PERSONALITY TYPE AND LANGUAGE LEARNING STRATEGY USE BY UNIVERSITY STUDENTS: WHERE THE MBTI AND SILL INTERSECT

PERSÖNLICHKEITSTYP UND SPRACHLERNSTRATEGIEN VON UNIVERSITÄTSSTUDENTEN: AM SCHNITTPUNKT VON MBTI UND SILL

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

This thesis explores the relationship between personality type, as defined by the Myers-Briggs Type Indicator® ("MBTI®"), and the learning strategies employed by learners enrolled in undergraduate foreign language courses at the University of Waterloo. The R.L. Oxford© Strategy Inventory for Language Learning ("SILL") version 5.1, designed specifically for speakers of English learning a new language, will be used by participants to self-assess current learning strategies (Oxford, 1990). The quantitative portion of the study cross tabulates the data generated from these two electronically administered surveys in an attempt to identify clusters of personality types and learning strategies and determine if any statistically significant correlations between personality type and student learning strategies exist. This study could not prove a higher percentages of any particular type(s) tends to enrol in second language acquisition courses, nor that a corresponding or any set of preferred learning strategies are used. An exploratory research approach is taken for the qualitative portion of the study to examine the language used by participants when answering non-prompted open-ended questions. Specifically, keywords and common phrases from the responses are used to determine if they are predictive of an MBTI type preference. The language the participants used to respond to the short answer questions did not point toward any type preferences; however, a more detailed examination with larger writing samples may be warranted to confirm this finding.

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Finally, to my family and to my friends, for believing in my dreams and supporting me throughout this process and for your love, thank you from the bottom of my heart. I could not have done this without you.

Dedication

I dedicate this thesis to my husband, Weir Hugh Garvin Milne (1955-2019), who supported and encouraged me, not only in my academic pursuits, but even more to enthusiastically and fearlessly go after and live a good life.

Love you.

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List of Abbreviations

a) FFM – Five Factor Model of Personality Traits

b) H1 – Hypothesis No. 1

c) H2 – Hypothesis No. 2

d) IRT – Item Response Theory

e) L2 – second language (or any language after first)

f) LLS – Language Learning Strategy/Strategies

g) MBTI – Myers-Briggs Type Indicator

h) PCI – Preferences Clarity Index

i) S^2R – Strategic, Self-Regulation Model

j) SAT – Scholastic Aptitude Test

k) SILL – Strategic Inventory for Language Learning

l) SLA – Second Language Acquisition

m) SN – Sensing-iNtuitive (MBTI function type scale)

n) SRLL – Self-Regulated Language Learning

o) TF – Thinking-Feeling (MBTI function type scale)

p) TL – Target Language

q) UWaterloo – University of Waterloo

1. Introduction

Humankind seems imbued with a drive to discover, define, measure and ultimately understand more about our physical, mental and emotional selves, our environment, and how any one of these elements may impact on any or all of the others. Hippocrates' (c. 460 – c. 370) medical theory of the four humours (an excess or lack of blood, yellow bile, black bile and phlegm) may have been the first recorded to describe and explain different human behavior, but it was far from the last. While this particular theory has long been discarded, the drive to discover the what and why of how we are similar and different from one another in terms of personality continues unabated.

This study will use the Myers-Briggs Type Indicator® ("MBTI®") classifications for personality types, and was chosen as the personality research tool because it has a long history, it is grounded in theory, and it continues to be used worldwide by over 2 million people annually (Stein & Swan, 2019, p. 1). It has been used in studies where researchers are looking for correlations between personality types and academic study choices: for example, Kim and Han's (2014) study which looked at the relationships between MBTI types, academic performance and student satisfaction in nursing students, and the Zarafshani (2011) study which examined the relationships between personality type and the entrepreneurial intentions of Iranian university students completing a course in entrepreneurship.

My research is designed to use the MBTI as the tool to determine whether there is an over- or underrepresentation of certain personality types among students who (a) enroll in the academic study of a second/foreign language; and (b) whether certain MBTI types are more likely to use specific learning language strategies.

Language learning strategies have become a focus of foreign language learning research

over the past thirty years. One of its better-known measurement tools is the Oxford© Strategy Inventory for Language Learning ("SILL") developed by Rebecca Oxford in 1989. This research used SILL Version 5.1 which was specifically designed for speakers of English learning a new language to self-assess their current learning strategies.

My research will analyze the quantitative data and gathered from the completion of these two surveys, looking for correlations, patterns, trends and other statistically relevant information to prove the assumptions regarding the participant distribution of personality types and the strategies used as second language learners. The results from this study will be compared to other similarly conducted research to determine if previous results are replicated or refuted.

What sets this study apart from previous ones will be the inclusion of a survey which includes three open-ended questions. Using analytic induction, data from this qualitative survey will be analyzed by looking for keywords within the answers provided to see if they point to an MBTI personality type or preferred language learning skill.

If the research in this study finds statistical evidence for a skewed distribution of personality types relative to the general population engaging in university second language courses and a correlation between personality type and language learning strategies employed by the study participants, the information may be used to develop methods of future curricula delivery and inform lesson plan construction to facilitate language acquisition strategies. The use of keyword predictors for personality type or language learning strategies may provide instructors with information which will allow them to modify classroom practices to provide learning tasks which focus on student strengths and provide tasks to develop other learning skills.

The five main theoretical frameworks – trait, type, psychometric, cognitive learning and

second language learning theories – which were used to design the research study will be described in the following chapter of the thesis. In Chapter 3, I review the literature with respect to second language acquisition research which utilizes language learning strategies, in particular the SILL, followed by a survey of personality research which uses the MBTI. This chapter concludes with a review of literature from previously conducted research which has used both the SILL and the MBTI.

Following the literature review, detailed information regarding the research questions, the research design, methodology, and data introducing the population is provided in Chapter 4. The results of statistical analyses which used the SILL and the MBTI to test the hypotheses, and the keyword analysis of the qualitative data will be presented in Chapter 5.

The final chapter, *Discussion and Conclusion,* will focus on evaluating the significance of the study results, placing it into context with current research, and suggesting how it may be used in classroom practice and curricula development. Shortcomings of this study will be examined, and where possible, modifications proposed for future similar studies. Additional research questions which arise from the study design or results will be included in this chapter.

2. Theoretical Frameworks

The primary objective of this research is to advance second language acquisition instruction by searching for any discernable correlations between the personality of adult learners and the language learning strategies they use. The research draws on several theoretical frameworks which will be reviewed in this section. In all instances, I will provide an overview of the theories which build the basis for the research design, the hypothesis, the analysis and conclusions; however, not all theories for this study carry the same weight during the analysis and some subsections – 2.1 *Personality Psychology: Trait Theory,* 2.3 *Psychometric and Item Response Theories,* and 2.4 *Cognitive Learning Theory* – will only provide a simple and straightforward description of the theory for the purpose of providing background information and establishing a common vocabulary for writer and readers.

Subsections 2.2, *Jung, Type Theory, and the MBTI,* and 2.5 *Second Language Learning Theories and Strategy and Style Models*, are the most relevant theoretical schema for this investigation. To reflect their bearing on the research, these subsections are accordingly amplified in their content.

2.1 Personality Psychology: Trait Theory

Personality looks at the very complex yet personal issues of individual differences between people, including preferences, motives and predispositions, and has been the subject of informal conversation, formal research, conjecture and debate for many years. The study of personality is one of the main themes in psychology, and the subdiscipline specializing in this area known as personality psychology. There are differing theories, methodologies and models on personality psychology, including but not limited to, the psychoanalytic, behaviorist, trait and interactionist perspectives (Lundgren et al., 2017, p. 199). Within one perspective there may be

differing approaches; for example, the expression of traits may be analyzed through a biological, cognitive, social or health psychology lens. These different approaches have not made it easier to reach a consensus about what personality actually is, its function, or even how it manifests itself.

Personality has been described as the complex amalgam of an individual's unique behavioral, temperamental, emotional and mental attributes. This fusion of characteristics and functions may be conceptualized as the entire mental organization of a person's circumstances and their physically stable set of individual attributes (Kaushal & Patwardhan, 2018, p. 3). The 2020 Encyclopædia Britannica adds to this definition by referencing how personality may express itself:

> Personality embraces moods, attitudes, and opinions and is most clearly expressed in interactions with other people. It includes behavioral characteristics, both inherent and acquired, that distinguish one person from another and that can be observed in people's relations to the environment and to the social group. (Holzman, 2020)

Both definitions of personality are based upon the assumption that personality traits are pre-eminently distinguishable and distinguishing features of personality, yet neither explicitly defines or enumerates these traits.

In his 1994 work Hofstee notes that traits may be defined in either an enumerative or abstract manner. He highlights the lexical approach as the foremost example of an enumerative approach to personality trait research. To provide an historical perspective to the argument, he refers to Rümelin's 1881 Tübingen Akademische Rede: „ …wir dürfen wohl mit Recht davon ausgehen, dass das die einfachsten, der Beobachtung zuerst und am häufigsten sich ausdrängenden Begriffe sind, welche die Sprache durch ein besonders Wort auszuzeichnen ein

Bedürfnis empfindet[1]“ (Rümelin, 1890, p. 397, as quoted in Hofstee, p. 151). Every language contains a plethora of adjectives which identifies or describes a consistent pattern of behaviour societal members may manifest – words such as *honest, grumpy, brave, lazy* or *sociable (ehrlich, mürrig, mutig, faul,* oder *gesellig)*. As Rümelin noted more than one hundred years ago, these widely agreed upon adjectives seem to describe individual styles of thought, feeling, and behaviour. These attributes may be considered traits when they are displayed with some consistency over time (Matthews, 2018, p. 69). Personality theories, in particular trait theory, attempts to identify these traits and organize them into broad personality dimensions (Dörnyei, 2005, p. 11).

Early and influential twentieth century personality researchers such as Gordon Allport, Raymond Cattell and Hans Eysenck, considered by Boyle, Matthews and Saklofske (2008) to be the three founding fathers of trait psychology, each worked from the assumption that traits indicate behavioral tendencies. The debate over the past sixty-plus years, has been to determine exactly what constitutes a trait: Is a trait latent or should it be considered source or surface? Where and in what type of hierarchy should it be placed? And what is its relationship to motivation, ability and mood? The core principles of contemporary trait theory are that traits display stable quantitative dimensions, are based in genetics, have a generality of expression, and are interactive. In addition, traits are consistently exhibited and serve the individual’s adaptive and expressive goals (Boyle et al., 2008).

Gordon Allport defined a trait – or using his preferred term, *personal disposition* – as a “generalized neuropsychic (particular to the individual) with the capacity to render many stimuli functionally equivalent, and to initiate and guide consistent (equivalent) forms of adaptive and

[1] English Translation: “... we can rightly assume that these are the simplest, most observed and most common concepts, which language perceives the need to distinguish by a particular word.”

stylistic behaviour" (Allport, 1937, p. 373). Expressed differently, a trait describes the filtering of experience through the self to impose a personal structure on the world (Boyle et al., 2008, p. 2).

Allport's seminal work *Pattern and Growth in Personality* (1961) advanced his theory of personality as "psychological processes that determine a person's characteristic behaviour and thought" (Lundgren et al., 2017, p. 199). Allport was an American scientist, and when taking this lexical approach to gather and create his list of some 4500 named traits, he used American English words[2]. Allport grouped his list of traits into a three-tiered hierarchy:

1. Cardinal traits: Those traits which shape an individual's identity, emotion, attitude and long-term behaviour. They are rare and tend to develop over the years.
2. Central traits: Those traits which are present to varying degrees in all people, not as overwhelming as cardinal traits, but the basic building blocks that shape or influence yet do not determine behaviour. They are the main characteristics that describe another person.
3. Secondary traits: Those traits that are also present in all individuals, and while they can influence behaviour, are strongly dependent on immediate context. These private traits are particular to each individual and often only revealed under certain circumstances. These traits are less generalized and relevant yet must be included to provide a complete picture of human complexity.

Raymond Cattell's theory of personality streamlined Allport's list of traits to a more manageable sixteen primary factors that he posited every individual possesses to some extent:

[2] While the scope of this research does not include an analysis of personality trait, type or language learning strategy semantics, it is important to note and keep in mind that throughout this thesis, unless noted otherwise, I am using English labels for these phenomena. As Wierzbicka (1997) notes: "There is a very close link between the life of a society and the lexicon of the language spoken by it. This applies in equal measure to the outer and inner aspects of life" (p. 1). I would anticipate that similar research undertaken in another language would yield broadly similar results with nuanced, relevant and unique differences specific to that language, society and culture.

warmth, reasoning, emotional stability, dominance, liveliness, rule-consciousness, social-boldness, sensitivity, vigilance, abstractedness, privateness, apprehension, openness to change, self-reliance, perfectionism, and tension. Someone can be in the low or high range of these factors, and there are a number of attributes which can be ascribed to the primary factors.

Core to Cattell's work was psychometrics, the field of study focused on measurement of psychological qualities such as traits. (More detail on psychometrics is provided in subsection 2.3 of this chapter.) Cattell used factor analysis, a key component of psychometric theory, to identify those sixteen primary personality factors. His formulation of trait models four attributes:

1. *source traits,* a latent construct with causal force, which should be distinguishable from superficial regularities in behaviour also known as *surface traits;*
2. personality models should be hierarchical;
3. the personality sphere should be differentiated from other domains of individual differences such as ability, motivation and transient mood states; and,
4. the influence of traits on behaviour is moderated by situational factors. (Boyle et al., 2008, p. 2)

Hans Eysenck[3] proposed a theory of personality based on biological factors, arguing that individuals inherit a type of nervous system that affects their ability to learn and adapt to the environment. His initial work, also using factor analysis, led him to theorize that behaviour could be represented by two dimensions which lie on a continuum: introversion/extroversion and neuroticism/stability. He would later add a third dimension, psychoticism/normality. Eysenck's

[3] Before turning to personality research, Eysenck's work focused on intelligence research. He hypothesized that general intelligence (*g*) is underlain by speed. He created a three-dimensional model comprised of content (verbal, numerical, and spatial), mental processes (reasoning, memory, and perception) and quality (referencing the nature of the test administration) – a model which has not withstood the test of time (Boyle et al., 2016). As with his theory of personality, he argued "the biological underpinnings of intelligence depend on genetic potential expressed through developmental and neurochemical pathways" (Eysenck, 1982 and 1998 as quoted in Boyle et al, 2016, p. 42).

theory takes into account both nature (e.g., the excitation and inhibition processes of the autonomic nervous system) and nurture (the conditioning and socialization during childhood) in the development of personality (McLeod, 2017).

Using factor-analytic structures, mid-twentieth personality researchers proposed different psychometrically based trait theories with as few as two to as many as sixteen dimensions depending on which traits were considered the major superfactors and which psychological systems were considered key causal agents. (Cervone & Caprara, 2001; Matthews, 2018).

By the 1980s and 1990s, researchers arrived at a consensus on the number and nature of the factors to use to assess individual personality differences. Consensus centered on a five-dimensional trait taxonomy known as the Big Five Model or Five Factor Model "FFM" of personality which has since emerged as a standard way of modeling personalities. The five higher-order dimensions of personality traits measured are extraversion or energy, neuroticism or emotional stability, agreeableness, conscientiousness, and openness to experiences.

Components of extraversion include high activity, sociability, assertiveness, talkativeness and a tendency to experience positive emotions. Neuroticism is the extent to which individuals experience and display negative affects like anxiety, embarrassment, anger, depression, or guilt, and reflects a person's tendency to experience psychological distress. Agreeableness refers to friendly, considerate, and modest behaviour reflecting a tendency to be trusting, sympathetic and cooperative. Conscientiousness is associated with persistence, dependability, responsibility, self-discipline and a high will to achieve. Openness to experience represents the willingness for an individual to involve themselves in intellectual activities, new experiences, or artistic pursuits through curiosity and imagination (Furnham et al., 2003; Kaushal & Patwardhan, 2018).

These constructs are measured on a continuous scale that ranges between the two extremes of one particular dimension. Scores measure the degree or magnitude of the personality construct; for example, openness to experience, with a high score showing a greater degree of the attributes used to define openness to experience, and a lower score showing a subsequent lack of the attributes used to describe openness. The majority of scores tend to cluster near a common point along the scale, showing fewer scores at the extremes, and thus forming a unimodal and relatively symmetrical distribution. The FFM did not derive from any single theory of personality, but has received much empirical support to become one of the most widely used tests in personality research (Cervone & Caprara, 2001; Furnham et al., 2003; Pittenger, 2005).

Other fields of personality psychology research include those researched through the lens of complex system theories, such as psychodynamic theory, which describes the system's parts and their conflicts, or social cognitive theory which describes the system's information processing of the social world. Trait theory finds a place within complex system theory since it studies the system's dimensions of preferred activity (Mayer, 1998, p. 122). The cognitive-adaptive theory of personality starts from the premise that trait variation reflects different strategies for adapting to environmental opportunities and pressures (Matthews, 2008).

Trait theories of personality, as stand alone theories or factors within other theoretical models, represent a significant component of personality research. They have been explained in greater detail here because traits and trait theory are often confused with type theories of personality which are described more fully in the following section. Simply put, trait theories propose that a personality is composed of a number of measurable attributes which lie on a continuum (an individual has "x" amount of extraversion), while type theory emphasizes the significance of a distinct personality which can be discretely categorized (an individual is an

extravert). As traits are measured on a continuum, the majority of trait scores will tend to be normally distributed within the population. Cultural values may attribute a higher or lower score on a particular scale as being more desirable (e.g., agreeableness). Type theory characterizes people according to certain qualitatively distinctive categories without assigning value. Assessing type results as traits may lead to an incorrect attribution of a skill or can lead to an over- or undervaluation of an attribute (Quenk, 1993). The inappropriate use of type assessment instruments may lead an individual to make inferences about skill sets, relationship suitability, possible job satisfaction or behavioural choices which type theory does not support.

