point significantly moderates the size of a pension's role during a VET decision for immediate annuity's population. 34 & younger overrep'd 40% & below category
Low-risk income (N=78)	Tenure at VET (Q23)	Size of DBP's role in stay reasoning (Q26)	.036	WH1: Tenure at VET decision point significantly moderates the size of a pension's role during a VET decision for low-risk income's population. 15 yrs or more overrepp'd 61% to 80% category
Low-risk income (N=78)	Age at VET (Q25)	Size of DBP's role in stay reasoning (Q26)	.013	WH1: Age at VET decision point significantly moderates the size of a pension's role during a VET decision for low-risk income's population. 34 & younger overrep'd 40% & below category
Non-portability (N=82)	Tenure at VET (Q23)	Size of DBP's role in stay reasoning (Q26)	.004	WH1: Tenure at VET decision point significantly moderates the size of their pension's role during a VET decision for non-portability's population. 15 yrs or more overrep'd 81% & above category
Backloaded annuity (N=94)	Tenure at VET (Q23)	Size of DBP's role in stay reasoning (Q26)	.021	WH1: Tenure at VET decision point significantly moderates the size of a pension's role during a VET decision for backloaded annuity's population 15 yrs or more underrep'd 40% & below category
COLA (N=84)	Gender (Q3)	VET decision outcome (Q24)	.026	WH1: Gender significantly moderates VET decision outcome for COLA's population. Men departed or undecided less; Women more

Two different types of relationships were observed, and they were observed within mutually exclusive design element populations. The more prevalent relationship was between either age or tenure and the proportional role that a DBP played in a respondent's reasons for staying (Q26). These relationships were only seen in an immediate annuity, low-risk income, non-portability, and backloaded annuity's populations, and at times were statistically strong (i.e., p-value = .01 or less). Generally speaking, the older (35 and above) and more tenured (15 years or more) a respondent, the more emphasis they placed on their DBP as a reason for staying (61% or above). Younger (34 and below) and less tenured workers (14 years or less) did the opposite.

Age and tenure's significant relationships with Q26 at the design element population-level mirrored the same relationships with Q26 at the N=144 group level. Section 4.2.1 detailed those tests, but they are summarized below in Table 16. The N=144 group included 14 members who did not rank design elements but answered Q23-Q26. Once again, older (45 and up) and more tenured (15 years or more) placed more emphasis on their DBP than younger, less tenured workers. Interestingly, current age moderated the N=144 group's VET decision outcomes (Q24) with 34 and younger workers overrepresenting in the ‘departed or undecided’ category. This did not replicate at the design element level but could reflect that some of the N=144 respondents (in a year of COVID pandemic disruptions) were going through their VET decision when they participated in the questionnaire.

Table 16 Review of Pearson Chi-square results for N=144 Q24 & Q26 answers

Demographic Moderators of Q24 (VET decision outcome) & Q26 (Size of Role) for N=144			
Independent Variable (Moderator)	**Dependent Variable**	***p* value**	**Accepted Hypothesis & Drivers**
Current age (Q2)	VET decision outcome (Q24)	.020	WH_1: Current age significantly moderates a VET decision outcome from a pensionable job.
			34 & younger overrep’d ‘departed or undecided’ category
Tenure at VET (Q23)	Size of DBP’s role in stay reasoning (Q26)	.011	WH_1: Tenure at VET significantly moderates a DBP’s role in reasons for staying during VET
			15 yrs or more underrep’d 40% & below category
Age at VET (Q25)	Size of DBP’s role in stay reasoning (Q26)	.009	WH_1: Age at VET significantly moderates a DBP’s role in reasons for staying during VET
			45 & older underrep’d in the 40% & below category

The literature review (LR) identified age and tenure as DBP-linked VET moderators. Haverstick et al. (2010) specifically found that tenure gradually moderates VET decisions towards staying for pensionable workers over time. Many others have also noted tenure’s effect (Asch, 2019; de Thierry et al., 2014; McCarthy et al., 2020). Ippolito (1991) captured the retention effect for older pensionable workers, which many others have also documented (de Thierry et al., 2014; Kirkman, 2017; Llorens, 2015). Furthermore, the results echo Luchak and Gellatly (2001)’s findings on the strong links between CC, DBPs, and retention in older and more tenured workers. Thus, finding such strong relationships between age or tenure at the design element level on respondents’ reasons for staying (Q26) appears in line with broader DBP literature.

Gender was the singular demographic category with an observed statistically significant relationship between it and VET decision outcome (Q24). This relationship was only observed in two separate design elements’ populations: healthcare and cost of living adjustments (COLAs). Interestingly, those elements were not ranked close together in the

V_e or E_e rankings (healthcare 1st, COLA 8th). In both cases, more males with DBP plan access to healthcare or COLAs stayed after making their VET decision, while more women departed or were still undecided.

The significant gender findings at the design element level also mirror significant gender findings at the DBP plan level. As discussed in Chapter 4 section 4.1.1, gender significantly moderated (p=.020) the result for the primary screening question (Q8), which asked respondents if they had ever seriously contemplated VET at their pensionable job. Men said no more, and women said yes more.

Based on the LR, gender was not an expected moderator. DBP connected VET literature says little about gender (Wynen & Op de Beeck, 2014). The general job quit literature may explain gender's results the best since it often points to the burden of familial obligations interfering with women's careers (Wynen & Op de Beek, 2014). Alternatively, these results might reflect the current stress caused by COVID-19, which prompted many primary school teachers to quit or retire (Diliberti et al., 2021). Teaching is a pensionable profession traditionally dominated by women in the US (NCES, 2020), and many of the respondents came from Facebook groups dedicated to teacher personal finance.

5.4 Research Questions Answered

5.4.1 SQ1: Design Elements and Retention

SQ1 asked:

> Which DBP design elements significantly relate to retention during US pensionable employees' voluntary turnover decisions?

The most narrowly defined answer to SQ1 is 'none' since Q24 (VET decision outcome) determined retention, and none of the ranked and tested design elements correlated to Q24 at a statistically significant level (i.e., p-value greater than .05). However, that would ignore the ranking results, which asked respondents to identify the DBP design elements that made them consider staying the most during their VET decision. Ranked questions are a legitimate method of determining what respondent's value because ranked results reveal preference (Jacoby, 2011; Stonebraker, 1981). Thus, the ranked results provide a new level of fidelity about which DBP design elements employees considered important enough to stay for during a VET decision.

5.4.1 SQ2: Demographic Moderators

SQ2 asked:

> How do demographic factors like age and tenure moderate the DBP design elements pensionable employees consider during voluntary turnover decisions?

Again, a narrowly defined answer would answer that age at VET and gender significantly moderated (i.e., *p*-value less than .05) the choice of healthcare or backloaded annuity as an important consideration for staying during a VET decision. In age and healthcare, younger respondents considered it less during VET, while older respondents considered it more. In the case of backloaded annuity and gender or age, male and younger (34 or less) respondents considered it less, while women and older respondents (35 or more) considered it more.

However, that narrowly defined answer would miss the six statistically significant relationships (i.e., *p*-values less than .05) found between age and/or tenure and the proportional role a DBP played in reasons for staying (Q26). In general, the older (35 and up) and more tenured (15 years or more) employees emphasized the role of their DBP more during VET, while the younger (34 and down) and less tenured (less than 15 years) employees emphasized it less. These relationships were observed in the immediate annuity, non-portability, low-risk retirement income, and backloaded annuity populations.

The narrowly defined answer would also miss the observed statistically significant link (i.e., *p*-value less than .05) between gender and VET decision outcome (Q24) among the healthcare and COLA populations. In those two instances, men with access to the healthcare or COLA design elements stayed at their pensionable job to a significant degree more than women who either departed or were undecided more.

In all, three demographic categories, age, tenure and gender, proved far better at explaining DBP linked VET considerations and outcomes than any of the six DBP design elements. When a respondent experienced their VET moment, and their gender mattered a lot. Perhaps design element availability played a role since the observed relationships occurred within specific design element's populations. However, that is a multivariate speculation, and Chi-square testing does not support testing more than two variables.

5.4.2 SQ3: Continuance Commitment (CC) and Results

SQ3 asked:

How well does continuance commitment explain those results?

CC and pension quit cost theory explained the ranked DBP design element results well. As already discussed in this chapter and Chapter 2, most of the top-ranked design elements are lucrative for employees, creating stay pension value. One, non-portability, imposes high quit pension costs. The only noted aberration was the non-contributory design element's low ranking.

Nevertheless, Chi-square tests determined that all six ranked design elements were independent of VET decision outcomes (Q24) and/or a DBP's proportional role in a respondent's reasons for staying (Q26). That determination was important because those questions measured the pull effect that DBPs create during VET, which the literature showed CC most likely created (Luchak & Gelallty, 2001; Luchak et al., 2008). Both questions registered strong signals, with over 66% of respondents staying after their decision and almost two-thirds indicating their pension formed 61% or more of their reasons for staying. The inability to correlate any design elements to those signals reduced CC's explanative power at the design element level.

Furthermore, the statistically significant observed relationships for age and tenure create a further problem for CC theory's explanative power because age and tenure are not CC antecedents in the Three-Component Model (TCM) (Meyer & Allen, 1991). That viewpoint was specifically reinforced by Meyer et al. (2002) when they noted that despite tenure and age correlating weakly to CC, they are not well-suited as antecedents. As already noted in this chapter, Luchak and Gellatly (2001) somewhat contradicted that notion by finding strong links between CC and DBPs in older and more tenured workers. Ultimately, though, despite how well CC explained the ranking results, the statistical analysis found severe limitations to the theory's usefulness at the design element level.

5.4.2 SQ4: Improving Human Resource Managers' Retirement Benefit Practices

SQ4 asked:

> How could these findings improve HRM retirement benefit practices?

HRMs can use this research in several ways. First, they could replicate the questionnaire and poll their employees about which DBP design elements most influenced them to stay during VET. This would aid in the unfortunate event of future benefit reductions because they could target the least significant benefits. Furthermore, for organizations that provide a DBP and worry about gender equity, this research, or more like it, could enable discussions on why a DBP certain design elements, like a backloaded annuity, attracts women's consideration more than men's during VET.

The use of this research need not be limited to retention either. HRMs could use it for recruitment. For instance, an organization with a well-run and well-funded DBP looking to hire workers 35 or older (perhaps due to their experience) could emphasize the financial fitness of the DBP and the importance of low-risk retirement income.

5.5 Concluding Discussions

The main research question (MQ) asked:

> Which DBP design elements have a significant relationship with voluntary employee turnover decisions by pensionable US workers before fully vesting at normal retirement age?

The rankings showed that healthcare, immediate annuities, and low-risk retirement income make pensionable workers consider staying the most when undergoing a VET decision. Nevertheless, no statistically significant relationship was observed between any singular design element and VET decision outcomes or a DBP's overall role in a respondent's reasons for staying. However, based on several statistically significant observed relationships at the DBP design element population level, age, tenure and gender appear far more strongly linked to respondent's retention considerations during VET and VET outcomes. These relationships proved far more explanatory than the CC framework, which is information HRMs can use to guide retention and recruitment policy decisions.

Chapter 6: Conclusion

6.1 Summary

This research sought to identify and examine the relationships between individual DBP design elements and voluntary turnover decisions made by pensionable US employees before fully vesting at normal retirement age (NRA). It also sought to determine if continuance commitment (CC) explained those relationships and improve human resources (HR) practices for US organisations. That was not a straightforward aim to achieve given the lack of published research on DBP design elements and the disparity in DBP benefits between US pension plans. The author accomplished the research aim by developing methods for identifying, comparing, and analysing the disparate DBP design elements offered to pensionable employees by the thousands of DBP plans in the US. These methods included the use of a questionnaire and descriptive and inferential statistics.

The results of this quantitative research included weighted preference ranking, which found that, when available, the 'pension subsidised healthcare', 'immediate annuity', and 'low-risk retirement income' design elements prompted respondents to consider staying during their voluntary turnover decision the most. CC proved an accurate explanative theory for ranked results. In some cases, age or gender significantly moderated respondents' selection of the healthcare or backloaded annuity design elements. Interestingly, no direct relationship was established statistically between those ranked results and a voluntary turnover decision outcome or the proportional role that a DBP played in a respondent's reasons for staying.

However, statistical analysis demonstrated that within particular DBP design element's populations, significant relationships (i.e., *p*-values less than .05) existed between specific demographic categories like age or tenure and the proportional role that a DBP played during VET. Those DBP design element populations included 'immediate annuity', 'low-risk retirement income', 'non-portability', and 'backloaded annuity'. In general, older or more tenured workers considered their DBP significantly more when those design elements were available than younger, less tenured workers. Moreover, this research found statistically significant relationships between gender and employees' VET outcomes (i.e., p-value less than .05) in the 'healthcare' and 'COLA' design element's populations. In general, men with access to healthcare or a COLA stayed at their pensionable job more than women, who either departed more or were undecided more. CC did not prove an accurate explanative theory for statistical analysis results at the design element level, especially for observed relationships between demographics and DBP-linked VET outcomes.

6.2 Recommendations

No one would expect government regulators to standardised an industry with over 50K different pension plans. However, regulators would do well to at least standardise nomenclature within the pension industry. This research suffered from a lack of commonly understood terms to use when searching the literature and also when building the questionnaire. As noted in Chapter 2, the term 'design element' was employed because terms like 'benefits' imply rewards and do not encompass a feature like non-portability, which is very much a penalty. Whether the US Bureau of Labor Statistics (BLS) should play that role or an organisation like the Government Accounting Standards Board (GASB) is best left to regulators to decide. However, it would benefit them to step in and mandate terms. Doing so would make pension focused research much easier.

HR managers (HRMs) could use the results of this research to inform policy. However, they would be wise to run a similar study within their organisation, referring only to the design elements that their DBP possesses. Doing so would provide far better fidelity on whether those specific DBP design elements create retention effects. HRMs could also judge whether or not continuance commitment (CC) helped explain the results. At the very least, HRMs would understand which design elements employees believe to be significant enough to stay for during their VET decisions. HRMs should run this research concurrently with the COVID-19 pandemic because many employees have probably contemplated VET due to work-life-health stressors.

6.3 Limitations

Sampling is a limitation of this research. The author used volunteer self-selection sampling, primarily due to time and resource limitations imposed by the NMIT master's program. At best, the results represent the population from which the sample was drawn, which is a community of online personal finance enthusiasts who also have access to pensions. Financial literacy among that population varies. However, it is wise to assume financial literacy is higher than the average US employee, which means there is certainly some amount of bias in these results. Also, as the demographic breakdown in Chapter 4 discussed and Appendix D shows, the sample of N=144 respondents who answered the final four questions was heavily white (87%), female (61%), and well educated (64% above a bachelor's degree). Again, this probably introduced bias. As a result, HRMs looking to use this researcher's results would do better to mirror the survey techniques and apply them to their organisations.

In mirroring this researcher's techniques but applying them to a single pensionable organisation, HRMs would also avoid the second limitation in this research: the need to rely on people's memory (or 'recall bias'). Most respondents had to choose which design elements their pension plan featured before ranking them. In some cases, depending on the respondent, they remembered a situation from years ago. Thus, not only did this study require some financial literacy, but it also required accurate recall of the events. This was a drawback of running a questionnaire that polled hundreds of workers from different DBP plans. Whereas the researcher collected a far more diverse set of answers, it required reliance on fallible human memory.