2.2 Jung, Type Theory and the MBTI

„Es gab zwar immer Psychologie, solange die geschichtliche Welt besteht, aber eine objektive Psychologie gibt es erst seit kurzem[4]“ (Jung, 1921b, p. 17).

Despite Jung’s assertion of an objective psychology, the resultant work in the field of psychology during the early twentieth century would, from this vantage point in time, not include the descriptive “objective.” There was no agreed upon general definition or definitive theory about psychology, and personality research was muddied even further by the competitiveness of the early theorists like Freud, Jung, and Adler, who each claimed superiority over the other’s theory. This attitude hindered the development of an overall integrated, agreed-upon framework in which to organize subsequent research (Mayer, 1998, pp. 118-9).

Freud and Jung would work together extensively following their initial correspondence in 1906, and for the next six years collaborated before going their separate ways in 1913. Subsequent to their parting, Jung founded his own “analytic” psychology and psychotherapy which differed substantially from Freud’s teachings (Boerner, 2015, p. 28). One of the points of

[4] English translation: “For all of recorded history, there has always been psychology, but only recently an objective psychology.”

contention was the interpretation each assigned to the role of libido in the development of the person. Unlike Freud, Jung did not restrict libido to the sex drive but also understood it as a "psychic energy" which he described as „die Intensität des psychischen Vorganges, sein psychologischer Wert[5]." He went on to explain his use of the term libido thusly: „Die Frage, ob es eine spezifische, psychische Kraft gibt oder nicht, hat mit dem Begriff der L. nichts zu tun. Ich gebrauche den Ausdruck L. öfters promiscuë mit ‚Energie'[6]" (Jung, 1921b, p. 645). In his theory of type, Jung would use the term libido as a synonym for psychic energy.

Theories and studies in personality concern themselves with the traits, moods, and characteristics human beings share and the points at which they differ between individuals. Jung, who described his work as „ … eine deductive Darstellung empirisch gewonnener Einsichten[7]" (Jung, 1921b, p. 9), assumed that people share the same basic psychological equipment of perception and an ability to respond to perceived stimulus, but where people differ is in how they use that psychological equipment (Blutner & Hochnadel, 2010, p. 245).

Jung conceptualized three dichotomous dimensions to personality: **E**xtraversion-**I**ntroversion, **S**ensing-i**N**tuition, and **T**hinking-**F**eeling. The first dimension pair he labeled attitude-types, the latter two as function-types (Jung, 1921a, p. 337). Each preference in a pair is constructed according its own unique measure, separate and distinct from the content of the preference on the opposite pole. Therefore, unlike the measurement systems found in many trait theories, opposite preferences in Jungian type theory are not described as a lack or a deficit of the opposite preference (Myers et al., 1998, p. 5).

[5] English translation: "The intensity of the psychological process; its psychological value."
[6] English translation: "The question of whether there is a specific psychological force or not has nothing to do with the concept of libido. I often use the expression libido interchangeably with 'energy'."
[7] English translation: "… the result of a deductive presentation of empirically gained insights."

Jung defined attitude as "a readiness of the psyche to act or react in a certain way … having an attitude is synonymous with an a priori orientation to a definite thing" (Jung, 1921a, p. 414). On the attitude-type dichotomy **E**xtraversion-**I**ntroversion, Extraversion is an outward-turning of libido, "a positive movement of subjective interest towards the object" (Jung, 1921a, p. 427); introversion is the inward-turning of libido, "a negative relation of subject to object … the subject is the prime motivating factor and that the object is of secondary importance" (Jung, 1921a, p. 452).

Jung's work on the Extraversion-Introversion dimension can be found in numerous other theories, like Hans Eysenck's and the Five Factor Model described more fully in Section 2.1 *Personality Psychology: Trait Theory* of this thesis. It is worth nothing that some theories ascribe different names to the attributes of extraversion and introversion such as 'sociability' or 'surgency.' The words themselves are often misunderstood as referring to behaviours that may be seen or described as gregariousness or shyness. While there is frequently a correlation between these behaviours and types, it is important to remember that the behaviour description is not the meaning being ascribed to extraverts or introverts within type theory or this thesis. For type theory, extraversion-introversion is thought of in terms of psychic energy. Extroverts tend to prefer the external world of things, events, people and activities. They are energized by being out in the world. Introverts prefer the internal world of their own thoughts, feelings, fantasies and dreams, and become energized by withdrawing into their inner world and being quietly reflexive (Blutner & Hochnadel, 2010, p. 245).

Jung noted that grouping people into only these two types did not provide a complete picture of what he observed:

"What struck me now was the undeniable fact while people may be classed as introverts

> or extraverts, this does not account for the tremendous differences between individuals in either class. So great, indeed, are these differences that I was forced to doubt whether I had observed correctly in the first place. It took nearly ten years of observation and comparison to clear up this doubt." (Jung, 1921a, p. 521)

Jung's ten years of observation led to his theorizing the existence of four functions, where a function is "a particular form of psychic activity that remains the same in principle under varying conditions" (Jung, 1921a, p. 436).

> Ich unterscheide vier Funktionen, nämlich *Empfindung, Denken, Gefühl* und *Intuition.* Der Empfindungsvorgang stellt im wesentlichen fest, dass etwas ist, das Denken, was es bedeutet, das Gefühl, was es wert ist, und Intuition ist vermuten und Ahnen über das Woher und das Wohin[8]. (Jung, 1936, p. 270 as quoted in Blutner & Hochnadel, 2010, p. 245)

According to Jung we all have these psychological functions or processes; we just have them in different proportions. The four functions direct conscious mental activity/energy toward a different goal. Each person will also have a function they draw on most often and with the greatest confidence. This function is labelled as the superior or dominant function. It has the largest share of the available psychic energy under its control, with each of the other functions in their hierarchy (auxiliary, tertiary and inferior functions) having proportionately less energy available that the individual can control and direct (Blutner & Hochnadel, 2010; Myers et al., 1998).

[8] English translation as per Blutner (2010): "I distinguish four functions, namely *sensation*, *thinking*, *feeling,* and *intuition. Sensation* tells us that something exists; *thinking* tells us what it is; *feeling* tells us what its significance is for us; and *intuition* tells us where it comes from and where it is going."

Jung identifies the **S**ensing-i**N**tuition as perceiving functions which are the two processes by which we gather information. A perceiving function is concerned with the direct receiving of information without filter or evaluation. He identified this pair of functions as *irrational* by which he meant that they attend to the flow of events and operate principally and most broadly without constraint by rational direction. Sensing refers to perceptions observable by way of the senses. Individuals oriented toward Sensing tend to focus on the immediate experiences available to their five senses. Intuition involves discovering possibilities which might not be immediately obvious from sensory data. Individuals oriented toward Intuition tend to focus on possibility, patterns and the abstract (Furnham et al., 2003; Myers et al., 1998).

The judging functions, **T**hinking-**F**eeling, describe the manner in which we come to conclusions about what we perceive. Jung identified these as the *rational* functions because they are personally directed. Thinking and Feeling judgements act as constraints or limit the free flow of the sensations or intuitions received by the two irrational perceiving functions. Thinking involves the logical analysis of information in terms of the strict principles of cause and effect. It tends to be objective and impersonal in the application of reason to a decision, relying on impartiality and neutrality. Feeling involves identifying the emotional value that is attached to objects, events or people. Decisions are weighed on the relative values and merits of the issues. It is a more subjective decision making process than thinking (Furnham et al., 2003; Myers et al., 1998).

The addition of the four function types to the initial two attitude types led to Jung's specification of the following eight types in *Psychological Types* (1921/1971).

Figure 1 Jung's Eight Types

Attitudes with Dominant Irrational (Perceiving) Functions	Attitudes with Dominant Rational (Judging) Functions
• Extraverts with dominant sensing	• Extraverts with dominant thinking
• Introverts with dominant sensing	• Introverts with dominant thinking
• Extraverts with dominant intuition	• Extraverts with dominant feeling
• Introverts with dominant intuition	• Introverts with dominant thinking

Myers et al. (1998), provides the following, expanded table as a synopsis to demonstrate how the function types (sensing-intuition and thinking-feeling) are expressed through the two attitude types (extraversion-introversion).

Figure 2 Myers-Briggs Expanded Eight Jungian

Table 3.1 The Eight Jungian Functions

Dominant Extraverted Sensing	Directing energy outwardly and acquiring information by focusing on a detailed, accurate accumulation of sensory data in the present
Dominant Introverted Sensing	Directing energy inwardly and storing the facts and details of both external reality and internal thoughts and experiences
Dominant Extraverted Intuition	Directing energy outwardly to scan for new ideas, interesting patterns, and future possibilities
Dominant Introverted Intuition	Directing energy inwardly to focus on unconscious images, connections, and patterns that create inner vision and insight
Dominant Extraverted Thinking	Seeking logical order to the external environment by applying clarity, goal-directedness, and decisive action
Dominant Introverted Thinking	Seeking accuracy and order in internal thoughts through reflecting on and developing a logical system for understanding
Dominant Extraverted Feeling	Seeking harmony through organizing and structuring the environment to meet people's needs and their own values
Dominant Introverted Feeling	Seeking intensely meaningful and complex inner harmony through sensitivity to their own and others' inner values and outer behavior

Taken from *MBTI® Manual: A Guide to the Development and Use of the Myers-Briggs Type Indicator® Instrument,* Third Edition, Myers et al., 1998, p. 23

Further to this dominant function, every type has an "auxiliary function which is in every respect different from the nature of the primary function" (Jung, 1921a, p. 406). According to

Jung, if the superior function is rational, the secondary function must be irrational and vice versa. The eight basic types can be further refined into sixteen psychological types depending on what is considered the secondary function (Blutner & Hochnadel, 2010, p. 246-247). The Myers-Briggs Type Indicator® (MBTI), developed by Katharine Cook Briggs and her daughter, Isabel Briggs Myers, is likely the best known system that makes use of the sixteen types.

Katharine Briggs observed that some people habitually use the rational or judgment functions in their interactions with the world. Others habitually interact with the outer world using the perceiving or irrational functions. Her work, in conjunction with Jung's implied but incomplete discussion of this area, formed the basis for the final dichotomous pair used by the MBTI: **J**udging-**P**erceiving (Myers et al., 1998, p. 26). Judging and perceiving are the two processes by which we act upon information we have gathered; perceiving is concerned with directly receiving information without evaluation and judging is concerned with organizing and processing information (Furnham et al., 2003, p. 578). The **J**udging-**P**erceiving dichotomy describes the orientation to the outer or extraverted world for every type. In the Judging attitude, a person is concerned with making decisions, seeking closure, planning operations, or organizing activies. In the Perceiving attitude, a person is attuned to incoming information with an aim to keep receiving information as long as possible (Myers et al., 1998, p. 26-27).

The four dichotomous poles of the MBTI allow it to be grouped into sixteen four letters types where the first letter indicates the preference for the extraverted (E) or introverted (I) attitude of energy; the second letter indicates the preference for sensing (S) or intuitive (N) perception; the third letter indicates the preference for thinking (T) or feeling (F) judgment; and, the fourth letter indicates a preference for a judging (J) or perceiving (P) attitude toward the outer, extraverted world (Myers et al., 1998, p. 30).

Type is a qualitative characterization of a person, whereas trait, explained earlier in Subsection 2.1 of this chapter, is more of a quantitative representation of a behavioral tendency. For example, within type theory, introverts and extraverts are grouped into one of two distinctly different categories of people. According to trait theories however, introversion and extraversion are part of a continuous dimension, with many people clustered in the middle. “Type is discrete, while trait is continuous” (Kaushal & Patwardhan, 2018, p. 5).

According to Myers (1988), Jung’s type theory may be further differentiated from trait theories in that it suggests the *why* of behaviour may be found in the different ways individuals prefer to gather information and make decisions. “Perception involves all the ways of becoming aware of things, people, happenings, or ideas. Judgement involves all the ways of coming to conclusions about what has been perceived. If people differ systematically in what they perceive and in how they reach conclusions, then it is only reasonable for them to differ correspondingly in their interests, reactions, values, motivations, and skills” (p. 3).

Theories provide principles and a perspective from which to investigate and explain observable phenomena. They may define complex situations, circumstances or phenomena and then set limits on how supporting data is gathered, used or judged. Statistical evaluation of data, regardless of theory, gives researchers a basic and common means of measuring results within and between studies.

2.3 Psychometric and Item Response Theories

A quantitative approach to research involves gathering data, constructing models from the information collected so that researchers and readers can explore the data in new and relevant ways, and discovering patterns and making insights which may not be seen by simply looking at raw data (Tolmie et al., 2011, p. 4). One goal of quantitative analysis and research is to take the

subjective and transform it into objective, measurable data.

To standardize and measure personality differences, personality psychology began quantifying individual traits such as preferences, motives and predispositions. This move to develop a quantitative rational science through the use of psychological measurements was given the name psychometrics (Jones & Thissen, 2007, p. 1). “Psychometrics is the branch of psychology that deals with the design, administration, and interpretation of quantitative tests or instruments for the measurement of psychological variables such as intelligence, attitudes and personality traits” (Krabbe, 2017a, p. 106).

To collect psychological data, instruments such as self-report questionnaires or subjective reports are created to sample the aspect of the individual’s psyche the researcher wishes to study (e.g., skill, ability, personality trait or personality type). Psychometrics provides a quantitative basis for understanding the network of relationships between the various measured instrument constructs (Boyle et al., 2008, p. 9).

Item Response Theory (IRT) was first proposed in the field of psychometrics for purposes of ability assessment. It is not really a theory but a collection of measurement models which examine how item responses in an instrument are related to the underlying construct in the individual (latent trait) that is presumed to produce those responses. It is used to calibrate and evaluate items in tests, assessment instruments and questionnaires, with its most common application in designing tests in traditional “ability-based” domains (e.g., achievement, intelligence, aptitude). For example, it is used for such major education tests as the scholastic

aptitude test (SAT)[9]. IRT can be calculated for a single item or for the whole test (An & Yung, 2014; Krabbe, 2017; Myers et al., 1998).

At its most fundamental level, a psychometric measurement system takes a subjective quality from a set of people and maps it onto a system of numbers so that the structural characteristics of numbers may be used to reflect or represent analogous characteristics of people (Ramsay, 2001, p. 12417). This objective representation of subjective data may then be analyzed through various statistical measures.

This thesis will use the subjective data gathered through a questionnaire which asks participants to report on strategies they use to learn a second language. Learning may take place through direct or indirect methods, from accessing visual or auditory information, through social interaction, reflection, or repetition of physical or mental tasks. This study will use the questionnaire results which relate specifically to mental processing, i.e., cognitive elements of learning used by the participants.

2.4 Cognitive Learning Theory

Cognition refers to thinking and includes all conscious and unconscious mental systems an individual uses to accumulate (perceive) and process (judge) knowledge including interpreting sensory input, memory, reasoning, decision making and language learning. It is a mental state of knowing which is distinguishable from an emotional experience ("Cognition," 2017)[10].

[9] The University of California has recently suspended testing requirements for the next two years and will omit test scores from in-state applications in 2023 and 2024. The university will study whether to adopt a new admission test by 2025 (Anderson, 2020).

[10] This is a contested assertion, as recent research "indicates that emotions involve all functions studied in relation to cognition, namely, attention, perception, learning, reasoning, memory, and so on" (Sun & Mathews, 2012, p. 109). However, as Oxford sorts language learning strategies into six strategies which includes specifically "affective strategies," this thesis will work with an assumption of a more definitive distinction between the "mental state of knowing" and the "emotional experience."

Cognitive learning is about using thinking to learn. Thus, cognitive learning theories focus on learning which occurs in the mental and psychological processes of the mind; that is, how knowledge is acquired, constructed, processed, represented, subsequently remembered, and used. It is not concerned with behaviour (Taylor & Hamdy, 2013; Kay & Kibble, 2016). Cognitive skills permit a more abstract, rule-oriented approach to learning (McLaughlin, 1978, p. 138).

Cognitive Learning theory maintains that skills become automatic or routinized only *after* analytical processes; that is, subsequent to a constant and continuing restructuring and integration of knowledge through various repeated phases. Learners are active agents in the learning process, and each learner comes to the learning experience with different levels of prior knowledge, skills, and motivation that influence learning outcomes. As the learner develops increasing degrees of mastery, s/he engages in a constant process of restructuring to combine new structures with those previously learned. Cognitive learning challenges a previous schema which is then readjusted to fit the new information (Kay & Kibble, 2016; Schulz, 1991; Van Vuuren et al., 2019).

Within cognitive learning theory, language production is regarded as the active operation and practice of constructing and expressing meaning (O′Malley & Chamot, 1990, p. 37).

2.5 Second Language Learning Theories and Strategy and Style Models

Second language acquisition (SLA) refers to the learning or acquisition of a new or additional language. Some researchers break the study of a non-native language into two distinct categories: “second language,” which are the languages to which a learner has access within their broader culture (e.g., learning English in Quebec), and “foreign language,” that is a language not used as an official medium within a given country (e.g., English in Paraguay). The term SLA is

often used to connote both language learning, defined as the conscious knowledge and instruction of language rules, and language acquisition, which occurs in a more spontaneous manner and on a more subconscious level. SLA may be used to signify any language acquired after the first language, whether it is the second or any additional language (Oxford, 1990, p. 4; Miao, 2015, p. 360). Within this thesis, the term L2 (second language) learning is used in reference to any additional language being learned after the first language or languages, whether it is a second or foreign language; and the term TL (target language) refers to the language being learned.

The field of SLA is constantly evolving. In her article, Kramsch (2000) highlights the ambiguities around the term "SLA" by reviewing definitions provided by three separate US university SLA programs. The answers range from SLA as "an internally driven, individual phenomenon that is largely independent of the context in which it takes place" to research that "focuses, in addition, on the nature of the learning environments – schools, classrooms, and curricula" to the third which distinguishes SLA research from L2 teaching methodology and first language acquisition research" (p. 314). SLA research today is conducted in areas as diverse as how language learners develop grammatical and pragmatic competencies, how they learn to speak and read languages in natural and instructional settings, and how learners change as they acquire an additional language (Celik, 2015, p. 112). In *Research Methods in Second Language Acquisition* (2012), Mackey & Gass have assembled articles on the range of SLA data currently being collected and studied including learner corpora, formal theory-based methodologies, instructed second language acquisition, the design and analysis of survey research, and the collection and analysis of qualitative date. SLA is an interdisciplinary study which may draw upon and in turn inform studies and theories in fields such as linguistics, psychology,

psycholinguistics, sociolinguistics, discourse analysis, conversational analysis and education (Gass, 1993, p. 102).

Oxford's *Language and Learning Strategies* (1990) text reflects the SLA field of the day. It was then a relatively new field in which the theories attempted to explain "well-attested empirical findings about relationships between process and production in interlanguage development[11] and universals, and variance in learners and learning environments" (Long, 1990, p. 649). Oxford (1990) posited that LLS contribute to all aspects of the language learning-language acquisition continuum (wherein learning is the conscious knowledge derived from formal instruction and acquisition refers to a learner's unconscious and spontaneous development of language) in particular through focusing on the *processes* by which learning occurs (pp. 4-5). The LLS instrument Oxford developed, and which is described in detail further on in this chapter, was based on this narrower conception of language learning.

Henning Wode (1988) identified five general categories into which language acquisition theories can be assigned: "1) those attempting a behavioristic explanation, emphasizing the role of conditioning; 2) those attempting an interactionist explanation, emphasizing communicative/social need, purpose, and setting; 3) those attempting a cognitive explanation, emphasizing logical, intellectual processes; 4) those attempting a nativist or biological explanation, emphasizing inborn, genetic abilities; and 5) those emphasizing the learner and learning strategies" (Schulz, 1991, p. 18). This thesis will be concerning itself primarily with categories 3 and 5 of Wode's list: cognitive learning and learning strategies.

[11] These SLA assumptions have since been attacked. For further information, see for example the articles which make up the "Firth and Wagner Debate:" Firth and Wagner (1997, 1998), Hall (1997), Kasper (1997), Liddicoat (1997), Long (1997), Poulisse (1997), Rampton (1997), and Gass (1998).

Within cognitive theory, learning strategies are those complex cognitive skills that follow the same general rules as other forms of procedural knowledge. Procedural knowledge has the capacity to transform declarative knowledge so that it is reorganized, summarized, or represented and linked to new information in memory (O′Malley & Chamot, 1990, p. 216).

The cognitive theory of language learning thus considers the mental processes which, through systemic practice of various skills such as focusing on selected aspects of new information, analyzing and monitoring information during acquisition, organizing or elaborating on new information during the coding process or evaluating the learning when it is completed, lead to the mechanical integration and "natural" use of linguistic patterns. A cyclical development of language is posited within this theory. As the learner develops mastery of a task, s/he is continuing to integrate new information onto the existing structure of knowledge, permitting continuing refinement and closer approximation to the TL (O′Malley & Chamot, 1990, p. 37; Schulz, 1991, p. 18).

The term *strategy* implies conscious movement toward a goal in which learners take steps to manage their learning to achieve those goals (Hsiao & Oxford, 2002, p. 369). "While folk wisdom tells us that practice makes perfect, it may not be the quantity of practice but the *kind* of practice that enhances acquisition" (Schulz, 1991, p. 23). The kind of practice a student might choose to use in an effort to enhance their language acquisition may be considered a language learning strategy (LLS).

LLS became a significant aspect of SLA studies in the mid-1970s and marked a shift in researchers' interest away from the teacher and teaching methods towards the learner and learning behaviours. LLS are developed and modeled on the idea that a number of the

differences in learner success rates can be attributed to the various strategic approaches they bring to the table. (Dmitrenko, 2017, p. 7; Griffiths & Parr, 2001, p. 249).

At its simplest, an LLS is a strategy related to learning or using the language being learned. Oxford defined LLS as "specific actions taken by the learner to make learning easier, faster, more enjoyable, more self-directed, more effective, and more transferrable to new situations" (Oxford, 1990a, p. 8). While other similar yet distinct definitions of LLS exist, this thesis will be working with Oxford's definition. The common features found within LLS are summarized by Oxford as:

1. Contribute to the main goal, communicative competence.
2. Allow learners to become more self-directed.
3. Expand the role of teachers.
4. Are problem-oriented.
5. Are specific actions taken by the learner.
6. Involve many aspects of the learner, not just the cognitive.
7. Support learning both directly and indirectly.
8. Are not always observable.
9. Are often conscious.
10. Can be taught.
11. Are flexible.
12. Are influenced by a variety of factors (Oxford, 1990, p. 9).

Oxford divided LLS into two major classes: direct and indirect. The direct strategies, those which require mental processing of the TL include memory, cognitive and compensation strategies. The indirect strategies, which support and manage language learning without directly

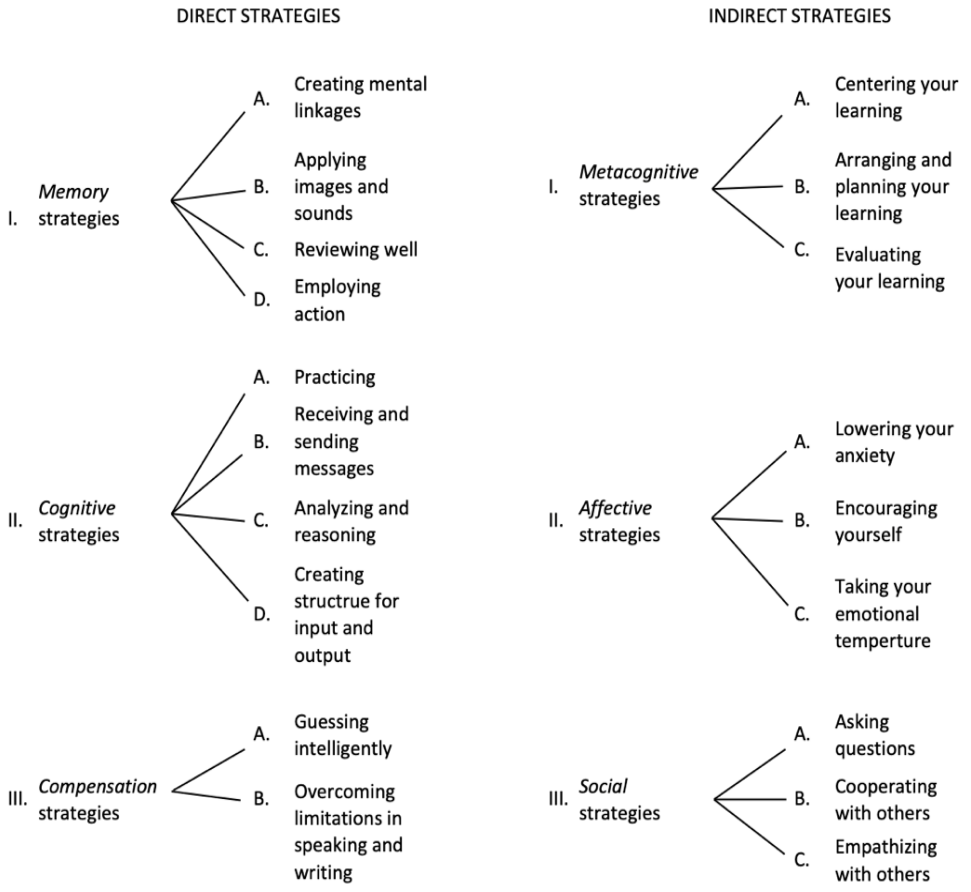
involving the TL are metacognitive, affective and social strategies. Each strategy group, whether direct or indirect, supports each of the others (Oxford, 1990).

Memory strategies help learners link one TL item or concept with another while cognitive strategies enable the learner to manipulate the language material in direct ways, e.g., through reasoning, note-taking, and synthesizing. Compensation strategies help make up for missing knowledge.

Of the indirect strategies, metacognitive strategies are used to manage the learning process overall; affective strategies help learners manage their emotions and motivation level; and, social strategies enable the learner to learn via interaction with others and understand the target culture. A learning strategy is in itself neither good nor bad, rather it is neutral until placed within a student's learning context. Where the strategy relates well to the TL task at hand, where it fits the student's learning style preferences, is used effectively, and is linked with other strategies, it may be considered useful or "good" (Ehrman et al., 2003, pp. 315–317). Learning strategies reflect the conscious effort a student makes to learn the TL, and is the element of choice which gives the strategy significance in the language learning process (Šafranj & Gojkov-Rajić, 2019, p. 692).

The following diagram illustrates Oxford's taxonomy of learning strategies, showing the two classes and the six groups mentioned above, and the nineteen sets of strategies which flow from them. The Oxford Strategy Inventory for Language Learning (SILL) questionnaire, explained in greater detail in Chapter 4.3 *Study Design*, is based upon these classifications.

Figure 3 Oxford Taxonomy of Learning Strategies



Taken from *Language Learning Strategies: What Every Teacher Should Know.* Oxford, 1990, p. 17.

Similar to LLS, self-regulated language learning (SRLL) strategies refer to the strategies that help language learners take active roles in their learning and assist them to becoming autonomous learners. In most SRLL models, the common four categories are cognitive, affective, social and metacognitive. Oxford's (2011) Strategic, Self-Regulation Model (S^2R) also classifies four categories: cognitive, affective, sociocultural-interactional, and metastrategies, where the latter is an overarching category that interacts with the other three (Seker, 2016, p. 2). Comparisons between the LLS and S^2R models will be discussed in greater detail in the Literature Review on the SILL Sub-Section 3.1.2 *Theoretical Underpinning and Model Shifts.*

Wharton (2000) has listed a number of factors which are assumed to affect language learning strategies. The list includes such items as cultural background, the language being studied, age, motivation and language learning styles. “Just as personality provides order and predictability in the life-span story of an individual through the choices and decisions the person makes among the many alternatives available (Datan et al., 1987; Wheelis, 1973), so learning style variables serve as a way to organize choices among the wide range of affective responses and learning strategies available to an individual” (M. Ehrman, 1990, p. 421). Thus it is no surprise that SLA research also looks at the typology of learning styles and has developed a number of different models and instruments to describe a learner’s style preference (Psaltou-Joycey & Kantaridou, 2011, p. 103).

Learning style is the term used to refer to the preferred way(s) in which an individual approaches a learning situation, and for the purposes of this thesis is specific to acquiring a language. It is “an overall pattern that provides broad direction to learning and makes the same instructional method beloved by some students and hated by others” (Oxford, 2003a, p. 273). Oxford bases her use of the term ‘language learning style’ on what Lawrence (1984) considers the four aspects of the learner: “(1) cognitive style, i.e., preferred or habitual patterns of mental functioning; (2) patterns of attitudes and interests that affect what an individual will pay most attention to in a learning situation; (3) a tendency to seek situations compatible with one’s own learning patterns; and (4) a tendency to use certain learning strategies and avoid others” (Oxford, 1990b, p. 439).

Learning styles are general approaches to learning. Style differences can be evidenced in different ways. The sensory style dimensions refer to an individual being a visual, auditory or hands-on learner. Cognitive style dimensions include: concrete-sequential versus abstract-

intuitive (creative, speculative, non-sequential), global (big picture) versus particular (detail oriented, focused); analyzing (performing logical analysis and contrast tasks) versus synthesizing (assembling material in an integrative fashion); impulsive versus reflective; closure-oriented (wanting clarity, organization, and rapid decisions) vs wanting to keep options open (tolerant of ambiguity, not concerned about deadlines). The social style dimensions of learning are extroversion or introversion (Andrew D. Cohen, 2003, p. 279; Oxford, 2003b, p. 273). While students may stretch beyond their learning style boundaries to use any given strategy, their learning style often determines their preferred choice of learning strategies (M. Ehrman & Oxford, 1988, p. 180).

LLS, learning styles and the cognitive learning approach comprise only a portion of SLA studies. LLS and learning styles, being more models than theories, were developed with a more universal and learner-based focus. Therefore, elements of LLS and learning styles are often found within other theories, research studies, methodologies and approaches. These elements may factor in such other SLA theories as the social cultural theory (Lantolf, 2000) which includes research in how language is used as social practice in conversation; systemic-functional linguistic theory (Halliday, 1979) which focuses on the development of TL grammar for meaning making in context; and language socialization theory (Kramsch, 2002) which studies the constructs relevant to learners' engagement in particular contexts (Chapelle, 2009, p. 747).

Larson-Freeman (1997) demonstrated that language has all the characteristics of dynamic complex systems. "It is dynamic and changes over time both synchronically and diachronically; it is complex with different subsystems (syntactical, phonological, lexical, textual) that interact; it develops nonlinearly and sometimes is unpredictable and chaotic; it is sensitive to initial conditions, open, self-organizing, feedback-sensitive, and adaptive; and there are attractors in

development." This Dynamic Systems Theory approach shows the interrelatedness of the social and individual cognitive dimensions of language learning (De Bot, 2008, p. 171).

2.6 Summary

A theory is a set of statements about natural phenomena that should be able to account for and explain observed phenomena, and make predictions about what will or will not occur. A theory will also unify the observations of researchers whose studies are conducted within its framework. Theories provide a way in which researchers can advance science, and in turn advances in science will advance theories. The goals in using the theoretical frameworks described in this chapter are to (a) provide restrictions and direction in how to conduct the research (psychometric, IRT and cognitive learning theories), (b) understand the broader contexts of psychological and personality research (personality psychology, trait, and Jungian theory), and (c) advance research (SLA theories).

3. An Overview of the SILL and the MBTI in Academic Research

The research for this thesis examines the intersection between two popular human behaviour measurement tools and the efficacy of relying on the statistical correlations of such an intersection. The SILL was designed specifically in relation to second language acquisition; and while the MBTI casts a wider net regarding the uses of type in education, the Myers-Briggs Foundation explicitly names and promotes foreign language learning as an area in which understanding type can be of use to instructors. The span of time since the inception of the SILL and the MBTI, their ease to administer, and the continued wide-spread popularity of both instruments in addition to opening up them up to misuse, misrepresentation and misinformation regarding the interpretation of assessment results, has provided researchers with tools that can provide useful insights in well-conducted research. Both of these factors, whether considered "positive" or "negative," have resulted in a great deal of literature on each tool individually and where they were combined in research on SLA or second language teaching.

3.1 The SILL

"[T]here are in fact three elements of foreign language education to consider: classroom practice, theoretical models and empirical investigations, all of which are interrelated" (Byram et al., 2013, p. 252). Using these three elements, I will be reviewing how the SILL was developed, examining its theoretical strengths and weaknesses, delving into empirical investigations on the instrument itself, and exploring research which used the SILL.

3.1.1 Classroom Practice and Theoretical Models

Research in this field started with observations and analyses of the strategies used by good language learners, the categorization of these strategies and training learners in their use (Huang, 2018, p. 647). Oxford's seminal text *Language Learning Strategies* (1990) was written

not as a theoretical text, but to provide a taxonomy of these strategies and put forward a systematic classroom practice for instructors of second languages to assist language learners to learn more effectively. Her text provides a model of the strategies language learners can use, how to determine which strategies are being used, how these strategies can be enhanced, and how learners may be instructed to develop and strengthen those strategies not currently being fully utilized. The text is primarily written to provide instructors with ideas and methods they can use to assist their students "become more active, self-directed, and effective learners" (Oxford, 1990a, p. x). While she provides definitions and categorizes those elements which she has determined constitute direct or indirect learning strategies based on the dichotomous idea of learning strategies conceptualized by Rubin (1981) and Dansereau's (1985) none second language yet synchronous general learning concepts of content-independent versus content-dependent strategies (Hsiao & Oxford, 2002, p. 370), it would be inappropriate to read Oxford's *Language Learning Strategies* as a theoretical text. What Oxford presents us with is a taxonomic model of language learning strategies she has compiled, demonstrates how they are interrelated, and provides practical information on how they may tested for and assessed by learners and taught by instructors.

Oxford (1990) and Rubin (1981) are not the only researchers who offer a language learning strategies model. A number of other taxonomies exist including the other well-researched and oft-used model proposed by researchers O'Malley and Chamot (1990). Their model distinguishes three broad types of learning strategies, namely metacognitive, cognitive and socioaffective, placing emphasis on the interaction between teacher and student and on the development of metacognitive strategies (Ehrman et al., 2003; Hsiao & Oxford, 2002). In their study, Hsiao and Oxford (2002, p. 377) concluded there was statistical support for classifying

second language strategies in a systematic manner, including those proposed by O'Malley and Chamot (1990) and Oxford (1990).

If we consider one of the most important goals of foreign language teaching to be the acquisition of communicative competence, a term proposed by Hymes (1979) to describe a person's ability to communicate in an appropriate manner (as quoted in García-Carbonell et al., 2001, p. 484), then "it can be said that all appropriate language learning strategies are directed towards this broadly set goal" (Šafranj & Gojkov-Rajić, 2019, p. 693). Taxonomies were developed through observing the learning strategies of "good language learners," that is, those who are willing and accurate guessers, have a strong drive to communicate, are willing to make mistakes, look for patterns and monitor their own speech among other attributes (Rubin, 1975). These good/successful language learners were found to generally use not only more learning strategies consciously but those better suited for the particular task, and by effectively combining strategies, they became more self-directed in their learning, thus being able to improve their performance (Ehrman & Oxford, 1988, 1990; Oxford, 1993).