6.4 Related Research

This study highlighted two potential areas for future pension research. The first is examining the same phenomena but using data collection and statistical analysis techniques to judge multivariate relationships and influence. This researcher had to limit his work scope for what turned out to be a positivist exploratory study, and multivariate data collection and analysis was that limit. The second area of future pension research is the effect of gender on voluntary turnover decision outcomes. As mentioned, several times, little research exists on gender and VET decisions at pensionable jobs. Specific focus on that subject could enable a better understanding of how DBPs create retention effects during VET decisions for women.

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Appendix A

Questionnaire and Flow Chart

Dear Participant,

The purpose of this survey is to identify and examine the impact of a Defined Benefit Pension’s (DBP) design on voluntary turnover decisions made by pensionable US workers before fully vesting. It focuses on the incentives for staying and the penalties for leaving that are built into most DBP plans.

DEFINITIONS

For the purposes of this survey, fully vesting means the point at which an employee qualifies for all unreduced pension benefits, and is often called normal retirement age. Voluntary turnover means the worker initiates the decision to leave. Reasons for voluntary departure are numerous but distinctly different from layoffs, firings, and retirement.

INSTRUCTIONS

This survey should take no more than 10 minutes to complete.

If you’ve made a stay or go decision for more than one pension plan, pick one and stay consistent when answering the questions about voluntary turnover, incentives, and penalties. You may take this survey multiple times to account for all plans for which you've made a stay or go decision.

Amplifying information and definitions of terms are provided throughout this study and noted by a small, white circle with a question mark (?) inside of it. It is highly recommended that you click on the symbol when available and before answering a question.

DISCLOSURES AND CONSENT

This survey is anonymous and does not collect identifying information on participants. The results of the survey will be used for academic research and potential future publication.

The researchers are not certified financial planners, advisors, or managers. Nothing contained within the survey should be interpreted as financial advice.

The researchers greatly appreciate your involvement and the time taken to assist with this valuable research. By continuing to the next page you are agreeing to participate in this survey. Should you choose not to not participate, or should you choose not to complete the survey, you will not be disadvantaged in any way.

Thank you in advance!

Questionnaire

The Pull Factor: Examining the Significance of Defined Benefit Pension Plan Design (DBP) on Voluntary Employee Turnover in the US

1) Are you now working, or have you ever worked, in a US-based job where you were covered by a Defined Benefit Pension (DBP) retirement plan? A DBP plan is a retirement plan that pays an annuity to a retired worker for working a set length of time for an employer. The annuity is usually paid out from a trust fund that manages the money set aside to pay the plan's retirees. ☐ Yes ☐ No	Y1 N1	If N1, go to end of questionnaire
2) Based on your most recently celebrated birthday, which age group are you in? ☐ 16-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55-64 ☐ Over 65 3) Which option best describes you? Transgender is defined by the US Department of Labor as "an umbrella term covering anyone whose gender identity or expression does not conform to society's expectations for, or stereotypes about, people assigned a particular sex." ☐ Male ☐ Female ☐ Transgender 4) What is your race or ethnicity? ☐ American Indian or Alaska Native ☐ Asian	A1 A2 A3 A4 A5 A6 B1 B2 B3 C1 C2	

☐ Black or African American ☐ Hispanic or Latin X ☐ Native Hawaiian or Other Pacific Islander ☐ White ☐ Two or more races	C3 C4 C5 C6 C7	
5) What is your relationship status? ☐ Married, spouse present ☐ Widowed, divorced, or separated ☐ Never married	 D1 D2 D3	
6) What is the highest degree or level of school you have completed? ☐ Less than a high school diploma ☐ High school diploma ☐ Some college, no degree ☐ Bachelor's degree only ☐ Advanced degree	 E1 E2 E3 E4 E5	
7) What is your current pensionable status? ☐ Pensionable employee (i.e., currently working a job with a DBP) ☐ Former pensionable employee (i.e., no longer covered by a DBP plan) ☐ Pensionable retiree (i.e., worked to full DBP vesting; receiving or will receive an annuity) ☐ Lump-sum retiree (i.e., worked to full DBP vesting; took lump sum) ☐ Partial-pensionable retiree (i.e., partially vested; reduced annuity) ☐ Non-pensionable retiree (i.e., not vested; no annuity) ☐ Multiple categories (i.e., you worked multiple pensionable jobs with different outcomes)	 F1 F2 F3 F4 F5 F6	
8) Are you seriously contemplating, or did you ever seriously contemplate, voluntarily departing your pensionable job prior to fully vesting? Fully vesting means the point at which you qualified for all unreduced pension benefits, often called normal retirement age. Serious contemplation means you engaged in a deliberate consideration process. For example, did you consult trusted family members, peers, or mentors; conduct research on different jobs; run some financial numbers; apply for a different job; etc.? If		

you've made this decision for more than one pension plan, pick one and stay consistent when answering the following questions. ☐ Yes ☐ No	Y2 N2	If N2 Go to end of questionnaire
9) Was your DBP one of the reasons why you considered staying? Or, is it one of the reasons why you are considering staying? The outcome of your decision (stay or leave) is not the point of this question. The inclusion of your DBP as one of the reasons for staying is the point. ☐ Yes ☐ No	Y3 N3	If N3 go to end of questionnaire
10) What type of DBP plan do you, or did you, belong to when considering your voluntary departure? ☐ US Federal ☐ US state, county, or local public plan ☐ US corporate plan (single-, multi-, and multiple-employer) ☐ US Railroad Retirement System ☐ US Military (active duty, reserve, National Guard)	G1 G2 G3 G4 G5	If G1 thru G4 go to Q14 If G5 go to Q10
11) What type of military DBP plan do you, or did you, belong to when considering voluntary departure? ☐ Active duty High-36 ☐ Active duty REDUX ☐ Active duty Blended Retirement System (BRS) ☐ Reserve Retirement (all plans) ☐ National Guard (all plans)	H1 H2 H3 H4 H5	If H1 go to Q12 If H2 thru H5 go to Q13
12) Below is a list of incentives and penalties built into the Department of Defense's High-36 DBP plan. These incentives and penalties are designed to entice active duty (AD) service members (SVCMs)to stay until, or restrain them from leaving prior to the cliff-vesting point at 20 years of service (YOS). Please rank the top three (3) incentives/penalties that made you consider staying, with one (1) being most influential, two (2) being second-most influential, and three (3) being the third most influential. For this		

task, ignore the ultimate outcome of your stay or go decision; an upcoming question will capture it. Please just focus on the incentives/penalties that created the largest reasons to stay. ☐ (I) Backloaded annuity -- High-36 favors highest paid years which incentivize SVCMs to stay since pay typically peaks at career's end ☐ (I) Cost of Living Adjustment (COLA) -- High-36's COLA protects the DBP's full purchasing power against inflation ☐ (I) Disability -- SVCMs determined medically unfit for continued service with a DoD disability rating of at least 30% can earn a disabilty pension through High-36 ☐ (I) Immediate start annuity -- High-36's annuity is unaffected by age; once a SVCM reaches 20 YOS and cliff-vests into the pension, the annuity starts immediately upon retirement ☐ (I) Low-risk retirement income -- High-36 is considered an ultra-safe pension plan which will always pays out as promised ☐ (I) Noncontributory plan -- High-36 does not require SVCM contributions and is cheaper for SVCMs to participate in than other types of Federal, state, local, and corporate DBP plans ☐ (I) Other forms of postemployment benefits -- High-36 synchs access to subsidized death benefits, life insurance, and long-term care to its 20-year cliff-vesting point ☐ (I) Subsidized postemployment healthcare -- High-36 synchs cliff-vesting at 20 YOS with qualifying for subsidized healthcare, vision, and dental, as part of a larger defined benefit package ☐ (P) Lack of portability -- High-36 penalizes early leavers prior to 20 YOS because the value of the yet-to-vest DBP does not typically transfer with them; YOS in the pension system may transfer to some pensionable government jobs at the local, state, and Federal level, but not corporate jobs ☐ (I) Survivor Benefit Program -- an option that, if elected, acts like insurance by passing annuity rights to a surviving spouse or minor children if the retiree dies	J1 J2 J3 J4 J5 J6 J7 J8 J9 J10	Upon completion of Q12 go to Q23