A concurrent 1990 study by Vann & Abraham looked at the LLS of unsuccessful learners by linking strategies with task demands rather than merely counting the frequency with which strategies are used. Their closer analysis of two unsuccessful learners provided evidence that they were also active cognitive strategy-users, while often failing to apply strategies appropriately to the task at hand, which suggested they were missing or not appropriately using metacognitive strategies.

Griffiths and Parr (2001), provide a brief overview of various language learning and teaching theories and point out how LLS operates comfortably alongside or fits within most of them. "Learning from errors, developed from interlanguage theory, involves cognitive and

metacognitive strategies. Compensation and social strategies can easily be assimilated into communicative competence theory and the communicative language-teaching approach" are two among a number of their examples (p. 249).

With respect to classroom practice, an LLS model which prompts both learners and instructors to consider the applicability of identified strategies, whether they are being used and how learners may incorporate them more effectively into their studies, can be very useful. Good language learners use any number of strategies to acquire a deep and proficient understanding of the TL, with no single set of strategies appropriate to all learners equally (Fazeli, 2011, p. 1313).

From an academic perspective, the categorization of strategies is but one of eight controversies identified by Griffiths & Oxford (2014, pp. 1–4) which have provoked debate and criticism of LLS research, with the others being: strategy definitions, theoretical underpinnings, language learning context, correlation between strategy use and proficiency, teachability and learnability of strategies, research methodology, and data analysis (Dmitrenko, 2017, p. 8). While each of these issues have relevance, are of interest and are interrelated, further examination of LLS literature will be limited to its theoretical underpinnings.

3.1.2 Theoretical Underpinning and Model Shifts

The development of language teaching approaches has been characterized by fast changes, trends and fads (Celce-Murcia, 2001 as found in Wu, 2016, p. 348), and the idea of learning strategies immediately appealed to researchers and was enthusiastically embraced by language teachers. However, no serious examination of the theoretical soundness of the concept was conducted at the time or in the subsequent two decades following the publication of books on the subject by O'Malley and Chamot (1990), Oxford (1990) and Wenden (1991).

In their early critique of language learning strategies, Dörnyei and Skehen (2003) labeled not only the definitions but also the concepts offered thus far in the literature as "rather inconsistent and elusive" (p. 608). They point out that in those early years, with learning strategies such an exciting topic of study and quantitative research that included learning strategies as either a dependent or independent variable producing interesting results, the lack of a solid theoretical underpinning was tolerated. They argued that LLS research to the early 2000s was often conducted in a "theoretical muddle" that would eventually be cleared away by researchers restructuring the existing knowledge (Dörnyei & Skehan, 2003, p. 610).[12]

Cohen (2003), among others, differentiated between language *learning* strategies – the "conscious or semi-conscious thoughts and behaviors used by learners with the explicit goal of improving their knowledge and understanding of a [TL]" – and language *use* strategies – those which "come into play once the language material is already accessible" (p. 280). He is critical of those target-language studies which take a broad pass at describing strategies and which then arrive at broad conclusions about large numbers of subjects. Despite his concern, he does conclude this study by noting it is valuable to have learners investigate their own language learning and strategy use preferences, and that a good place to start is by having instructors administer inventories such as the SILL and then provide guidance and follow-up regarding the reported results.

The 2000s saw a shift within SLA research away from LLS toward self-regulated learning (SRLL) which focuses on the degree to which learners consciously and proactively contribute to the enhancement of their own learning. As active participants, learners set their own

[12] For those who would like to read more about developing teaching practices from theory, see Wu, (2016) in which he explores the pedagogical implications of applying Hegel's language learning concepts of intersubjectivity, the primacy of the spoken word over the written form, and the importance of the training of form or grammar to second language teaching.

learning goals and then attempt to monitor, regulate and control their cognition, motivations, behaviours, learning environments and emotions to achieve them. This multidimensional construct incorporates cognitive, metacognitive, motivational, behavioral and environmental processes leading to a more dynamic concept than language learning strategies (Dörnyei & Skehan, 2003; Habók & Magyar, 2018; Hsiao & Oxford, 2002; Hwang & Lee, 2019; Rose et al., 2018). In short, SRLL skills may be defined as the fundamental capabilities that second language learners must possess in order to manage an effective TL learning environment and be an independent learner; and that learners who deeply and actively engage in SRLL's recursive phase of goal setting, monitoring, control and reflection, can enjoy their own learning (Hwang & Lee, 2019, p. 545).

3.1.3 Empirical Investigations of the SILL

Over the past twenty years, a variety of assessment tools have been developed to measure LLS, the most widely accepted and widespread tool being the SILL (Habók & Magyar, 2018, p. 2). The SILL focuses on specific strategic behaviours with scale descriptors asking for frequency of strategy use. The psychometric characteristics of the SILL have been criticized as inaccurate and unreliable because it uses standard Likert-type scales (Dörnyei, 2005; Amerstorfer, 2018; Habók & Magyar, 2018). Likert scales produce ordinal data. Therefore arithmetical manipulations, such as calculating the mean and standard deviation, and other parametric tests are inappropriate, meaning non-parametric tests should be employed (Jamieson, 2004, p. 1217). Parametric statistics rely on data having a normal distribution; that is, the data's probability curve is bell-shaped with the distributions symmetric around their mean. This requirement for a normal distribution to conduct parametric statistical analysis can be difficult to verify for small

sample sizes. Nonparametric statistics do not depend on the data having a normal distribution (Larson-Hall, 2015).

There is a shift to improve the reporting and analysis of studies within the field of language learning that use statistical analysis. For example, Lindstromberg (2016) surveyed all issues of *Language Teaching Research* from the first issue of 1997 to 2015 and reported on how authors used and reported their data, and then offered criticism and suggestions for improvement. In this article, Lindstromberg advocated for the use of nonparametric tests, particularly on small sample sizes, and a move away from reporting a statistical difference on a simple "yes/no" parametric test to using more robust statistical analysis tools which, for example, provide information on the likely size of the effect. Lindstromberg noted that "the survey did come across a small number of recent studies featuring use of such approaches" (p. 763).

An element of unreliability arises from the degree to which student self-reporting can be relied upon to be an accurate reflection of actual use, since terms such as "often" or "frequently" can be rated very differently between respondents (Gu et al., 1995, as cited in Griffiths & Oxford, 2014, p. 4). Put simply, intervals between values on a Likert scale cannot be presumed equal.

While data from questionnaire research can provide insight when patterns emerge, differences or similarities among groups are uncovered, or relationships among variables are ascertained, studies do not often go beyond this pattern finding or relationship mapping. Care must be taken to ensure that the questionnaire, as a research tool, actually draws out the information that it was designed to elicit (P. Y. Gu, 2016).

Each SILL item focuses specifically on one more-or-less corresponding LLS, making the items noncumulative and rendering the SILL scoring of arithmetic averages of little statistical or

psychometric use. As behavioural items, a linear relationship between individual item scores and the total scale scores cannot be assumed; “for example, one can be a good memory strategy user in general while scoring low on some of the items in the memory scale” (Tseng et al., 2006, p. 83).

SILL scores on frequency of use – looking at quantity of strategy use rather than quality. This can produce misleading results. Poor learners may use a number of strategies frequently but ineffectively. On the other hand, learners progressing well through their language learning journey, having acquired a broader knowledge base and deeper understanding of the TL, may report a lower frequency of LLS use such as for items “asking others to correct pronunciation” or “previewing the language lesson.”

A significant portion of this study was designed to provide empirical data using the SILL. Therefore, the implications of using a Likert scale instrument will be taken into account during data analysis (e.g., using nonparametric tests) and when drawing conclusions.

3.1.4 SILL use in SLA research

In her study which examined the continued relevance of SILL use in SLA research, Amerstorfer (2018) noted that Oxford has “encouraged researchers and teachers to adapt the SILL for their contexts by adding, omitting, or revising items.” Amerstorfer provided a number of examples, including a study by Ardasheva & Tretter (2013) who adapted the SILL to accommodate elementary, middle and high school learners of ESL in the USA, and a 2006 study by Vandergrift which was adjusted to focus specifically on metacognitive strategies. My further review of research using SILL found that Dmitrenko's (2017) study used participant interview results to classify the strategies reported most used into the six SILL categories, and then took the most prominent to create a new strategy questionnaire for multilingual learners, the

Multilingual SILL or M-SILL. Hwang & Lee (2019), in their work to develop a Scale of Self-Regulated Language Learning, used the SILL as one of the questionnaires to ensure that developed items were closely relevant to the target latent constructs they wanted to measure.

The continued use of the SILL as the questionnaire of choice in ongoing second language learning research and the adaptation of the SILL in numerous other studies suggests that the basic premise of modelling LLS remains an area of interest to SLA researchers. This study has not been developed to exclusively examine just one strategy or to adapt its use to a specific group and will therefore use the SILL questionnaire as originally crafted.

3.2 The MBTI

Where else to begin a literature review of the MBTI than in the official MBTI® Manual itself (Myers et al., 1998). The publication is extensive and includes information on Jung's theory of type, the fleshing out of the **J**udging-**P**erceiving dichotomy by Briggs and Briggs-Myers based on what Jung implied about a fourth type dimension in his writing, development of the various questionnaires, questionnaire reliability and validity, and possible uses for the MBTI.

3.2.1 Reliability and Validity

Reliability of an instrument or questionnaire answers the question of whether the item performs consistently over time. Reliability should estimate internal consistency and replicability over a protected period of time while taking into account an acceptable level of variance that researchers would expect to see given the uniqueness of respondents. Rather than a property of the instrument, reliability is based on the results obtained on an evaluation. Therefore, it is most appropriate to speak of reliability as a factor of test scores or measurement rather than of the instrument itself (Gronlund & Linn, 1990, as quoted in Capraro & Capraro, 2002, p. 591).

The MBTI® Manual reports on the measurement precision of the internal consistency reliability estimates for the MBTI using split-half reliability testing and coefficient alpha, test-retest reliability estimates, and item response theory. Using split-half reliability testing on a U.S. national sample of 3,036 participants, the correlation coefficient *r* for each of the four dichotomies Extraversion-Introversion (EI), Sensing-iNtuitive (SN), Thinking-Feeling (TF), and Judging-Perceiving (JP) produced scores ranging from .89 to .94 which fall within the excellent reliability category where *r* = .80 or above (Myers et al., 1998, pp. 160–161).

The internal consistency of the four MBTI scales was estimated using coefficient alpha, an index of the consistency of responses made by a particular group at a particular time to a specific set of items designed to measure a psychological construct. Reports from the MBTI® Manual show that whether looking at gender, age, adults within specific ethnic groups, or college students within certain ethnic groups, reliability measured between *r* = .82 and *r* = .95, again placing it within the excellent reliability category (Myers et al., 1998, p. 161).

IRT was used to estimate measurement precision by calculating the amount of information available from each item that can be used to discriminate people of opposite preferences and showed a greater level of precision for Form M than for the previous MBTI instrument Form G against which it was measured (Myers et al., 1998, p. 165ff).

The test-retest for Form M (the instrument used for this thesis) showed an agreement across the scales from a low of 84% in the TF scale to a high of 96% in the other three scales, where the standard for assessing reliability as "excellent" is *r* = .80 (or 80%). The chance probability of an individual choosing all four preferences on a retest is 6.25% (Myers et al., 1998, pp. 162–164).

Capraro & Capraro (2002) conducted a meta-analytic reliability generalization study on articles written between 1998 to September 2001 about the MBTI. Of the 210 articles utilized in the study, only 7% reported at least one reliability estimate for the data on hand, 26% reported reliability from prior studies or the test manual and 11% made a generic statement the MBTI was reliable without providing any evidence. The remaining number of authors, 56%, did not mention reliability at all. Vacha-Haase et al. (2000, p. 512) have given the name *reliability induction* to the practice of referencing reliability coefficients from prior studies as relevant and applicable to presume the score integrity of new study data.

While the Capraro & Capraro (2002) study concluded that the administrations of the MBTI examined yielded scores with acceptable reliability (an average of about .81), the most relevant reliability estimate for a study is the reliability coefficient computed on the data in hand. Salter et al. (2005) begin their study by noting that a number of earlier test-retest reliability studies are "somewhat mixed," and suggest this may be due to a lack of recognition that the MBTI includes two types of information which can be examined psychometrically – the four letter type and the Clarity Preferences Index (CPI), a numerical score included on the assessment reports and explained in greater detail in Section 3.2.2 *Type v Trait* – and that most test-retest studies generally used only two data points (i.e., the sample population is only tested twice within a certain time period) with "unsophisticated analytical strategies" (p. 208). For their study, Salter et al. conducted a longitudinal configural frequency analysis across three administrations of the MBTI in order to test if the measurement of innate personality dispositions is stable (e.g., scoring as an extravert over all three occasions was significantly overrepresented.) They also tested for antitypes of stability and types of change, which are fluctuating patterns in the personality preferences as measured by the MBTI, neither of which configuration should be

found if the theory holds true (p. 210). What Salter et al. (2005) found is that all eight stable patterns show high statistically significant types of stability. Further, when looking for the antitype of change, the three unstable patterns for Sensing, Thinking, and Perceiving were statistically underrepresented, providing a second tier of preference stability (p. 213).

Concurrently in 2005, Pittenger published his critique of the MBTI, citing several test-retest reports that suggest the reliability of the instrument decreases at a rate over retest intervals comparable to other (trait) measures of personality. He concluded that the test-retest, therefore, does not meet expectations developed from Jung's theory that predicts "nonpathological personality preferences should become and remain stable early in life" (2005, p. 214).

Pittenger (2005) also posited that the theory predicted between-group heterogeneity of variance and the within-group homogeneity of variance implied a bimodal distribution of scores. He did not find the bimodal distributions expected. Stein and Swan (2019) go on to note that the most recent MBTI version applies IRT, in effect making it more difficult to get scores at the midpoint of each dimensional score, in effect forcing a more bimodal distribution.

According to Myers et al. (1998), validity for the MBTI is determined by its ability to demonstrate relationships and outcomes as predicted by Carl Jung's theory of psychological types. If Jung's theory describes preferences that do exist, and if the MBTI instrument adequately indicates those preferences, then surface behaviours should occur in the directions predicted by the theory within reasonable levels of variance to account for things such as measurement error, respondent emotional state or environment context which may interfere with expression of type preferences. The MBTI® Manual examines evidence of the validity of the four preference scales by correlating them to a variety of scales from other instruments (such as the FIRO-B®, the Adjective Check List, Strong Interest Inventory® Tool, Salience Inventory, and

Maslach Burnout Inventory among others). These analyses support the predictions of type theory regarding the meaning of and the behaviours believed to be associated with the four dichotomies. A number of studies looking at very specific personality aspects are also included in the MBTI® Manual; for example, a reanalysis of a study of orientation to time which supports the predicted differences in the experience and use of time for the different types (Myers et al., 1998, pp. 171–219).

The Stein & Swan (2019) study is highly critical of the MBTI instrument. They have written their evaluative article to "increase academic awareness of this incredibly popular idea and provide a novel teaching reference for its conceptual flaws" (p. 1). Using Shaw & Costanzo's (1982) three criteria, Stein & Swan find that the MBTI theory falters on rigorous theoretical criteria in that it (1) lacks agreement with known data and facts, (2) does not posses internal consistency and (3) lacks testability (the ability to generate empirical predictions). They argue that despite its popularity, the MBTI does not represent a suitable framework for understanding personality, and note that it is not sold based on its theoretical rigor but on its ability to help its users, a concept which is also fraught with theoretical issues, questions regarding the usefulness of "inaccurate feedback" and other internal inconsistencies. Recognizing the appeal of the MBTI-style theory and that attacking it on theoretical or psychometric grounds may have little effect, Stein and Swan conclude "[a] challenge for academics is to get others to share their valuation of the scientific process in creating knowledge about human behaviour" (p. 9).

Quantifying differences in personality remains fraught with issues around empirical reliability and theoretical validity. While Stein and Swan make a compelling argument against the use of the MBTI, this study was designed to utilize this instrument because of its continued use over a long period of time, familiarity within the general population, its user-friendly online

format, its use of dichotomous categorizations for statistical analysis purposes, and because results obtained from this research can be compared to the results from earlier, similar studies.

3.2.2 Type v Trait

The MBTI is a personality inventory rather than a test of skills or abilities. Jung believed that psychological type reflects a person's innate tendencies and disposition and that this type grows and develops over the course of a lifetime (Jung, 1921a). Conceptually, the letters (e.g., ESNP: Extraversion, Sensing, iNtuition, Perceiving) capture an individual's basic personality dimensions. Due to the misinterpretation of the Clarity Preferences Index (CPI), a numerical score included on the assessment reports, there are times the MBTI is mistaken for a personality trait measure rather than a measure of dynamic typology (Myers et al., 1998; Salter et al., 2005).

Unlike numerical scores on trait instruments that are designed to reflect the degree or magnitude of the trait being measured (Pittenger, 2005, p. 212), the PCI is designed to show only how sure the respondent is that she or he prefers one pole of the dichotomy over its opposite. PCI scores are determined for each preference from a differential between the frequencies of endorsements for one side versus the other of the dichotomy. Thus, the number associated with an MBTI preference is better interpreted as providing information about the likelihood that the preference has been correctly reported. It is incorrect to assume that a person with a PCI of N30 has a better command of iNtuition than a person with N15. A larger number simply means that the respondent, when forced to choose, is clearer about what he or she prefers. The PCI was designed to be an indication of the MBTI's capacity to measure one's personality at the point in time that the instrument is given. As a result, PCIs might be anticipated to fluctuate over time based on environmental influences (Myers et al., 1998; Salter et al., 2005).

The type-trait distinction leads to quite different meanings for the scores of trait instruments and MBTI PCIs. For example, a person with a high score on the *Extraversion* scale of the *NEO Personality Inventory*™ (NEO-PI™), a tool based upon the FFM (Costa & McCrae, 1985), is seen as having more Extraversion than a person with a low score on that scale, and a person with a low score on the scale may be viewed as having a deficit of the identified personality trait of Extraversion. In contrast, MBTI PCIs indicate how clearly a respondent prefers one of two opposite poles of a dichotomy, not how much of that pole she or he has. MBTI sorts individuals into opposite categories rather than measuring the amount or degree of a trait as is done in trait-based instruments (Myers et al., 1998).

"Attention should be given to the fact that having a personality trait, which may be organically based, is a notion that is different from how that trait is expressed, which relies on experience and development" (Salter et al., 2005, p. 218). In their work on Whole Trait Theory and the FFM, Fleeson & Jayawickreme (2015) put it this way, "[T]rait theory has described the *what* but few theories have attempted to explain the *why* or *how*" (p. 83).

As noted above, Salter raised the point that the expression of personality, which arises from experience and development and is therefore more in line with concepts found in trait theory, may be based in biology which is conceptually more in line with type theory; in other words, positioning some personality research into the nurture/nature debate.

Furnham et al. (2003) designed their study specifically to examine the relationship between the Revised NEO-Personality Inventory which measures the FFM and the MBTI. Results demonstrated an overlap between the two personality measures, with the greatest correlation[13] measured between the FFM Extraversion scale and the MBTI Extraversion-

[13] Correlations were measured using Bayesian probabilities which Blutner & Hochnadel (2010) contend is methodologically unsound for Jungian theory. Alternatively, they proposed a mathematical framework of modern

Introversion dimension. Openness to experience (FFM scale) was negatively correlated with Sensing and positively correlated with iNtuition. Agreeableness (FFM scale) was negatively correlated with Thinking and positively correlated with Feeling. Conscientiousness (FFM scale) was positively correlated with Judging and negatively corelated with Perceiving. Of interest is that Neuroticism (FFM scale) was negatively correlated with MBTI extraversion and positively correlated with Introversion "although this correlation was not very high in comparison to the other correlations" (Furnham et al., 2003, p. 583). This study, using a large sample (900 participants) replicated the results from earlier studies conducted by McCrae & Costa (1989), MacDonald et al. (1994) and Furnham (1996).

The next section of this literature review will focus on how the MBTI is used with respect to research on learning behaviours.

3.2.3 Practice

According to the MBTI® Manual: "The goal of making psychological type useful in people's lives is realized in [the next] chapters … The emphasis … is on what is practical and useful, backed up by theoretical consistency and available research evidence" (Myers et al., 1998, p. 221). The text looks at using type in counseling and psychotherapy, in education, in career counseling, in organizations, and in multicultural settings.

Where the MBTI is used with respect to language learning, it is often used as the variable denoting learning style. "Learning reflects a change in the learner's behavior based on what is experienced … [The] learning style of the student can be understood by observing the person's behaviour … MBTI provides a way to deduct a student's learning style" (Vincent & Ross, 1996

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quantum theory which dynamically relates states and observables, concluding that "quantum theory, as a mathematical construction, provides a natural framework for giving a sound foundation to C.G. Jung's theory of personality" (p. 257).

as quoted in Ayadi et al., 2006). Ayadi et al. looked at correlations between MBTI learning style and university student performance on open-ended and multiple choice test questions of 244 students in finance and management science. They found that intuitive and thinking students did not do well on an open-ended quantitative test; and intuitive, sensory and thinking students performed poorly on an opened-ended theory test. In the multiple choice quantitative test, intuitive students performed poorly, exactly the opposite result for the multiple choice theory test where intuitive students performed well, but the feeling, sensory and thinking students did not. From their results, they concluded that students' performance, as measured by test grades, can be influenced by the test format (p. 91).

Seeking to uncover different learning behaviours, Hwu (2007) used computer-assisted language learning to record 34 fifth-semester Spanish learner's behaviours with a grammar application. Different behaviours were uncovered with a significant positive correlation between the sequence in which computer pages for the specific grammar lessons were accessed, and the Sensing personality dimension. Sensing and Intuitive students differed in the way they preferred to receive and assimilate new information within the study's computerized learning context. Of note is that different learning behaviours were not related to knowledge gains.

Steele and Young conducted two similar studies (2008, 2011) using the MBTI as a stand-alone measurement tool comparing type differences first between two university majors and secondly between two similar professional careers. The first study compared music education and music therapy majors, the second compared professional music educators and music therapists to undergraduate majors. The results of the 2008 study found that the MBTI for both music education and music therapy majors indicate an overall preference for Extravert-iNtuition-Feeling-Perception (ENFP), which supported three earlier named studies. The second highest

preference of music education majors and music therapy majors, while displaying an overlap in type, began to diverge (ENFJ, INFP and INFJ). The researchers concluded that the results indicated more similarities, all are iNtuitive Feelers, than differences between these two groups, with music therapy students demonstrating more preferences for introversion. The second Steel and Young study (2011) also suggested that personality tendencies between the two groups, music educators and music therapy professionals, are similar in many respects. In particular when comparing their results to the 2008 study, they found the same divergence between the extraversion-introversion for music therapy professionals, and the same strong NFP combination for both groups. They found that when combined, the studies lend support to Jung's type theory notation of consistency in personality type over life span.

In a study examining student performance at a University of Toronto hands-on, project-based engineering design course, Emami et al. (2019) used the MBTI tool as the variable to explore potential correlations with performance to personality type. What they found was that certain MBTI types are "reasonably good indicators for performance in the course due to the natural inclinations that students with those indicators possess," and that "the interplay between specific indicators … were shown to be beneficial for certain types of assessments" (p. 30). They suggest that this type of analysis may help educators create assessment schemes less biased to specific learning styles and personality types.

MBTI has also been used as a tool to examine teaching styles. Bell et al., (2011) wondered whether it was possible that people with differing preferences related more to the way in which something was said rather than to what was said and whether this "mismatch" of personality types could promote misunderstanding between instructor and learner (p. 191). Aggregate data for 154 teachers and 1395 first-year medical students at the Indiana University

School of Medicine was analyzed based on the MBTI, and the relationship examined between teacher or learner and preference using Chi-square tests of independence. Their results suggested that while student satisfaction is influenced by a congruence between personality styles of teachers and learners, other factors such as a student's level of interest in the course content, career motivation and the learning environment could not be ruled out. They concluded, however, that given teachers traditionally received poor student evaluations from those learners where they differed on the Sensing/Intuition, Thinking/Feeling and Judging/Perceiving scales, "careful attention should be given to the manner in which instruction and feedback are delivered to avoid misunderstandings that can occur because of incongruence between personality styles" (p. 192).

3.3 Studies using both MBTI and SILL

A tendency toward quantitative psychological studies, exemplified by statistical reporting about styles, strategies, anxiety, beliefs and academic performance using surveys, tests and other measurement instruments, dominated much of the SLA and applied linguistics research in the 1990s and 2000s. This tradition focused on the characteristics of groups, without looking closely at the highly personalized, dynamic, socially interactive relationships among people engaged in second language learning. Ehrman & Oxford's (1988) pilot MBTI-SILL study, detailed below, falls squarely into this tradition. The value of this form of research is that it reveals the big picture perspective across large numbers of individuals and variables simultaneously. The drawback is that the finely tuned, detailed analysis of individual cases is typically missing (Oxford, 2003a, pp. 275–276).

Ehrman & Oxford's (1988) study examined LLS in relation to sex differences, career choice, cognitive style, and aspects of personality. For purposes of their study, cognitive style

and personality variables were treated together as psychological type using the MBTI classifications. Their sample was made up of 79 adult language learners that Ehrman & Oxford identified as "relatively sophisticated." The study used the 121-item SILL developed for the Defense Language Institute and a five-point Likert scale covering four language skill areas: listening, reading, speaking, and writing.

When looking at differences by psychological type, the Ehrman & Oxford (1988) study found that extraverts significantly prefer visual strategies and report greater use of affective strategies than introverts. Introverts tended to look for meaning and context before acting. "The most striking result is the statistically significant connection between intuition and strategies for searching for and communicating meaning, affective strategies, authentic language use, and formal model building" (p. 261). Sensing had no significant relationship with any of the SILL factors which the researchers attributed to either (a) sensing students being exceptionally good classroom language learners or (b) that they were using strategies not reported on the SILL. There were no significant findings regarding their hypothesized relationship between SILL factors and the Thinking/Feeling scale. Finally, Judgers showed a significant preference for general study strategies while Perceivers showed a significant preference when searching for and communicating meaning. This exploratory study flung the door wide open for SLA studies using both the MBTI and SILL.

For their study conducted with 364 senior high school students in Taiwan studying English, Chen & Hung (2012) used the MBTI and the Perceptual Learning Preferences Survey, a self-report survey using a three-point Likert scale to measure participant's perceptual style preferences, and the SILL as their variables. Their results corroborated the Ehrman and Oxford (1989) study which found that intuitive types chose compensation over other strategies.

However, unlike the Ehrman and Oxford (1989) study, Chen & Hung's results indicated that extroverted students used compensation, metacognitive, cognitive memory, affective, and social strategies more than their introverted counterparts, and they did not find that sensing types reported frequent use of memory strategies. The researchers postulated the inconsistency may stem from a difference in cultural backgrounds between their and the Ehrman and Oxford study participants.

Starting from the premise that general intelligence (as measured by IQ tests) may predict what a person can do, Sharp (2008) set out to determine whether personality type might predict what a person is likely to do (p. 18). The study was conducted with 100 undergraduates at a university in Hong Kong to investigate personality differences and strategy use (using MBTI and SILL), and to identify any relationships between those variables and the students' language proficiency. Using the MBTI as the dependent variable and strategy use as the independent variable, the only significant relationships found were with respect to those identified by the MBTI as introverts. Introversion was negatively related to the SILL social strategies and positively related to metacognitive strategy use. There was no significant relationship found between SILL categories and proficiency (assessed with a standardized English language test.) "The study failed to find any simple direct relationship between personality, learning strategies and second language proficiency" (p. 20). Sharp speculates one reason this study could not establish a relationship between the variables is that, as a test for personality preference, the MBTI does not include factors such as student maturity, motivation or situation factors. These factors are also mentioned in the Carrell et al. (1996) study which presents results of a study looking for correlations between personality types of English as foreign language students in Indonesia and academic performance. Other than some significant scoring differences between

Extraverts and Introverts, their study also failed to establish more than a few direct relationships between learners' type preference and language performance.

Wakamoto (2000) used both the MBTI and SILL instruments when looking for differences in LLS between extraverted and introverted junior college students in Japan majoring in English. The MBTI Japanese trial version Form G and the Japanese translation of the 50 item SILL devised for speakers of other languages learning English were used. Using factor analysis, Wakamoto broke the SILL into six factors and used Pearson's correlation method to find a relationship between them and the extraversion-introversion indices in the MBTI. Two of the six factors, "functional practice strategies," in which the focus of practice is on actual language use, and "social-affective strategies," which mediate the relationship between people, were found to have a positive significant correlation with extraversion. Unlike the Ehrman & Oxford (1990) study, Wakamoto could not confirm any preferred LLS in terms of factors or individual strategies for introverts and wonders if the data collection method, specifically limited to the use of self-report questionnaires, may have affected the results.

A large number of studies, including the ones noted above, find connections between extraversion and/or introversion and LLS, particularly in the affective and social categories. In contrast, this study will use the MBTI NS and TF scales as to identify and analyze correlations between each scale and the three direct SILL and metacognitive strategy categories which fall within the cognitive learning theory framework.

4. Research Questions, Design and Data

This research project was designed to gather quantitative personality type (MBTI) and language learning strategy use (SILL) data from university students enrolled in second language classes in order to determine relationships between these two data sets. Where such connections are found, they will be examined for statistically significant correlations. The study will also use responses from the open-ended questions to determine whether language used by the participants predicts personality type or language learning strategy preferences. The research is conducted for the purpose of providing potential instruction and curricular design information to instructors of university and adult second language courses.

Taking into account learner personality type, specifically with respect to the gathering and processing of information, would permit instructors to craft instruction delivery, in-class and homework activities, and assessment tools which take into account all preference types, thereby giving each student an opportunity to complete tasks which come more easily to them and giving space for them to stretch their learning skills. Understanding connections between personality types and language learning strategies will also provide instructors with insight into which strategies are taken up by learners in a manner that seems more intuitive, as opposed to those which may require more explicit instruction and prompting to encourage students to broaden their use of study tools. If language use provides instructors with cues to second language learner cognitive learning preferences, then ongoing classroom instruction may be moderated and modulated more pragmatically.

In the following sections of this chapter, both quantitative study hypotheses and the qualitative research questions will be fully stated. Information regarding the biographical and qualitative questionnaire development and instrument tool selection processes, website

development and study flow, participant recruitment and feedback will be outlined. Examples of each questionnaire will be provided, with appendices providing additional information on each section of the research, screenshot captures of the website and reporting criteria.

The final section of this chapter will provide biographical information on the participants, tables of raw data results for the MBTI and SILL, and examples of the qualitative data gathered.

4.1 Hypotheses

This study was designed to test the following two hypotheses:

Hypothesis 1 (H1)

There is a statistically significant variation between the MBTI personality type distribution of the general population in English Canada and second language learners enrolled in undergraduate Indo-European language courses at the University of Waterloo.

Hypothesis 2 (H2).

There is a correlation between personality types as determined by the MBTI Indicator and language learning strategies as defined and categorized by the SILL, Version 5.1.

4.2 Qualitative Data Research Questions

Participants were asked several open-ended questions, with very little in the way of instruction or researcher prompt as to how they were to be answered. Looking for keywords within responses to the first two questions “What comes to mind when you think about foreign-language learning?” and “What comes to mind when you think about the language you are studying?”, I will seek to determine whether participant MBTI cognitive functions may be detected based upon language use and words chosen. Keywords will be chosen which indicate or hint at elements common to particular perceiving or judging type learning styles. For example, Myers (1998) cites numerous studies providing examples which show that Sensing types have

been found to like sequential learning (Drummond & Stoddard, 1992) and approach learning through fact retention, methodical study, and serialist learning (Beyler & Schmeck, 1992). Using the same keywords, the research will examine the SILL statements for similarities and overlaps in language or concept (e.g. methodical study) to determine whether participants who use those keywords score higher on matching LLS.

4.3 Study Design

This study employs a cross-sectional design methodology to deductively test H1 and H2. Cross-sectional research designs have no time dimension, test existing differences, and the groups tested are selected based on existing differences rather than random allocation. Therefore, the research focuses specifically on personality type and language learning strategies of undergraduate Indo-European language students at the University of Waterloo (UWaterloo) during Fall 2016, under the supervision of Dr. Mathias Schulze, and Spring 2018 under the supervision of Dr. Emma Betz. Participants were recruited from undergraduate in-class or on-line second language courses at the university. There are no exclusions based on culture, gender, race, ethnicity, age or accessibility.

Participants were asked to complete three on-line tasks: a biographical language survey, an externally generated and scored psychometric assessment (MBTI), and a standardized language learning strategy survey (SILL). The tasks were chosen and designed to allow participants to complete them independently of one another at times convenient to the individual. Students were given the study website address which provided study information, ethics approval information, contact information, and links to each of the tasks and the feedback page. Upon completion of all tasks, participants were invited to select a time to attend a webinar-based

feedback session in order to obtain their personalized MBTI and SILL results and receive a $10 participation payment. At the conclusion of active research, the website was taken down.

Email address information was used to link the electronic surveys and assessments during the data collection phase of the project. The researcher created the online surveys and to enhance participant privacy, disabled the collection of IP addresses. The survey website and the research home page website were both hosted in Canada. The external psychometric assessment for the MBTI is accessed through psychometrics.com, the Canadian subsidiary of the Myers-Briggs Foundation (formerly CPP Inc.), which use Canadian web servers and data storage facilities. The psychometric assessment portal is administered by the researcher who can control the optional identifiable data flow. All optional biographical data was not requested, completed nor submitted.

An analytic induction study will examine whether language used in the open-ended biographical language survey is predictive of MBTI type. Analytic induction requires a search of the data for those cases which do not fit the initial hypothesis, and through examination of those deviant cases re-theorize the research topic. Where a retheorization of the research topic is not possible from the existing dataset, analytic induction methodology requires a collection of new data to continue the study.

4.3.1 Recruitment

Participants were recruited from both on-line and in-class undergraduate second language courses offered at UWaterloo in Fall 2016 (October and November) and Spring 2018 terms (May). On-line course instructors were asked to share a recruitment letter (Appendix A) on the e-learning platform. In-class recruitment was conducted by the researcher. An email was sent to the individual course instructors requesting two to three minutes of time either at the beginning

or end of class. Where access was granted, the researcher very briefly explained the research project. The website address was written on the blackboard for reference purposes and the researcher handed out the University of Waterloo Office of Research Ethics approved information letter to everyone in attendance (Appendix B).

Recruited students were directed to the research website home page (Appendix C), where they were provided with a synopsis of the research project and participant information. To be eligible to participate in the research study, the individual had to (a) be a student at the University of Waterloo, (b) be currently enrolled in an undergraduate second language learning class (offered either in class or on-line), and (c) have read the Information Letter. Participants were directed to choose the "Language Learning Survey" button which would allow them to enrol as a participant and continue on to the first of the three online tasks.

The link to the biological language survey, on the website designed as "Language Learning Survey," opened a survey document entitled *Language Biography Survey* which consisted of two parts. The first part provided a welcome statement and links to the Information Letter and back to the research website, and an electronic consent form (Appendix D). In order to move onto the second part of the survey, each of the three fields of the consent form attesting to a participant's informed consent (*First Name, Surname*, and *UWaterloo email*) had to be completed. At this point, the second portion of the survey, identified as Task #1, became available to the participant.