13) If presented with a list of design elements common to many DBPs, could you pick out the ones applicable to the DBP plan for which you made the voluntary departure decision? Pension design elements include the various features, provisions, characteristics, and benefits that organizations can choose from when they create or modify their DBP plans. There is a wide variance in pension design in the US, and the almost limitless combinations of design elements to choose from makes each DBP plan unique. ☐ Yes ☐ No ☐ I don't know	Y4 N4 IDK4	If Y4, go to Q15 If N4, go to Q23 If IDK4, go to Q14
14) Below is a partial list of common DBP design elements. Now that you've seen an example, do you think you could identify the ones applicable to your DBP plan? • Social Security (SS) participation not allowed (some DBPs restrict participation in SS which penalizes leavers with no SS work history) • Backloaded annuity (annuity formulas typically favor final or highest paid years and incentivize employees to stay) • Low-risk retirement income (US Federal pensions are generally considered safe & reliable; so too are corporate and public pension funds near or above 100% funding ratios) • Immediate start annuity (annuities that start immediately upon retirement possess greater cumulative future value potential) • Noncontributory plan (DBP plans that do not require employee contributions are cheaper for employees and incentivize them to stay	Y5 N5	If Y5 go to Q15 If N5, go to Q23
15) Please select from the list below ALL the DBP design elements present in the plan for which you made a voluntary departure decision. For the purposes of this research, DBP design elements include both incentives for staying until full vesting (I) and penalties for leaving before full vesting (P). **Definitions for each element are provided below. If an important incentive or penalty built into your DBP is missing, you can add it on the next question.**		

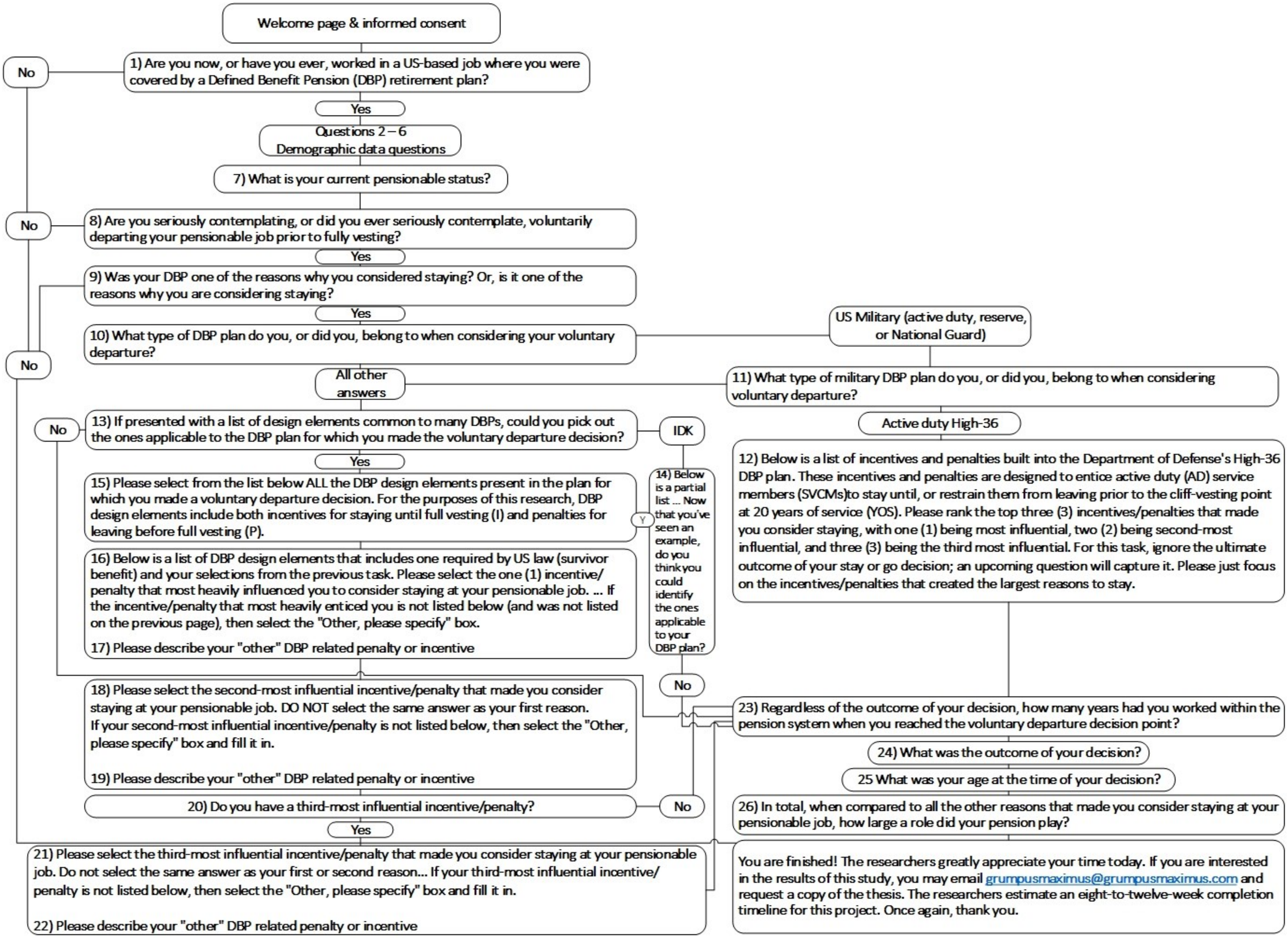
☐ (P) Lack of portability -- in most DBP plans, early leavers are penalized because the value of the yet-to-vest DBP does not transfer with them ☐ (P) Social Security (SS) participation not allowed -- some DBPs restrict participation in SS which penalizes leavers with no previous SS work history ☐ (I) Basic annuity -- all DBPs provide an annuity option; select this option if your pension's annuity lacked additional features like those below ☐ (I) Backloaded annuity -- annuity formulas typically favor final or highest paid years which incentivize employees to stay since pay typically peaks at career's end ☐ (I) Immediate start annuity -- some annuities are unaffected by age if fully vested and start immediately upon retiring from that pension system ☐ (I) Low-risk retirement income -- some pensions are considered ultra-safe like US Federal pensions as well as corporate and public pension funds at or above a 100% funding ratio ☐ (I) Noncontributory plan -- some DBP plans do not require employee contributions and are cheaper for employees to participate in them ☐ (I) Disability Insurance (DI) -- some DBPs supplement Social Security (SS) disability insurance (SSDI); plans which fully replace SS also fully replace SSDI and are often more generous ☐ (I) Cost of Living Adjustment (COLA) -- depending on its size, a COLA can protect a DBP's full or partial purchasing power against inflation ☐ (I) Lump-sum option -- some DBP plans offer a full or partial lump-sum option which workers take in lieu of a full or partial annuity ☐ (I) Subsidized postemployment healthcare -- many DBPs synch full pension vesting with qualifying for Other Post-retirement Earned Benefits (OPEBs), like healthcare, vision, and/or dental, as part of a larger defined benefit package ☐ (I) Other forms of postemployment benefits -- for example death benefits, life insurance, disability, and long-term care	I1 I2 I3 I4 I5 I6 I7 I8 I9 I10 I11 I12	
16) Below is a list of DBP design elements that includes one required by US law (survivor benefit) and your selections from the previous task.		