4.3.2 Language Biography Survey

Upon completing the consent form, the next page opened to the language biography survey proper (Appendix E). Unlike the consent form section of this survey, none of the eleven

answer fields were coded to require a response, thereby allowing participants to determine how much information they wished to share with the researcher.

The first eight questions were designed to provide the researcher with non-identifying statistical information on the participants: gender, year of birth, program of study, current term of study, current language classes, previous post secondary school education classes, first language(s) spoken, and second language(s) spoken plus some clarification regarding the experience around the second language experience such as “first year of high school,” “lived six months in Mexico,” etc.

The final three questions of the survey were open-ended and designed to elicit some information on university learner attitudes towards language learning and perceptions around foreign language and culture: (1) What comes to mind when you think about foreign language learning? (2) What comes to mind when you think about the language you are studying? (3) What comes to mind when you think about the countries where this language is used? The people? The culture? The second and third questions were prefaced with a request for those participants involved in multiple language courses to answer questions based on only one language and to indicate in their answer which language they were referencing.

The survey was designed to take between 5 and 10 minutes to complete depending on the complexity of the answers provided to the final three questions. Upon completing this task, the final page of the survey opened which provided participants with a link back to the website home page, the MBTI log-in page and the SILL Questionnaire. Participants were asked to complete the next two tasks within two weeks and were advised the tasks could be completed in any order. For purposes of this thesis, the MBTI assessment is designated Task #2.

4.3.3 MBTI – Form M

The researcher was certified by Psychometrics Inc., the Canadian subsidiary of The Myers-Briggs Foundation to administer and evaluate this assessment. Therefore, the link to the MBTI opened onto a Psychometrics customized log-in page which welcomed the participant to this research project task (Appendix F). Participants were asked to use their UWaterloo email address as the user ID information and to create their own password. Participants were then able to select the MBTI® Step 1 Form M Assessment to complete, which for purposes of this study, was the only assessment made available. As this is an externally administered assessment, participants were asked to accept the Psychometrics Terms and Conditions of use, provide their first name, surname and email address and were then presented with the Psychometrics Form M Instructions.

The instrument consists of 93 paired, forced-choice questions (questions where the respondent is limited to choosing only one of two possible answers), which the assessment breaks into three parts. Part I – Word Phrases, asks participants to select the answer that comes closest to telling how they usually feel or act; Part II – Word Pairs, asks participants to select the word in each pair which has the greatest appeal based on meaning; and, Part III – Word Phrases, which again asks participants to select the answer that comes closest to telling how they usually feel or act. As the MBTI is a proprietary instrument, the inclusion of the entire tool is not permitted. However, providing examples of the type of questions is permitted and these are included as Appendix G.

Upon completion of the 93 questions, participants could review their responses or submit them. Upon submission participants received an automated response indicating the task was completed. The researcher received an email notification from Psychometrics (Appendix H)

indicating assessment completion. It is only at this stage that the researcher was made aware a participant's enrolment in the study.

Participants would return to the webpage to access the link to take them to Task #3.

4.3.4 SILL – Version 5.1

Version 5.1 of the SILL is designed specifically for English Speakers Learning a New Language. The survey consists of 80 statements which are answered using a five-point Likert scale with answers ranging from a value of 1 for "Never or almost never true or me" to a value of 5 for "Always or almost always true of me." The researcher modified the electronic survey to begin with the following non-SILL fields: Please enter your UWaterloo email address (to allow a participant's SILL responses to be connected to their MBTI results). Are you currently studying more than one language? If the answer to the second question was yes, the participant was asked to select one language on which to focus while answering the SILL questions and to identify that language in the space provided.

The balance of the survey consisted of the 80 SILL questions (Appendix I), each of which required a response. The survey was designed in this way so that participants could not inadvertently miss answering a question. In order for participants to retain the ability to decide whether they wished to provide a response to a particular question, the option "Decline to answer" was added to each statement. Participants were advised the survey would take approximately 30 minutes to complete.

As noted in the SILL literature review (Chapter 3.1.3 *Empirical Investigations of the SILL*), there are issues with the psychometric measures of this instrument, and while it may not

be the most recent nor the most comprehensive in the field of language learning strategies,[14] it was used for this research because of its simplicity for participants to complete, its focus on language learning, and its extensive use which provides ample opportunity to assess similar studies for correlations, findings and pitfalls, along with the applicability of the data to inform instructor approach when guiding learners to enhance their ability to learn.

The end of the survey instructed participants to go back to the website to book a feedback time.

4.3.5 Feedback Session

Upon completion of their third task, participants were directed to return to the website and select an electronic feedback meeting with the researcher from a list of upcoming dates and times. They could submit their selection after completing the 'email,' 'first name' and 'last name' fields. The website feedback page was set up to automatically forward an email to the researcher.

Receipt of the email prompted the researcher to create a "GoToWebinar™" event and send an email to the participant with a link to the applicable GoToWebinar site requesting their registration. GoToWebinar would then follow-up with confirmation emails to both the participant and the researcher as the host of the webinar. One hour prior to the scheduled webinar start time, GoToWebinar would generate a reminder email to all participants including me in my role as host.

Prior to the webinar, the researcher would prepare both the SILL and MBTI reports. An email with the SILL report attached was sent to the participant approximately 30 minutes prior to

[14] See for example the Self-Regulated Foreign Language Learning Strategy Questionnaire, Short Self-Regulation Questionnaire, the Metacognitive English Language Learning Strategies instrument or the Writing Strategies for Self-Regulated Learning Questionnaire

the initiation of the webinar (see sample SILL report Appendix J). Approximately five minutes into the feedback session, an email with the MBTI report, a one-page sheet of *Additional Information* specific to the participant's Psychometrics generated result, and a handout with a brief overview of all 16 MBTI types was sent to the participant (see Appendix K for samples of the MBTI report and the additional information handouts).

Most feedback sessions were one on one with only two sessions being attended by the maximum allotted two student participants. The feedback session power point presentation (Appendix L) was broken up into four sections: the welcome, the SILL assessment, the MBTI assessment, and the wrap up which included providing the participant with the e-transfer password for the participation fee. For security purposes, the e-transfer password was changed for each presentation. E-transfer was accepted by all but one participant as the means to receive their $10 remuneration. For one participant, a cash payment was made, and a receipt to evidence payment received was obtained.

4.4 Data

This section of the thesis introduces the research sample population to the reader. A total of 57 participants initiated the Language Biography Survey (Task #1). It was completed by 56 each of whom completed the MBTI (Task #2). Of the 56 who completed Tasks #1 and #2, 41 also completed the SILL questionnaire (Task #3). Therefore, for this research project $n = 41$. Frequency tables on various aspects of the sample population follow.

Participants ranged in age from 20 to 67 (Tables 4.4.1a and 4.4.1b), and the overwhelming majority (85.4%) identify as female (Table 4.4.2).

Table 4.4.1a

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20	1	2.4	2.4	2.4
	21	2	4.9	4.9	7.3
	22	7	17.1	17.1	24.4
	23	8	19.5	19.5	43.9
	24	8	19.5	19.5	63.4
	25	6	14.6	14.6	78.0
	26	1	2.4	2.4	80.5
	27	1	2.4	2.4	82.9
	28	2	4.9	4.9	87.8
	32	1	2.4	2.4	90.2
	34	1	2.4	2.4	92.7
	41	1	2.4	2.4	95.1
	43	1	2.4	2.4	97.6
	67	1	2.4	2.4	100.0
	Total	41	100.0	100.0	

Table 4.4.1b

Statistics

Age

N	Valid	41
	Missing	0
Mean		26.05
Median		24.00
Mode		23[a]

[a] Multiple modes exist. The smallest value is shown.

Table 4.4.2

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	35	85.4	85.4	85.4
	Male	6	14.6	14.6	100.0
	Total	41	100.0	100.0	

One of the major criteria for participation in this research was enrolment in a UWaterloo undergraduate language course. Each undergraduate year, and graduate and post-graduate study years are represented in the sample (Table 4.4.3). Each of the six UWaterloo faculties is also represented, however one post-graduate participant did not associate themselves with a particular faculty (Table 4.4.4).

Table 4.4.3

Term

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Grad	3	7.3	7.3	7.3
	Post	2	4.9	4.9	12.2
	1A	5	12.2	12.2	24.4
	1B	1	2.4	2.4	26.8
	1C	1	2.4	2.4	29.3
	2A	6	14.6	14.6	43.9
	2B	4	9.8	9.8	53.7
	2C	1	2.4	2.4	56.1
	3A	8	19.5	19.5	75.6
	3B	3	7.3	7.3	82.9
	4A	5	12.2	12.2	95.1
	4B	1	2.4	2.4	97.6
	5B	1	2.4	2.4	100.0
	Total	41	100.0	100.0	

Table 4.4.4

Faculty

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Information	1	2.4	2.4	2.4
	Applied Health Sciences	3	7.3	7.3	9.8
	Arts	18	43.9	43.9	53.7
	Engineering	1	2.4	2.4	56.1
	Environment	5	12.2	12.2	68.3
	Math	4	9.8	9.8	78.0
	Science	9	22.0	22.0	100.0
	Total	41	100.0	100.0	

Participants were drawn primarily from French, German and Spanish courses. One individual was studying Croatian and two students were attending at least one course from two different undergraduate language studies offered at UWaterloo (noted as multilingual on Table

4.4.5). Each of the two "multilingual" course takers is enrolled in a German course, with one participant combining that with a Korean language course, the other a French language course.

Table 4.4.5

Current Course

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Croatian	1	2.4	2.4	2.4
	French	11	26.8	26.8	29.3
	German	14	34.1	34.1	63.4
	Multilingual	2	4.9	4.9	68.3
	Spanish	13	31.7	31.7	100.0
	Total	41	100.0	100.0	

In Task #1, participants were asked to provide information on first language(s) spoken (Table 4.4.6). No description nor criteria was given by the researcher for the term "First Language," leaving it to the participant to determine how to interpret the phrase and apply it to their own situation. Given that UWaterloo is located in English-speaking Canada, it is not surprising that the majority of the participants, twenty-seven (65.9%), noted their first language as English. Of greater interest are the five participants (12.2%), who listed two or more languages as their first languages. Going back into the raw data, each of the five who identified as having multiple first languages included English as one of their two or more first languages. The other languages were French, Hindi, Mandarin, Punjabi, Thai and Urdu.

Table 4.4.6

First Language

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Chinese	1	2.4	2.4	2.4
	English	27	65.9	65.9	68.3
	German	1	2.4	2.4	70.7
	Korean	1	2.4	2.4	73.2
	Mandarin	3	7.3	7.3	80.5
	Multilingual	5	12.2	12.2	92.7
	Polish	1	2.4	2.4	95.1
	Portuguese	1	2.4	2.4	97.6
	Tagalog	1	2.4	2.4	100.0
	Total	41	100.0	100.0	

Tables 4.4.7 and 4.4.8 provide basic information regarding the MBTI results and average SILL scores for the 41 participants who make up the study sample.

Table 4.4.7

MBTI

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ISTJ	6	14.6	14.6	14.6
	ISFJ	1	2.4	2.4	17.1
	INFJ	4	9.8	9.8	26.8
	INTJ	5	12.2	12.2	39.0
	ISTP	1	2.4	2.4	41.5
	ISFP	4	9.8	9.8	51.2
	INFP	4	9.8	9.8	61.0
	INTP	1	2.4	2.4	63.4
	ESFP	2	4.9	4.9	68.3
	ENFP	1	2.4	2.4	70.7
	ENTP	2	4.9	4.9	75.6
	ESTJ	2	4.9	4.9	80.5
	ESFJ	4	9.8	9.8	90.2
	ENFJ	1	2.4	2.4	92.7
	ENTJ	3	7.3	7.3	100.0
	Total	41	100.0	100.0	

SILL

Table 4.4.8

		Memory Strat	Cognitive Strat	Compen-sation	Meta-cognitive	Affective Strat	Social Strat	Avg SILL
N	Valid	41	41	41	41	41	41	41
	Missing	0	0	0	0	0	0	0
Mean		2.978	3.385	3.583	3.395	2.473	3.466	3.268
Median		2.950[a]	3.367[a]	3.618[a]	3.363[a]	2.400[a]	3.700[a]	3.338[a]
Mode		2.9[b]	4.0	3.6	2.9[b]	1.9[b]	3.9	3.4
Range		2.4	3.2	2.5	3.3	2.9	3.4	2.5
Minimum		1.7	1.5	2.0	1.6	1.1	1.4	1.8
Maximum		4.1	4.7	4.5	4.9	4.0	4.8	4.3

a. Calculated from grouped data.

b. Multiple modes exist. The smallest value is shown

The qualitative data is in many respects both more interesting to examine and more difficult to analyze. Answers to the question "What comes to mind when you think about foreign language learning?" elicited answers such as "verbs and how hard it is to learn without immersion," "learning how to speak and pronounce the language," and "all languages are connected."

The question "What comes to mind when you think about the language you are studying" saw a number of responses themed around "opportunity" and "linguistic differences," each of which was mentioned nine times.

The final question "What comes to mind when you think about the countries where this language is used? The people? The culture?" produced the most wide-ranging responses.

"People are similar throughout the word, but every region has something unique. Such as Germany's food."

"I think about the people that I have met, and the beautiful people that they are, and all the experiences I have had with them."

"[U]nderstanding the language is the best way to learn about the culture."

"These countries feel like another world because of the foreign language they speak. The people remind me of family roots and where I might have come from a hundred years or so ago. The culture brings to mind that I know little about the world around me and that I want to experience and see more."

The 56 open-ended responses of the UWaterloo students who completed Task #1 could be used to gather information on any number of topics such as cultural awareness, stereotypes or language learning expectations. However, for the purposes of this research study, analysis of the responses to the open-ended questions will be limited to the 41 participants who completed both Task #2 and Task #3. The following chapter will provide the results of the statistical analysis conducted on the quantitative data gathered and will lay out the qualitative data parameters and subsequent results of the comparative analysis.

5. Analysis

The analysis of the research data is broken into two parts. The first section will examine the data to answer the two quantitative hypothetical research questions. The second section will use qualitative data from the open-ended question portion of the Language Biography Survey to determine if MBTI personality traits and/or frequency of particular learning strategies can be predicted based on language used in the participant answers.

5.1 Quantitative Research

Single point-in-time surveys were used to gather data, and there was no active intervention by the researcher to create differences between the participants; therefore, a cross-sectional design study was employed to test both hypotheses. Hypothesis 1 used only the MBTI data gathered from the sample population and then compared it to that of the general population of Canadians who took the English language test. Hypothesis 2 was restricted to analyses using the MBTI and SILL results from within the sample population. By reason of an unequal MBTI distribution across the general population, and the small study sample size (n = 41), which makes it difficult to determine with certainty whether the distribution of the SILL results are symmetric around their mean, nonparametric statistical tests were conducted to analyze the quantitative data for both hypotheses.

5.1.1 Hypothesis 1

There is a statistically significant difference between the MBTI personality type distribution between the general population in English Canada and the sample population of second language learners enrolled in undergraduate Indo-European language courses at UWaterloo.

The Research Department of Psychometrics Canada Ltd., the authorized Canadian distributor of the MBTI instrument, published an information document in 2008 which contains more than twenty years of Canadian MBTI testing results for instruments administered in both French and English. The sample population used the English language version of the MBTI Form M assessments. Therefore, when testing for differences between MBTI results between the general population and the sample population, the Canadian MBTI distribution data results for tests taken in English was used. Table 5.1.1 summarizes the MBTI distribution of the general population, the sample population, the expected distribution for the sample based on the general population distribution, the actual sample population results, and variations between both for each of the MBTI types.

Table 5.1.1 MBTI DISTRIBUTION – ENGLISH CANADA V SAMPLE

		ENGLISH CANADA[ab] (percent)	SAMPLE (percent)	SAMPLE FREQUENCY PREDICTED	SAMPLE FREQUENCY ACTUAL	FREQUENCY VARIATION ACTUAL	FREQUENCY VARIATION (percent)
Type	ISTJ	14.8	14.6	6	6	0	0.0%
	ISFJ	6.2	2.4	3	1	-2	4.9%
	INFJ	2.8	9.8	1	4	3	7.3%
	INTJ	4.4	12.2	2	5	3	7.3%
	ISTP	5	2.4	2	1	-1	2.4%
	ISFP	3.6	9.8	1	4	3	7.3%
	INFP	5.7	9.8	2	4	2	4.9%
	INTP	5.7	2.4	2	1	-1	2.4%
	ESTP	2.2	0	1	0	-1	2.4%
	ESFP	4.9	4.9	2	2	0	0.0%
	ENFP	9.6	2.4	4	1	-3	7.3%
	ENTP	7.5	4.9	3	2	-1	2.4%
	ESTJ	11.4	4.9	5	2	-3	7.3%
	ESFJ	6.4	9.8	3	4	1	2.4%
	ENFJ	4.1	2.4	2	1	-1	2.4%
	ENTJ	5.8	7.3	2	3	1	2.4%
	Total	100.1	100	41	41		

[a] Taken from *Myers-Briggs Type Indicator® and (MBTI®) Instrument in French and English Canada*, Psychometrics Canada Research Department Paper, 2008, p. 5
[b] N = 58,755

A visual assessment of Table 5.1.1 suggested that with a variance of 7.3% between the expected sample frequency and the actual sample frequency of five types, and a variance of 4.5% between the expected sample frequency and the actual sample frequency of a further two types, significant differences between the MBTI type distributions in the general population and the sample population would be found.