Please select the one (1) incentive/penalty that most heavily influenced you to consider staying at your pensionable job. For this task, ignore the ultimate outcome of your stay or go decision; an upcoming question will capture it. Please just focus on the incentive or penalty that created the largest reason to stay. If the incentive/penalty that most heavily influenced you is not listed below (and was not listed on the previous page), then select the "Other, please specify" box, and fill it in. ☐ (I) Survivor benefit -- all US based DBPs must have an option that, if elected, acts like insurance by passing annuity rights to a surviving spouse or minor children if the retiree dies ☐ Piped in selections from (I1-I12) ☐ Other 17) Please specify ☐ _____________	S1 thru S(n) O1	If O1 go to Q17
18) Please select the second-most influential incentive/penalty that made you consider staying at your pensionable job. DO NOT select the same answer as your first reason. If your second-most influential incentive/penalty is not listed below, then select the "Other, please specify" box and fill it in. ☐ (I) Survivor benefit -- all US based DBPs must have an option that, if elected, acts like insurance by passing annuity rights to a surviving spouse or minor children if the retiree dies ☐ Piped in selections from (I1-I12) ☐ Other 19) Please specify ☐ _____________	T1 thru T(n) O2	If O2 go to Q19
20) Do you have a third-most influential incentive/penalty? ☐ Yes ☐ No	Y6 N6	If Y6 go to Q21 If N6 go to Q23
21) Please select the third-most influential incentive/penalty that made you consider staying at your pensionable job. Do not select the same answer as your first or second reason.		

DO NOT choose the same answers as your first- and second-most important reasons. If your third-most influential incentive/penalty is not listed below, then select the "Other, please specify" box and fill it in. ☐ (I) Survivor benefit -- all US based DBPs must have an option that, if elected, acts like insurance by passing annuity rights to a surviving spouse or minor children if the retiree dies ☐ Piped in selections from (I1-I12) ☐ Other 22) Please specify ☐ _____________	U1 thru U(n) O3	If O3 go to Q22
23) Regardless of the outcome of your decision, how many years had you worked within the pension system when you reached the voluntary departure decision point? ☐ 0-4 ☐ 5-9 ☐ 10-14 ☐ 15-19 ☐ 20-24 ☐ Over 25	V1 V2 V3 V4 V5 V6	
24) What was the outcome of your decision? ☐ I stayed at my pensionable job or within the same pension system ☐ I left my pensionable job and the pension system ☐ I have not decided	W1 W2 W3	
25) What was your age at the time of your decision? ☐ 16-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55-64 ☐ Over 65	X1 X2 X3 X4 X5 X6	
26) In total, when compared to all the other reasons that made you consider staying at your pensionable job, how large a role did your pension play?		

☐ 25% or less ☐ 26% to 50% ☐ 51% to 75% ☐ 76% to 100%	Z1 Z2 Z3 Z4	

You are finished! Thank you. The researchers greatly appreciate your time today. If you are interested in the results of this study, you may email grumpusmaximus@grumpusmaximus.com and request a copy of the thesis. The researchers estimate an eight-to-twelve-week completion timeline for this project. Once again, thank you.



Welcome page & informed consent
1) Are you now, or have you ever, worked in a US-based job where you were covered by a Defined Benefit Pension (DBP) retirement plan?
No
Yes
Questions 2 – 6
Demographic data questions
7) What is your current pensionable status?
8) Are you seriously contemplating, or did you ever seriously contemplate, voluntarily departing your pensionable job prior to fully vesting?
No
Yes
9) Was your DBP one of the reasons why you considered staying? Or, is it one of the reasons why you are considering staying?
Yes
10) What type of DBP plan do you, or did you, belong to when considering your voluntary departure?
No
US Military (active duty, reserve, or National Guard)
All other answers
11) What type of military DBP plan do you, or did you, belong to when considering voluntary departure?
Active duty High-36
No
13) If presented with a list of design elements common to many DBPs, could you pick out the ones applicable to the DBP plan for which you made the voluntary departure decision?
IDK
Yes
15) Please select from the list below ALL the DBP design elements present in the plan for which you made a voluntary departure decision. For the purposes of this research, DBP design elements include both incentives for staying until full vesting (I) and penalties for leaving before full vesting (P).
Y
14) Below is a partial list ... Now that you've seen an example, do you think you could identify the ones applicable to your DBP plan?
12) Below is a list of incentives and penalties built into the Department of Defense's High-36 DBP plan. These incentives and penalties are designed to entice active duty (AD) service members (SVCMs)to stay until, or restrain them from leaving prior to the cliff-vesting point at 20 years of service (YOS). Please rank the top three (3) incentives/penalties that made you consider staying, with one (1) being most influential, two (2) being second-most influential, and three (3) being the third most influential. For this task, ignore the ultimate outcome of your stay or go decision; an upcoming question will capture it. Please just focus on the incentives/penalties that created the largest reasons to stay.
16) Below is a list of DBP design elements that includes one required by US law (survivor benefit) and your selections from the previous task. Please select the one (1) incentive/penalty that most heavily influenced you to consider staying at your pensionable job. ... If the incentive/penalty that most heavily enticed you is not listed below (and was not listed on the previous page), then select the "Other, please specify" box.
17) Please describe your "other" DBP related penalty or incentive
No
18) Please select the second-most influential incentive/penalty that made you consider staying at your pensionable job. DO NOT select the same answer as your first reason.
If your second-most influential incentive/penalty is not listed below, then select the "Other, please specify" box and fill it in.
19) Please describe your "other" DBP related penalty or incentive
23) Regardless of the outcome of your decision, how many years had you worked within the pension system when you reached the voluntary departure decision point?
24) What was the outcome of your decision?
25 What was your age at the time of your decision?
20) Do you have a third-most influential incentive/penalty?
No
26) In total, when compared to all the other reasons that made you consider staying at your pensionable job, how large a role did your pension play?
Yes
21) Please select the third-most influential incentive/penalty that made you consider staying at your pensionable job. Do not select the same answer as your first or second reason... If your third-most influential incentive/penalty is not listed below, then select the "Other, please specify" box and fill it in.
22) Please describe your "other" DBP related penalty or incentive
You are finished! The researchers greatly appreciate your time today. If you are interested in the results of this study, you may email grumpusmaximus@grumpusmaximus.com and request a copy of the thesis. The researchers estimate an eight-to-twelve-week completion timeline for this project. Once again, thank you.

Appendix B

Ethics Approval

Subject: Ethical Approval

Date: 9/02/20

Kia ora

I am pleased to inform you that your application for ethical approval Category B has been approved and your data collection may proceed under the conditions outlined in your ethics application.

The ethical approval number for your research project is **2020-B01**.

Please refer to this letter in the body of your thesis and attach this letter as an appendix.

Good luck with your upcoming data collection.

Atawhai nui atu,

Principal Academic, NMIT.

Appendix C

1. Chi-square Formulas

McHugh (2012) notes that the formula for Pearson's Chi-square test is (p. 145):

$$\sum \chi^2_{i\text{-}j} = \frac{(O - E)^2}{E}$$

Where:

O = Observed (the actual count of cases in each cell of the table)

E = Expected value (calculated below)

χ^2 = The cell Chi-square value

$\sum \chi^2$ = Formula instruction to sum all the cell Chi-square values

$\chi^2_{i\text{-}j}$ = *i-j* is the correct notation to represent all the cells, from the first cell (*i*) to the last cell (*j*)

McHugh (2013) also states that the expected cell counts are calculated by (p.146):

$$E = \frac{M_R \times M_C}{n}$$

Where:

E = represents the cell expected value,

M_R = represents the row marginal for that cell,

M_C = represents the column marginal for that cell, and

n = represents the total sample size.

And that cell X^2 values are obtained by (p.146):

$$\chi^2 = \frac{(O - E)^2}{E}$$

2. Table 3 Chi-Square Results:

Q8 (Contemplated VET) vs. Q2 (Current Age)

WORKSHEET 1

Tabulated Statistics: 8. Departure Y/N, 2. Age - Valid - rejects H0

Rows: 8. Departure Y/N Columns: 2. Age

	2	3	4	5	6	All
1	22	63	50	17	1	153
	17.00	51.50	50.50	27.00	7.00	
	1.4706	2.5680	0.0050	3.7037	5.1429	
2	12	40	51	37	13	153
	17.00	51.50	50.50	27.00	7.00	
	1.4706	2.5680	0.0050	3.7037	5.1429	
All	34	103	101	54	14	306

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	25.780	4	0.000
Likelihood Ratio	27.964	4	0.000

Q8 (Contemplated VET) vs. Q3 (Gender)

WORKSHEET 1

Tabulated Statistics: 8. Departure Y/N, 3. Gender - valid - rejects H0

Rows: 8. Departure Y/N   Columns: 3. Gender

	1	2	All
1	58	95	153
	71	82	
	2.380	2.061	
2	84	69	153
	71	82	
	2.380	2.061	
All	142	164	306

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	8.883	1	0.003
Likelihood Ratio	8.927	1	0.003

Table 5 Chi-Square Results:

Q26 (Size of Role) vs. Q23 (Tenure at VET)

WORKSHEET 1

N=144 Q26 (Size of Role) vs. Q23 (Tenure at VET) - Reject Null Hypothesis

Rows: 26. Influence (C, 1-2)   Columns: 23. Tenure (C; 1-2, 6-4)

	2	3	4	All
2	12	7	2	21
	8.02	5.40	7.58	
	1.9741	0.4769	4.1108	
3	17	12	8	37
	14.13	9.51	13.36	
	0.5821	0.6538	2.1511	
4	9	8	14	31
	11.84	7.97	11.19	
	0.6813	0.0002	0.7031	
5	17	10	28	55
	21.01	14.13	19.86	
	0.7643	1.2081	3.3352	
All	55	37	52	144

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	16.641	6	0.011
Likelihood Ratio	18.161	6	0.006

Q26 (Size of Role) vs. Q25 (Age at VET)

WORKSHEET 1

N=144 Q26 (Size of Role) vs. Q25 (Age at VET) - Reject Null Hypothesis

Rows: 26. Influence (C, 1-2) Columns: 25. Age @ D (C; 1-2, 6-4)

	2	3	4	All
2	13	8	0	21
	7.44	8.02	5.54	
	4.1602	0.0001	5.5417	
3	17	12	8	37
	13.10	14.13	9.76	
	1.1582	0.3216	0.3187	
4	8	12	11	31
	10.98	11.84	8.18	
	0.8084	0.0022	0.9717	
5	13	23	19	55
	19.48	21.01	14.51	
	2.1551	0.1891	1.3866	
All	51	55	38	144

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	17.013	6	0.009
Likelihood Ratio	21.876	6	0.001

Q24 (VET Outcome) vs. Q2 (Current Age)

WORKSHEET 1

N=144 Q24 (VET Outcome) vs. Q2 (Current Age)- Reject Null Hypothesis

Rows: outcome (C, 2-3) Columns: 2. Age (C; 6-4)

	2	3	4	All
1	8	40	48	96
	12.67	41.33	42.00	
	1.7193	0.0430	0.8571	
3	11	22	15	48
	6.33	20.67	21.00	
	3.4386	0.0860	1.7143	
All	19	62	63	144

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	7.858	2	0.020
Likelihood Ratio	7.646	2	0.022

Table 7 Chi-Square Results:

Hypotheses 2: Healthcare (Weighted) Vs. Q24 (VET Outcome)

CONSOLIDATED HEALTHCARE

N=87 Healthcare (Weighted) vs. Q24 (VET Outcome) Failed to Reject Null Hypothesis

Rows: Consolidated Healthcare (Weight   Columns: 24. Outcome (C; 2-3)

	1	3	All
0	14	7	21
	15.448	5.552	
	0.1358	0.3778	
1	10	2	12
	8.828	3.172	
	0.1557	0.4333	
2	19	10	29
	21.333	7.667	
	0.2552	0.7101	
3	21	4	25
	18.391	6.609	
	0.3702	1.0301	
All	64	23	87

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	3.468	3	0.325
Likelihood Ratio	3.605	3	0.307

1 cell(s) with expected counts less than 5.

Hypotheses 2: Healthcare (Y/N) Vs. Q26 (Size of Role)

CONSOLIDATED HEALTHCARE

N=87 Healthcare (Y/N) vs. Q26 (Size of Role) Failed to Reject Null Hypothesis

Rows: Healthcare Y=1/N=0 Columns: 26. Influence (C, 1-2, 4-5)

	2	3	5	All
0	4	8	9	21
	3.38	5.79	11.83	
	0.1140	0.8407	0.6760	
1	10	16	40	66
	10.62	18.21	37.17	
	0.0363	0.2675	0.2151	
All	14	24	49	87

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	2.150	2	0.341
Likelihood Ratio	2.121	2	0.346

1 cell(s) with expected counts less than 5.

Hypotheses 13: Healthcare (Y/N) Vs. Q25 (Age at VET)

CONSOLIDATED HEALTHCARE

N=87 Healthcare (Y/N) vs. Q25 (Age at VET) Rejected Null Hypothesis

Rows: Healthcare Y=1/N=0   Columns: 25. Age @ D (C; 5-3)

	2	3	All
0	14	7	21
	8.45	12.55	
	3.648	2.456	
1	21	45	66
	26.55	39.45	
	1.161	0.781	
All	35	52	87

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	8.046	1	0.005
Likelihood Ratio	7.966	1	0.005

Healthcare WH: Q24 (VET Outcome) vs. Q3 (Gender)

WORKSHEET 1

N=87 Healthcare: Q24 (VET Outcome) vs. Q3 (Gender)

Rows: C Outcome (1, 2-3)   Columns: 3. Gender

	1	2	All
1	34	30	64
	29.43	34.57	
	0.7112	0.6053	
3	6	17	23
	10.57	12.43	
	1.9791	1.6843	
All	40	47	87

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	4.980	1	0.026
Likelihood Ratio	5.169	1	0.023

Table 8 Chi-Square Results:

Hypotheses 1: Immediate Annuity (Weighted) Vs. Q24 (VET Outcome)

CONSOLIDATED IMMEDIATE ANNUITY

N=59 Immediate Annuity (Weighted) vs. Q24 (VET Outcome)

Rows: Consolidated Immediate Annuity   Columns: 24. Outcome (C; 2-3_

	1	3	All
0	20	4	24
	19.119	4.881	
	0.0406	0.1591	
1	4	2	6
	4.780	1.220	
	0.1272	0.4981	
2	8	5	13
	10.356	2.644	
	0.5360	2.0992	
3	15	1	16
	12.746	3.254	
	0.3987	1.5615	
All	47	12	59

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	5.420	3	0.143
Likelihood Ratio	5.528	3	0.137

5 cell(s) with expected counts less than 5.