A chi-square goodness-of-fit test was conducted to determine whether the 41 participants recruited to the study had the same distribution of MBTI types as those in the general population. To analyze data using a chi-square goodness-of-fit test, there are three assumptions to consider. (1) There is one categorical variable – in this case MBTI type. (2) There is an independence of observations – in this case each participant can only be placed into one MBTI type. (3) There must be an expected frequency of at least 5 in each group of the categorical variable – something which SPSS Statistics can test for. For this study, a visual examination of Table 5.1.1 "expected frequencies," already suggests assumption (3) will not be met.

The chi-square goodness-of-fit test will test the Null Hypothesis (H_0): There is no statistically significant difference between the MBTI personality type distribution between the general population in English Canada and the sample population of second language learners enrolled in undergraduate Indo-European language courses at UWaterloo. The *p*-value is the probability that a statistic as large as the one computed would be found if the null hypothesis were true (Larson-Hall, 2015, p. 60). For this and all tests in this research, I use a cutoff point of 0.05 to decide whether to reject the null hypothesis.

For the *p*-value to be accurate the expected frequency in each category should be at least five. In Table 5.1.2, the chi-square goodness-of-fit test statistics explicitly reports what was

visually apparent in Table 5.1.1, that 93.3% of the expected frequencies are less than five. The minimum expected cell frequency is 1.2.

Table 5.1.2

Chi-Square Goodness-of-Fit Test Statistics

	MBTI_Sample
Chi-Square	25.183[a]
df	14
Asymp. Sig.	.033

a. 14 cells (93.3%) have expected frequencies less than 5. The minimum expected cell frequency is 1.2.

The chi-square goodness-of-fit test indicates the sixteen MBTI types were not similarly distributed in the sample population as in the general population ($\chi^2(14)=25.183$, $p=.033$). The p-value of 0.033 says that the probability that we would find a χ^2 statistic of 25.183 if there truly were no differences between groups is about 33 in 1,000. Therefore, the null hypothesis should be rejected which means there is a statistically significant difference between the MBTI personality type distribution between the general population and the sample population. However, as noted above, having not met the level expected frequency, the p-value cannot be assumed accurate.

5.1.2 Hypothesis 2

There is a correlation between personality types as determined by the MBTI and frequency of use of language learning strategies as defined and categorized by SILL, Version 5.1.

The Mann-Whitney U test is a rank-based nonparametric test that can be used to determine if there are differences between two groups on a continuous or ordinal dependent variable. When the data fails the assumptions of the independent-samples t-test, the Mann-Whitney U test is a nonparametric alternative that may be used. This can happen if (a) you have non-normally distributed data; or (b) you have an ordinal dependent variable. Since Likert scales

produce ordinal data, the t-test should not be used to analyze this research data (Laerd Statistics, 2015).

The Mann-Whitney U test assumptions are:

(1) There is a dependent variable that is measured at the continuous or ordinal level. For this test those are the average results of the six language learning strategies and the SILL overall average broken into the five levels reported as SILL results and called "Key to Understanding Your Averages" (Oxford, 1990a, p. 291).

Level 1 – scores of 1.0 to 1.4 equivalent to never or almost never used

Level 2 – scores of 1.5 to 2.4 equivalent to general not used

Level 3 – scores of 2.5 to 3.4 equivalent to sometimes used

Level 4 – scores of 3.5 to 4.4 equivalent to generally used

Level 5 – scores of 4.5 to 5.0 always or almost always used

(2) There is an independent variable that consists of two categorical, independent groups, (i.e., a dichotomous variable) such as an MBTI type scale.

(3) There is an independence of observations.

The dependent variable for the following analysis is the average score for each of the memory, cognitive, compensation and metacognitive learning strategies. This study was constructed to examine results within a cognitive learning theory framework; therefore, affective and social strategies scores will not be tested[15]. The SILL total average score is a simple average of all six learning strategy scores, including the affective and social strategies, and therefore will also not be tested.

[15] For results on similar studies which included tests on affective and social strategies, see Wakamoto (2009) and Chen & Hung (2012).

The independent variable for the Mann-Whitney U test is the MBTI scale. Based on Jung's theory, the perception and judgment functions are conceived of as mental functions and fit within the cognitive learning framework. Therefore I will be testing results using the Sensing-iNtuition (SN) perception and Thinking-Feeling (TF) judgment scales.

The Null Hypothesis (H_0): The distribution of the dependent variable (memory, cognitive, compensation and metacognitive average scores) is the same across each category of the independent variable (SN or TF scale).

When analyzing the data, a visual examination is made of the distributions between the two groups of the independent variable ("Sensing" and "iNtuition" or "Thinking" and "Feeling"). Where the distributions of the independent variables are the same for a dependent variable, the median score for the two groups may be used to determine the size difference between the two groups. Where the distributions are not similar, the only determination which can be made is whether values in one group are higher or lower based on the mean rank of the distribution scores. (See result for cognitive strategy on SN scale below.) Where the distributions for a dependent variable are not similar, the median report, which forms a portion of the test results and are included in this analysis, will not include that particular dependent variable.

Tables which summaries the results when SN scale is the independent variable follow on the next page.

Table 5.1.3a

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of MemoryStrat is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.530	Retain the null hypothesis.
2	The distribution of CognitiveStrat is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.223	Retain the null hypothesis.
3	The distribution of Compensation is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.619	Retain the null hypothesis.
4	The distribution of Metacognitive is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.638	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Table 5.1.3b

Median Report (SN) for Table 5.1.3a
Mann-Whitney U Test

Median

SNScale	MemoryStrat	Compensation	Metacognitive
Sensing	2.950	3.600	3.500
iNtuitive	2.900	3.600	3.300
Total	2.900	3.600	3.400

A Mann-Whitney U test was run to determine if there were differences in the **memory strategy** average score between Sensing and iNtuitive. Distributions of the memory strategy average scores for Sensing and iNtuitive were similar, as assessed by visual inspection. Memory strategy average score was not statistically significantly different between Sensing (*Mdn* = 2.95) and iNtuition (*Mdn* = 2.90), $U = 186$, $z = -.628$, $p = .530$. Memory strategy average scores were a median of .05 higher in Sensing than in iNtuition.

A Mann-Whitney U test was run to determine if there were differences in the **cognitive strategy average** score between Sensing and iNtuitive. Distributions of the engagement scores for Sensing and iNtuitive were not similar, as assessed by visual inspection. Cognitive strategy scores for Sensing (mean rank = 18.68) and iNtuitive (mean rank = 23.21) were not statistically significantly different, $U = 256.5$, $z = 1.219$, $p = .223$.

A Mann-Whitney U test was run to determine if there were differences in the **compensation strategy** average score between Sensing and iNtuitive. Distributions of the compensation strategy average scores for Sensing and iNtuitive were similar, as assessed by visual inspection. Compensation strategy average score was not statistically significantly different between Sensing (*Mdn* = 3.60) and iNtuition (*Mdn* = 3.60), $U = 229$, $z = .498$, $p = .619$. Compensation strategy average scores between the two groups had equal median scores.

A Mann-Whitney U test was run to determine if there were differences in the **metacognitive strategy** average score between Sensing and iNtuitive. Distributions of the metacognitive strategy average scores for Sensing and iNtuitive were similar, as assessed by visual inspection. Metacognitive strategy average score was not statistically significantly different between Sensing (*Mdn* = 3.50) and iNtuition (*Mdn* = 3.50), $U = 192$, $z = -.471$, $p = .638$. Metacognitive strategy average scores between the two groups had equal median scores.

The results of the Mann-Whitney U tests indicate there is no statistically significant difference in the distribution of strategy scores between Sensing types and iNtuitive types. The Sensing and the iNtuitive type have a similar distribution of scores in their use of LLS.

Results when TF scale is the independent variable:

Table 5.1.4a **Hypothesis Test Summary**

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of MemoryStrat is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.744	Retain the null hypothesis.
2	The distribution of CognitiveStrat is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.743	Retain the null hypothesis.
3	The distribution of Compensation is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.763	Retain the null hypothesis.
4	The distribution of Metacognitive is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.601	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Table 5.1.4b

Median Report (TF) for Table 5.1.4a
Mann-Whitney U Test

Median

TFScale	MemoryStrat	CognitiveStrat	Compensation	Metacognitive
Thinking	2.900	3.450	3.600	3.200
Feeling	3.000	3.400	3.600	3.400
Total	2.900	3.400	3.600	3.400

A Mann-Whitney U test was run to determine if there were differences in the **memory strategy** average score between Thinking and Feeling. Distributions of the memory strategy average scores for Thinking and Feeling were similar, as assessed by visual inspection. Memory strategy average score was not statistically significantly different between Thinking (*Mdn* = 2.90) and Feeling (*Mdn* = 3.00), $U = 222.5$, $z = .327$, $p = .744$. Memory strategy average scores were a median of .10 higher in Feeling than in Thinking.

A Mann-Whitney U test was run to determine if there were differences in the **cognitive strategy** average score between Thinking and Feeling. Distributions of the Cognitive strategy average scores for Thinking and Feeling were similar, as assessed by visual inspection. Cognitive strategy average score was not statistically significantly different between Thinking (*Mdn* = 3.45) and Feeling (*Mdn* = 3.40), $U = 197.5$, $z = -3.28$, $p = .743$. Cognitive strategy average scores were a median of .05 higher in Thinking than in Feeling.

A Mann-Whitney U test was run to determine if there were differences in the **compensation strategy** average score between Thinking and Feeling. Distributions of the compensation strategy average scores for Thinking and Feeling were similar, as assessed by visual inspection. Compensation strategy average score was not statistically significantly different between Thinking (*Mdn* = 3.60) and Feeling (*Mdn* = 3.60), $U = 221.5$, $z = .301$, $p = .763$. Compensation strategy average scores between the two groups had equal median scores.

A Mann-Whitney U test was run to determine if there were differences in the **metacognitive strategy** average score between Thinking and Feeling. Distributions of the metacognitive strategy average scores for Thinking and Feeling were similar, as assessed by visual inspection. Metacognitive strategy average score was not statistically significantly different between Thinking (*Mdn* = 3.20) and Feeling (*Mdn* = 3.40), $U = 230$, $z = .523$, $p = .601$. Metacognitive strategy average scores were a median of .20 higher in Feeling than in Thinking.

The results of the Mann-Whitney U tests indicate there is no statistically significant difference in the distribution of strategy scores between Thinking types and Feeling types. The Feeling and the Sensing type have a similar distribution of scores in their use of LLS.

To determine whether using learning strategy averages masked statistically significant differences to be found in individual statement results, a second round of Mann-Whitney U tests was conducted using each statement within the memory, cognitive, compensation and metacognitive strategies as the dependent variable, and both the SN and TF scale as the independent variable.

The H_0 for the next group of tests: The distribution of the dependent variable (a specific SILL statement from within the memory, cognitive, compensation and metacognitive category of learning strategies) is the same across each category of the independent variable (SN or TF scales). There are 15 memory, 25 cognitive, 8 compensation and 15 metacognitive statements, each run against both the SN and TF scale for a total of 126 tests. There were three instances in which the H_0 was rejected and they are reported here. (The complete Hypothesis Test Summaries generated are attached as Appendix M. Where the null hypothesis was retained, no visual examination to determine similar-shaped distribution was made. Without the visual examination the relevance of median information can not be determined, and no median reports were generated where the hypothesis test summary retained H_0.)

Instance #1)

For H_0: The distribution of the dependent variable, memory strategy statement #4, "I associate the sound of the new word with the sound of a familiar word," is the same across each category of the independent variable, TF scale.

Table 5.1.5a

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Memory4 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.041	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Table 5.1.5b

Median Report for Table 5.1.5a

Median

TFScale	Memory4
Thinking	3.50
Feeling	4.00
Total	4.00

A Mann-Whitney U test was run to determine if there were differences in Memory Strategy Statement #4 ("I associate the sound of the new word with the sound of a familiar word.") scores between Thinking and Feeling. Distributions of this statement were similar, as assessed by visual inspection. Memory strategy statement #4 **was statistically significantly different** between Thinking (*Mdn* = 3.50) and Feeling (*Mdn* = 4.00), $U = 219.5$, $z = .272$, $p = .785$.

In summary, Feeling types scored consistently higher on this statement than Thinking types. The median score for Feeling types was 4.0 as compared to 3.5 for Thinking types.

Instance #2)

For H_0: The distribution of the dependent variable, cognitive strategy statement #7, "I use familiar words in different combinations to make new sentences," is the same across each category of the independent variable, TF scale.

Table 5.1.6a

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Cognitive7 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.036	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Table 5.1.6b

Median Report for Table 5.1.6a

Median

TFScale	Cognitive7
Thinking	3.00
Feeling	4.00
Total	3.00

A Mann-Whitney U test was run to determine if there were differences in Cognitive Strategy Statement #7 ("I use familiar words in different combinations to make new sentences.") scores between Thinking and Feeling. Distributions of this statement were similar, as assessed by visual inspection. Cognitive strategy statement #7 **was statistically significantly different** between Thinking (*Mdn* = 3.00) and Feeling (*Mdn* = 4.00), $U = 287.0$, $z = 2.099$, $p = .036$. Cognitive strategy statement #7 scores were a median of 1.0 higher in Feeling than in Thinking.

In summary, Feeling types scored consistently higher on this statement than Thinking types. The median score for Feeling types was 4.0 as compared to 3.0 for Thinking types.

Instance #3)

For H_0: The distribution of the dependent variable, metacognitive strategy statement #7, "I organize my language notebook to record important language information," is the same across each category of the independent variable, SN scale.

Table 5.1.7 **Hypothesis Test Summary**

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Metacog7 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.023	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

A Mann-Whitney U test was run to determine if there were differences in Metacognitive Strategy Statement #7 ("I organize my language notebook to record important language information") scores between Sensing and iNtuitive. Distributions of the scores for Sensing and iNtuitive were not similar, as assessed by visual inspection. Metacognitive strategy statement #7 scores for Sensing (mean rank = 25.18) and iNtuitive (mean rank = 17.02) were **statistically significantly different**, $U = 126.5$, $z = -2.278$, $p = .023$.

In summary, Sensing types scored consistently higher on this statement than iNtuitive types. The mean rank for Sensing types was 25.18 as compared to 17.02 for iNtuitive types.

No significant patterns or trends were identified through this analysis; and with a small sample size, no further statistical measures were conducted on this data. The significance of the quantitative research results will be addressed in Chapter 6 – *Discussion and Conclusion*.

5.2 Qualitative Research

This section of the study will examine whether language used by respondents in the open-ended biographical language survey is predictive of MBTI type. A search of sentences, phrases and keywords which correspond to MBTI type themes was conducted across the responses made by the 41 participants to the first two questions: Q1 – What comes to your mind when you think about language learning? Q2 – What comes to mind when you think about the language you are

studying? Responses from the final question, Q3 – What comes to mind when you think about the countries where this language is used? The people? The culture? – were not used for these analyses, as the answers were less related to language learning or language use and therefore less likely to contain the searched-for learner characteristic cues. The decision not to include the responses from this question was made in advance of a formal analysis of the data.

The themes used to categorize responses and thus respondents into the Sensing, iNtuitive, Thinking and Feeling types was determined by the list of *Characteristics of Learners by Psychological Type* (see Figure 4 below) as provided by Myers (1988) in the MBTI® Manual.

Figure 4 Characteristics of Learners by Psychological Type

Sensing Types	iNtuitive Types
Concrete experiential style	Abstract conceptual learning style
Learn in several ways	Visual learners
Abstract sequential learning style	Auditory learners
Concrete sequential learning style	Concrete random learning style
Collaborative learners	Participant learners
Dependent learners	High conceptual level
High in fact retention, methodical study, and serialist learning	Holistic learners
Field dependent	Internal decision makers
Left hemisphere learners	Field independent
Adaptive in creativity	Thin boundaries
	Right hemisphere learners
	Innovative in creativity
	Postconventional decision makers
	High in reflective judgment
	High in goal orientation
	High academic self-esteem
	High in academic comfort
	Like self-directed learning
Thinking Types	**Feeling Types**
Abstract conceptual learning style	Concrete experiential learning style
Abstract sequential learning style	Abstract random learning style
Participant learners	Dependent learners
High in fact retention, methodical study, and serialist learning	Holistic learners
Systematic decision makers	Field dependent
Field independent	Thin boundaries
Left hemisphere learners	Right hemisphere learners
Adaptive in creativity	Adaptive in creativity
Seek self-justice in moral orientation	Seek care and self-care in moral orientation
High in goal orientation among adults	High in goal orientation among junior high students
	Connected knowers

Taken from *MBTI® Manual: A Guide to the Development and Use of the Myers-Briggs Type Indicator®.* (Third) Myers et al, 1988, p. 262.

From the sample of 41 participants, two respondents did not provide an answer to Question #1 – What comes to your mind when you think about language learning? or Question #2 – What comes to your mind when you think about the language you are studying? Sentences, sentence fragments, phrases or words from the remaining 39 responses were assessed to determine if they could be grouped into one or more of the four functional types (Sensing, iNtuition, Thinking or Feeling) based on the learner characteristics listed in Figure 4. Twenty-five respondents made statements which the gave the researcher a degree of confidence to permit categorization into one of the four function types. Statements which did not lend themselves to categorization included, for example, the one-word answer "France" to Q #2. Six of the twenty-five respondents provided an answer which the researcher determined provided sufficient information to allow categorization into two of the four function types, that is into each of the SN and TF scales. A total of 31 blind categorizations were made (i.e., MBTI types were not linked to the respondent's answer information before or during the categorization process). Seventeen participants (55%) were categorized in accordance with MBTI type. Fourteen categorizations were incorrect. Analytic induction methodology requires the researcher be readily able to identify those cases in the sample which are deviant (Bloor & Wood, 2006). The results of the analyses are provided in the tables following Figure 4 with deviant samples highlighted in grey. Deviant categorizations are reviewed.