Hypotheses 1: Immediate Annuity (Y/N) Vs. Q26 (Size of Role)

CONSOLIDATED IMMEDIATE ANNUITY

N=59 Immediate Annuity (Y/N) vs. Q26 (Size of Role)

Rows: Immediate count Y=1/N=0 Columns: 26. Total amount (C; 1-2. 4-3)

	2	3	5	All
0	4	8	12	24
	4.068	10.169	9.763	
	0.00113	0.46282	0.51271	
1	6	17	12	35
	5.932	14.831	14.237	
	0.00077	0.31737	0.35157	
All	10	25	24	59

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	1.646	2	0.439
Likelihood Ratio	1.654	2	0.437

1 cell(s) with expected counts less than 5.

Immediate Annuity WH: Q26 (Size of Role) vs. Q23 (Tenure at VET)

WORKSHEET 1

N=59 Immediate Annuity: Q26 (Size of Role) vs. Q23 (Tenure at VET)

Rows: 26. Total amount (C; 1-2, 4-5)   Columns: 23. Tenure at D (C;1&2-3,6-4)

	3	4	All
2	9	1	10
	6.610	3.390	
	0.864	1.685	
3	15	3	18
	11.898	6.102	
	0.809	1.577	
5	15	16	31
	20.492	10.508	
	1.472	2.870	
All	39	20	59

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	9.276	2	0.010
Likelihood Ratio	9.898	2	0.007

1 cell(s) with expected counts less than 5.

Immediate Annuity WH: Q26 (Size of Role) vs. Q25 (Age at VET)

WORKSHEET 1

N=59 Immediate Annuity: Q26 (Size of Role) vs. Q25 (Age at VET)

Rows: 26. Total amount (C; 1-2, 4-5) Columns: 25. Age at decision? (C; 5-3)

	2	3	All
2	8	2	10
	5.085	4.915	
	1.671	1.729	
3	11	7	18
	9.153	8.847	
	0.373	0.386	
5	11	20	31
	15.763	15.237	
	1.439	1.489	
All	30	29	59

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	7.087	2	0.029
Likelihood Ratio	7.385	2	0.025

1 cell(s) with expected counts less than 5.

Table 9 Chi-Square Results:

Hypotheses 7: Low-Risk Retirement Income (Weighted) Vs. Q24 (VET Outcome)

LOW-RISK CONSOLIDATED

N=78 Low-Risk Income (Weighted) vs. Q24 (VET Outcome) Failed to Reject Null

Rows: Low-Risk Consolidated (weighted   Columns: 24. Outcome (C; 2-3)

	1	3	All
0	25	6	31
	23.051	7.949	
	0.16474	0.47775	
1	6	2	8
	5.949	2.051	
	0.00044	0.00128	
2	17	4	21
	15.615	5.385	
	0.12277	0.35604	
3	10	8	18
	13.385	4.615	
	0.85588	2.48205	
All	58	20	78

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	4.461	3	0.216
Likelihood Ratio	4.165	3	0.244

2 cell(s) with expected counts less than 5.

Hypotheses 7: Low-Risk Retirement Income (Y/N) vs. Q26 (Size of Role)

LOW-RISK CONSOLIDATED

N=78 Low-Risk Income (Y/N) vs. Q26 (Size of Role) Failed to Reject Null

Rows: Low-risk count (Y=1/N=0) Columns: 26. Influence (C; 1-2)

	2	3	4	5	All
0	5	8	7	11	31
	5.167	8.346	7.154	10.333	
	0.005376	0.014357	0.003309	0.043011	
1	8	13	11	15	47
	7.833	12.654	10.846	15.667	
	0.003546	0.009469	0.002182	0.028369	
All	13	21	18	26	78

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	0.110	3	0.991
Likelihood Ratio	0.109	3	0.991

Low-Risk Income WH: Q26 (Size of Role) vs. Q23 (Tenure at VET)

LOW-RISK CONSOLIDATED

N=78 Low-Risk Income: Q26 (Size of Role) vs. Q23 (Tenure at VET) Null Hyopothesis Rejected

Rows: 26. Influence (C; 1-2) Columns: 23. Tenure at time (C; 1-2, 6-4

	2	3	4	All
2	7	5	1	13
	5.000	3.833	4.167	
	0.8000	0.3551	2.4067	
3	11	7	3	21
	8.077	6.192	6.731	
	1.0579	0.1054	2.0679	
4	3	5	10	18
	6.923	5.308	5.769	
	2.2231	0.0178	3.1026	
5	9	6	11	26
	10.000	7.667	8.333	
	0.1000	0.3623	0.8533	
All	30	23	25	78

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	13.452	6	0.036
Likelihood Ratio	14.833	6	0.022

2 cell(s) with expected counts less than 5.

Low-Risk Income WH: Q26 (Size of Role) vs. Q25 (Age at VET)

LOW-RISK CONSOLIDATED

N=78 Low-Risk Income: Q26 (Size of Role) vs. Q25 (Age at VET) Null Hyopothesis Rejected

Rows: 26. Influence (C; 1-2) Columns: 25. Age at decision (C; 6-3)

	2	3	All
2	10	3	13
	6.167	6.833	
	2.3829	2.1504	
3	13	8	21
	9.962	11.038	
	0.9268	0.8364	
4	5	13	18
	8.538	9.462	
	1.4664	1.3233	
5	9	17	26
	12.333	13.667	
	0.9009	0.8130	
All	37	41	78

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	10.800	3	0.013
Likelihood Ratio	11.158	3	0.011

Table 10 Chi-Square Results:

Hypotheses 3: Non-Portability (Y/N) Vs. Q24 (VET Outcome)

NON-PORTABILITY

N=82 Non-Portability (Y/N) vs. Q24 (VET Outcome) Fail to Reject Null

Rows: Non-port Y=1/N=0 Columns: 24. Outcome (c; 2-3)

	1	3	All
0	33	10	43
	30.94	12.06	
	0.1373	0.3522	
1	26	13	39
	28.06	10.94	
	0.1514	0.3883	
All	59	23	82

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	1.029	1	0.310
Likelihood Ratio	1.030	1	0.310

Hypotheses 3: Non-Portability (Y/N) Vs. Q26 (Size of Role)

NON-PORTABILITY

N=82 Non-Portability (Y/N) vs. Q26 (Size of Role) Fail to Reject Null

Rows: Non-port Y=1/N=0 Columns: 26. Total amount (C; 1-2)

	2	3	4	5	All
0	9	13	6	15	43
	6.817	13.110	7.341	15.732	
	0.69901	0.00092	0.24512	0.03403	
1	4	12	8	15	39
	6.183	11.890	6.659	14.268	
	0.77070	0.00101	0.27026	0.03752	
All	13	25	14	30	82

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	2.059	3	0.560
Likelihood Ratio	2.105	3	0.551

Non-Portability WH: Q26 (Size of Role) vs. Q23 (Tenure at VET)

NON-PORTABILITY

N=82 Non-Port: Q26 (Size of Role) vs. Q23 (Tenure at VET) Rejects Null Hypothesis

Rows: 26. Total amount (C; 1-2) Columns: 23. Tenure at time (C. 1-3, 6-4

	3	4	All
2	12	1	13
	8.244	4.756	
	1.7114	2.9664	
3	19	6	25
	15.854	9.146	
	0.6244	1.0823	
4	9	5	14
	8.878	5.122	
	0.0017	0.0029	
5	12	18	30
	19.024	10.976	
	2.5936	4.4956	
All	52	30	82

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	13.478	3	0.004
Likelihood Ratio	14.466	3	0.002

1 cell(s) with expected counts less than 5.

Table 11 Chi-Square Results:

Hypotheses 4: Backloaded Annuity (Y/N) Vs. Q24 (VET Outcome)

CONSOLIDATED BACKLOADED

N=94 Backloaded Annuity (Y/N) vs. Q24 (VET Outcome)

Rows: Backload count (Y=1/N=0) Columns: 24. Outcome C; 2-3)

	1	3	All
0	49	15	64
	45.62	18.38	
	0.2509	0.6226	
1	18	12	30
	21.38	8.62	
	0.5352	1.3281	
All	67	27	94

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	2.737	1	0.098
Likelihood Ratio	2.658	1	0.103

Hypotheses 4: Backloaded Annuity (Y/N) Vs. Q26 (Size of Role)

CONSOLIDATED BACKLOADED

N=94 Backloaded Annuity (Y/N) vs. Q26 (Size of Role)

Rows: Backload count (Y=1/N=0)   Columns: 26. Influence (C; 1-2)

	2	3	4	5	All
0	11	21	10	22	64
	10.89	17.70	12.26	23.15	
	0.00104	0.61439	0.41504	0.05702	
1	5	5	8	12	30
	5.11	8.30	5.74	10.85	
	0.00222	1.31069	0.88542	0.12165	
All	16	26	18	34	94

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	3.407	3	0.333
Likelihood Ratio	3.520	3	0.318

Hypotheses 13: Backloaded Annuity (Y/N) Vs. Q3 (Gender)

CONSOLIDATED BACKLOADED

N=94 Backloaded Annuity (Y/N) vs. Q3 (Gender)

Rows: Backload count (Y=1/N=0) Columns: 3. Gender

	1	2	All
0	35	29	64
	27.91	36.09	
	1.798	1.391	
1	6	24	30
	13.09	16.91	
	3.836	2.968	
All	41	53	94

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	9.993	1	0.002
Likelihood Ratio	10.592	1	0.001

Hypotheses 13: Backloaded Annuity (Y/N) Vs. Q23 (Tenure at VET)

CONSOLIDATED BACKLOADED

N=94 Backloaded Annuity (Y/N) vs. Q23 (Tenure at VET)

Rows: Backload count (Y=1/N=0)   Columns: 25. Age @ D (C, 5-3)

	2	3	All
0	34	30	64
	25.19	38.81	
	3.080	1.999	
1	3	27	30
	11.81	18.19	
	6.571	4.265	
All	37	57	94

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	15.915	1	0.000
Likelihood Ratio	18.046	1	0.000

WH Hypotheses: Q26 (Size of Role) Vs. Q23 (Tenure at VET)

CONSOLIDATED BACKLOADED

N=94 Backloaded Annuity: Q26 (Size of Role) vs. Q23 (Tenure at VET)

Rows: 26. Influence (C; 1-2) Columns: 23. Tenure @ D (C, 1-3, 6&5-4)

	3	4	All
2	15	1	16
	10.89	5.11	
	1.5479	3.3022	
3	20	6	26
	17.70	8.30	
	0.2983	0.6363	
4	11	7	18
	12.26	5.74	
	0.1286	0.2743	
5	18	16	34
	23.15	10.85	
	1.1453	2.4432	
All	64	30	94

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	9.776	3	0.021
Likelihood Ratio	11.085	3	0.011

Table 12 Chi-Square Results:

Hypotheses 5: COLA (Y/N) Vs. Q24 (VET Outcome)

COLA CONSOLIDATED

N=84 COLA (Y/N) vs. Q24 (VET Outcome)

Rows: COLA counts (Y=1/N=0)   Columns: 24. Outcome (C, 2-3)

	1	3	All
0	40	11	51
	37.64	13.36	
	0.1476	0.4160	
1	22	11	33
	24.36	8.64	
	0.2281	0.6429	
All	62	22	84

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	1.435	1	0.231
Likelihood Ratio	1.415	1	0.234

Hypotheses 5: COLA (Y/N) Vs. Q26 (Size of Role)

COLA CONSOLIDATED

N=84 COLA (Y/N) vs. Q26 (Size of Role)

Rows: COLA counts (Y=1/N=0) Columns: 26. Influence (C, 1-2)

	2	3	4	5	All
0	9	14	7	21	51
	8.500	13.964	9.714	18.821	
	0.02941	0.00009	0.75840	0.25217	
1	5	9	9	10	33
	5.500	9.036	6.286	12.179	
	0.04545	0.00014	1.17208	0.38972	
All	14	23	16	31	84

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	2.647	3	0.449
Likelihood Ratio	2.608	3	0.456

WH Hypotheses: Q24 (VET Outcome) vs. Q3 (Gender)

COLA CONSOLIDATED

N=84 COLA: Q24 (VET Outcome) vs. Q3 (Gender)

Rows: 24. Outcome (C; 2-3)   Columns: 3. Gender

	1	2	All
1	34	28	62
	29.52	32.48	
	0.6786	0.6170	
3	6	16	22
	10.48	11.52	
	1.9126	1.7387	
All	40	44	84

Cell Contents
Count
Expected count
Contribution to Chi-square

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	4.947	1	0.026
Likelihood Ratio	5.108	1	0.024

Appendix D

Chapter 4 Demographic Tables

The demographic details for all 306 respondents who screened past Q1 are below:

Question No.	Variable	Items	Frequency (Respondents)	Percentage (%)
2	Current Age	16-24	0	0%
		25-34	34	11%
		35-44	103	34%
		45-54	101	33%
		55-64	54	18%
		Above 65	14	5%
3	Gender	Male	142	46%
		Female	164	54%
4	Race and Ethnicity	American Indian or Alaska Native	0	0%
		Asian	9	3%
		Black or African American	13	4%
		Hispanic or Latin X	9	3%
		Native Hawaiian or Other Pacific Islander	1	0%
		White	259	85%
		Two or more races / ethnicities	15	5%
5	Marital Status	Married, spouse present	235	77%
		Widowed, divorced, or separated	33	11%
		Never married	38	12%
6	Education Level	Less than a high school diploma	0	0%
		High school diploma	0	0%
		Some college, no degree	22	7%
		Bachelor’s degree only	88	29%
		Advanced degree	196	64%
7	Pension status	Pensionable employee	224	73%
		Former pensionable employee	10	3%
		Pensionable retiree	50	16%
		Lump-sum retiree	4	1%
		Partial-pensionable retiree	5	2%
		Non-pensionable retiree	1	0%
		Multiple categories	12	4%

The demographic details for the 144 respondents who screened past Q8 and Q9 are below:

Question No.	Variable	Items	Frequency (Respondents)	Percentage (%)
2	Age (in years)	16-24	0	0%
		25-34	19	13%
		35-44	62	43%
		45-54	46	32%
		55-64	16	11%
		Over 65	1	1%
3	Gender	Male	56	39%
		Female	88	61%
4	Race and Ethnicity	American Indian or Alaska Native	0	0%
		Asian	4	3%
		Black or African American	3	2%
		Hispanic or Latin X	4	3%
		Native Hawaiian or Other Pacific Islander	1	1%
		White	125	87%
		Two or more races / ethnicities	7	5%
5	Marital Status	Married, spouse present	107	74%
		Widowed, divorced, or separated	15	10%
		Never married	22	15%
6	Education Level	Less than a high school diploma	0	0%
		High school diploma	0	0%
		Some college, no degree	10	7%
		Bachelor's degree only	42	29%
		Advanced degree	92	64%
7	Pension status	Pensionable employee	110	76%
		Former pensionable employee	6	4%
		Pensionable retiree	16	11%
		Lump-sum retiree	0	0%
		Partial-pensionable retiree	4	3%
		Non-pensionable retiree	1	1%
		Multiple categories	7	5%
10	Pension plan type	US Federal	21	15%
		US State, County, or Local public plan	66	46%
		US Private/Corporate plan	16	11%
		US Railroad Retirement System	1	1%
		US Military	40	28%