Table 5.2.1

SENSING TYPE

ID Code	ANSWER TO QUESTION #1	ANSWER TO QUESTION #2	ACTUAL Sensing iNtuitive
ABA		German grammatical structures are different from the other languages and very interesting.	N
ACB		Structured	S
AJI	grammar, learning about different cultures		N
ANM	I think about learning new vocabulary, in spanish, considering I am taking it right now, it is hard to grasp.		N
BGE	The rules of language and how we convey meaning. Word placement and how it differs. I deconstruct the foreign language and see its English counterparts so it helps me better understand English.	French: pointed nasal pronunciation, gendered everything, the rules of the language that I have to follow, the words and phrases I am deeply familiar with and the edges of my knowledge when concerning in depth topics.	S
BIG		Slow improvement	S
BMK	I think of learning basic phrases which brings back elementary school memories and I think of travelling to locations that use this language.	When learning French, I think of French culture more, Quebec, France, the Canadian government, and French text on Canadian products.	N
BUS		structure, interest	N
BVT	exponential-shaped learning curve		S
BYW	As is illustrated above, I quite enjoy learning foreign-languages and consider it my main hobby. I enjoy the challenge that learning a new language brings and take great gratification in making connections between the languages (ex. similarities with romance/latin languages). I believe that it's important to know as many languages as possible, especially now, as the world is becoming increasingly internationalized.		S
CHF	Difficult at first and then better with practice		S

A total of eleven respondent answers were categorized into the Sensing psychological type; five were categorized incorrectly. ABA's answer "German grammatical structures are different from the other languages and very interesting" and AJI's answer "grammar, learning about different cultures" were categorized as Sensing type in accordance with the theme statement "concrete experiential learning style." However, AJI's answer included "learning

about different cultures" which could have allowed for categorization as iNtuitive with the theme statement "concrete random learning style."

ANM's response "I think about learning new vocabulary, in Spanish, considering I am taking it right now, it is hard to grasp" was also categorized as Sensing type in accordance with the theme "concrete experiential learning style," and rejected from the iNtuitive type because it did not fit with the "high academic self-esteem" theme. In this instance the researcher used two cues to mis-categorize ANM.

BMK's responses "I think of learning basic phrases which brings back elementary school memories and I think of travelling to locations that use this language" and "When learning French, I think of French culture more, Quebec, France, the Canadian government, and French text on Canadian products" were categorized as Sensing type in accordance with the theme "concrete experiential learning style." The response to the second question also led BMK to be categorized in the Sensing type in accordance with the theme "field dependent."

BUS's response "structure, interest" was categorized as Sensing type in accordance with the themes "concrete sequential learning style and "left hemisphere learning."

Table 5.2.2

INTUITIVE TYPE

ID Code	ANSWER TO QUESTION #1	ANSWER TO QUESTION #2	ACTUAL Sensing iNtuitive
AED		sounds very nice	N
AKJ		Possibilities	N
ALK	Verbs and how hard it is to learn without immersion.		S
AML		Travel and work opportunities	N
APO	Learning how to speak and pronounce the language.	Opportunity in the US	N
AQP		Opportunity, travel	S
ARQ		I think of overseas work and living opportunities.	S
AUT	Switching off my native language of English and submerging myself in foreign language alone.		N
AWV	I would love to be able to fluently speak in another language, but usually find it difficult to actually do.	Spanish is totally a new experience for me, as a romance language. I love how it sounds, and I find it very elegant and vibrant.	S
AZY	Use it or lose it. Listening tasks are important. Motivation for practice of verbal and written skills can be tricky.	The grammar, the non-direct-translation expressions, and the abundance of dialects and accents	N
BDB	It opens up endless possibilities.	Learning French will help me to get a better job/gives me more and better job options after I graduate.	S
BEC		Spanish is totally a new experience for me, as a romance language. I love how it sounds, and I find it very elegant and vibrant.	S
CDB	Acting skits, listening to taped conversations and cheesy language videos		N
CGE		(German): I really like it. The different cases are a bit confusing and declension of adjectives are difficult, but I do enjoy the language a lot. It sounds very clean to me, as German sounds exact. It's very nice.	N

A total of fourteen respondent answers were categorized into the iNtuitive psychological type; six were categorized incorrectly. ALK's response "Verbs and how hard it is to learn without immersion" was categorized as iNtuitive in accordance with the theme statement "concrete random learning style" and "right hemisphere learner."

AQP's response "Opportunity, travel," ARQ's response "I think of overseas work and living opportunity" and both of BDB's responses "It opens up endless possibilities" and "learning French will help me get a better job/gives me more and better job options are I graduate" were categorized as iNtuitive in accordance with the theme statement "high in goal orientation."

AWV's responses "I would love to be able to fluently speak in another language, but usually find it difficult to actually do" and "Spanish is totally a new experience for me, as a romance language. I love how it sounds, and I find it very elegant and vibrant" were categorized as iNtuitive in accordance with the theme "right hemisphere learner." The response to Q2 was also categorized in the iNtuitive category in accordance with the theme "auditory learner."

BEC's response "Spanish is totally a new experience for me, as a romance language. I love how it sounds, and I find it very elegant and vibrant" was categorized as iNtuitive in accordance with the theme statements "auditory learner" and "right hemisphere learners."

Table 5.2.3

THINKING TYPE

ID Code	ANSWER TO QUESTION #1	ANSWER TO QUESTION #2	ACTUAL Thinking Feeling
AKJ	Learning a new culture and how to communicate with the people from that culture in their own native language.		T
ARQ	When I think of foreign-language learning, I think of an expanded audience for communication.		F
BDB	It opens up endless possibilities.		F
BIG	Difficulty, opportunities to visit other countries		T
BVT		French, opening new doors	T

A total of five respondent answers were categorized into the Thinking psychological type; two were categorized incorrectly. Both ARQ's answer, "When I think of foreign-language learning, I think of an expanded audience for communication" and BDB's answer "It opens up endless possibilities" were categorized as Thinking in accordance with the theme statement "high in goal orientation among adults."

Table 5.2.4

FEELING TYPE

ID Code	ANSWER TO QUESTION #1	ANSWER TO QUESTION #2	ACTUAL Thinking Feeling
ALK	Verbs and how hard it is to learn without immersion.		T

One respondent answer was categorized into the Feeling psychological type and it was done so incorrectly. ALK's answer, "Verbs and how hard it is to learn without immersion" was categorized as Feeling in accordance with the theme statement "abstract random learning style."

The following chapter will examine in more detail what may be concluded from the results presented above.

6. Discussion and Conclusion

This study was designed to determine whether there is a connection between personality type and second language learning, specifically the reported use of learning strategies. The research was designed to test three possible connection points between personality type and second language learning using both quantitative and qualitative methods to gather and analyze the data.

6.1 The Instruments

Participants were asked to complete three surveys. The first was a biographical and qualitative data-gathering instrument, designed to provide the researcher with background information on the respondents and elicit subjective comments with respect to second language learning expectations and the thoughts that language elicits in regards to its use. The quantitative portion of this study used two well-established and well-researched questionnaires, the MBTI and the SILL. I would be remiss if I did not heed the comments of Capraro and Capraro (2002), quoted earlier in this thesis, and discuss the reliability and validity of both quantitative data gathering instruments used. I am neither a statistician nor a specialist in psychometrics by training and thus not in a position to conduct validity or reliability tests on the specific results the surveys generated for this research. Therefore, I am limited to reporting that with respect to the MBTI, Cronbach's alpha was computed for a US national sample of 2,859 for which reliability coefficients averaging EI = .91, SN = .92, TF = .91, and JP = .92 were recorded (Myers et al., 1998, p. 161). For the SILL, Cronbach's alpha coefficient was .94 for the whole questionnaire, with individual categories results computed as memory strategies = .75, cognitive strategies = .84, compensation strategies =.69, metacognitive strategies = .86, affective strategies = .68 and social strategies = .78 (Hsiao & Oxford, 2002, p. 373). An $\alpha \geq 0.9$ is considered excellent.

Cronbach's alpha is used to determine how much the items of a scale are measuring the same underlying dimension, and commonly used when a survey includes Likert-scale questions commonly used to determine the reliability of a scale when a survey uses Likert questions (Laerd Statistics, 2015).

The validity and reliability data are focused on the instruments themselves and are statistical measures used to determine whether the instruments adequately measure what they are designed to test, and whether the results are repeatable. Validity and reliability, however, do not address the assumptions which underlie either of these instruments.

The subtitle of Oxford's (1990) text which introduced the SILL is *What Every Teacher Should Know*. The text and the SILL focus on skills acquired in a more formal, classroom-type learning environment, and the majority of the SILL statements are more in line with tasks associated with formalized instruction (e.g., "I review often." "I arrange my schedule to study and practice the new language consistently, not just when there is the pressure of a test." "I work with other language learners to practice, review, or share information.") rather than with immersion or considering holistic global language acquisition experiences (e.g., "I read for pleasure in the new language.") Given these prompts, there is a good probability that when assessing and responding to SILL statements, learners are more likely to rank their responses based on instructional contexts – what they do in the classroom, how they approach homework or online tasks.

Instruments, such as the SILL may also be subject to self-report biases such as social desirability and recall bias. Social desirability is an external bias in which the respondent may be looking for approval from the questionnaire giver or attempting to generated anticipated results or results that are in line with test takers. This type of bias may be exacerbated in situations

where anonymity is not guaranteed. Recall bias occurs where a respondent is unable to accurately recall a past event or the number of times they do something over a given period of time (Althubaiti, 2016). Without fleshing out research data with observational data or deeper questioning and conversation around an individual's strategy use in a particular situation, self-report questionnaire data may reflect the respondent's self-view rather than actual behaviour (Kaushal and Petwardhan, 2018, p. 12).

As learners progress through formal training programs, the use of certain strategies may be used with such frequency and facility that their use becomes almost invisible and difficult for the learner to track. In other instances, the learner's language proficiency has increased to such an extent that certain strategies are no longer used on a frequent basis. Both scenarios may result in lower scores in certain categories and suggest that learners are not using strategies well. SILL results are a snapshot in time and do not take into consideration the dynamic nature of language learning over time or contextual differences in learning conditions.

In this research study, participants were asked to complete the SILL without any prior information provided regarding language learning, learning strategies in general or specific language learning strategies. In the preface to *Language Learning Strategies,* Oxford writes, "Although learning strategies are used by students themselves, teachers play an important role in helping students develop and use strategies in more effective ways" (1990, p. ix). The book was written to provide a model to instructors for strategy training and the SILL was developed as the self-assessment tool for assessing L2 learning strategies. Oxford's premise is that strategies can and should be taught to improve students' language learning capabilities. To lower or mitigate the level of potential self-report biases, subjective rating levels on the Likert scale and the possible misinterpretation of results, future similar studies should consider providing respondents

with general information regarding learning strategies, how language learning strategies can be seen as a component of language learning, the underlying assumptions built into the SILL statements, how the scores may change over time, and guidelines regarding how to report frequency of use prior to giving the SILL.

The MBTI limits respondents to being sorted into one of sixteen discreet categories based on four dichotomous poles. According to type theory, individuals grouped into a particular type will share their desire for either the external or internal world, the ways in which they prefer to gather and process information and their orientation to the external world. However, sixteen groups cannot adequately reflect the many nuanced ways in which individuals who share certain characteristics may differ from each other. As type theory works on the assumption that an individual's type does not change, the instrument does not take into account the contextual situation in which a respondent finds themselves at the time of taking the assessment, their life experiences, their experience with taking such tests, or other factors.

In anticipation of conducting quantitative research, a minimum sample size of 165 participants was the goal, and the expectation of being able to work with a larger sample size is reflected in the research design. Unfortunately, both participant recruitment drives were truncated resulting in a small sample size which reduced the effectiveness of the quantitative study results. Neither a solid research question nor study design for the qualitative data collected was properly considered which meant only a minimal amount of data was collected from which to work.

In developing future studies, where a sufficiently large sample size to conduct a robust quantitative analysis is not possible, collecting additional qualitative data should be considered.

In particular, to counter the effect of self-report biases, in-depth follow-up interviews regarding strategy usage could prove useful.

6.2 Hypothesis One: Conclusions and reflections for future similar studies

The first analysis of the data was designed to test the hypothesis that certain personality types would be more attracted to engaging in adult second language learning courses. To answer this question, the sample population distribution was compared to the results of over 50,000 Canadian individuals in the general population who took the English language MBTI test. Had the sample skewed higher or lower in one or two types, this may have indicated a particular type tended to have a preference or an aversion to engaging in second language learning. Demonstrating a statistically significant result of non-correlation between sample and general population would warrant additional statistical analysis of the data to determine the size of the effect of the finding.

The unequal distribution of the general population MBTI results called for the use of non-parametric statistical analysis (Jamieson, 2004; Larson-Hall, 2015; and Lindstromberg, 2016), and the chi-square goodness-of-fit test was applied to distribution results of the sample to determine the level of correlation to the general population. The chi-square goodness-of-fit test requires a minimum frequency of five for each category. With a sample size of n=41, this criterion was not met, and the results of the test, which showed little correlation between sample and general population, were not meaningful. The MBTI distribution of type for the defined general population ranges between 2.2% and 14.8%. To avoid similar issues in future studies and to generate the required expected frequency of ≥ 5 in each category suggests a minimum sample size of 240 is required.

During the initial data collection, one of the potential recruits remarked he was taking the language course in order to fulfill an Arts credit requirement to complete his STEM study degree. Going forward, should a study similar to this be undertaken in a university setting, I would recommend:

(a) When gathering the biographical data include a question which asks if the respondent is taking a language course to meet non-second language degree requirements.

(b) Focus on recruiting participants from second year and higher courses in order to control for students who may not become actively engaged in second language learning.

(c) Recruit among the second language graduate student population as they have actively engaged in second language studies for a number of years.

(d) To maximize participant numbers, to remain true to the cross-sectional design methodology, and to optimize the number of potential recruits in second year language courses, recruit twice during the calendar year rather than the academic year (i.e., once during the Winter or Spring term and again in the following Fall term).

6.3 Hypothesis Two: Conclusions and reflections for future similar studies

The second possible connection point between personality type and second language to be tested was designed to examine whether a correlation between personality type and language learning skills could be demonstrated. This test involved the use of both instruments. In this instance, it was the SILLs use of Likert-scale measures which necessitated the use of non-parametric statistical analysis (Gu, 2016; Jamieson, 2004; Larson-Hall, 2015; and Lindstromberg, 2016).

Mann-Whitney U tests, which look for differences in the distribution of two groups, were conducted using the four learning strategies which are cognitive in nature (memory, cognitive, compensation and metacognitive) as the dependent variables, and the two MBTI cognitive functional type scales as the independent variable. The results were all negative. No correlations were found in any of the eight possible combinations of the dependent and independent variables. This means there is no personality type group which uses one category of strategy with measurably greater consistency than the personality type on the opposite end of the dichotomy scale being tested (e.g., Thinking types did not consistently report higher usage of one category of LLS than Feeling types.)

To determine whether using learning strategy averages masked correlations which might be found when examining individual LLS, a second round of Mann-Whitney U tests was conducted which used each statement as a dependent variable on each of the two functional type MBTI scales (SN and TF). In three instances out of a possible 128 the test decision was to reject the null hypothesis. This means that in those three cases, there was a statistically measurable difference in the frequency of use of a particular LLS by one type on the scale over the other (e.g., Feeling types consistently reported that they more often used familiar words in different combinations to make new sentences than the Thinking types.) In the two cases where the rejection of the null hypothesis could be made based on differences in the median, which is a stronger test result, the independent variable was the TF scale, and Feeling had the higher median. This is inconsistent with the Ehrman & Oxford study (1990), in which the Feeling learners mentioned the fewest specific strategies, and where they did, it was around concern for social and interpersonal issues. In this study the correlation was found in one memory strategy,

"I associate the sound of the new word with the sound of a familiar word," and one cognitive strategy, "I use familiar words in different combinations to make new sentences."

The correlated finding on the SN scale occurred on the metacognitive statement, "I organize my language notebook to record important language information." In this instance, because distribution scores were not similar, a difference in median could not be calculated. The mean rank was significantly different, showing a Sensing mean rank of 25.18 compared to an iNtuitive mean rank of 17.02. While advocating for the use of parametric statistics when conducting analyses using the SILL or other instruments which collect ordinal data, Mizumoto & Takeuchi (2018) also caution against their use if the data is not normally distributed. Given sample size and the cautions against using arithmetic or parametric statistics on non-normal distribution of data, no further analysis of these results were made.

The results obtained while attempting to find correlations between type and LLS, rather than indicating a trend, are anomalous, and no additional tests were conducted. I had anticipated finding that certain strategies would be used either consistently higher or lower based on type. For example, Question 30 "I seek specific details in what I hear or read" and Question 39 "I look for patterns in the new language" both appear to be statements which may be considered to lie on the perceiving, information gathering dichotomy designated as **SN** (Sensing and iNtuition). The first statement, based on type theory, would be expected to be more likely to be associated with someone on the Sensing side of the pole, the latter on the iNtuition side of the pole. Given the lack of a significant sample size which hindered the analysis of data, it is impossible to conclude with any reasonable level of certainty whether this lack of statement correlation to type is meaningful. Quantitative data studies are best suited to large groups of individuals and lends itself well to the manipulation of numerous variables simultaneously. Researchers with greater

statistical acumen may have other ways in which to extract meaning from this data. Going forward, conducting such studies jointly with a statistician would likely facilitate more meaningful results.

6.4 Hypothesis Three: Conclusions and reflections for future similar studies

The qualitative analysis section of the thesis began by searching the open-ended responses to the initial survey in an attempt to answer the question of whether type could be predicated based on language used by respondents. The analysis was made with some success. However, analytic induction methodology requires the researcher to look for falsifying evidence and then to modify the theoretical conclusion in light of the evidence (Bloor & Wood, 2006). In this instance, sample size is not an issue; however, the initial survey was not designed with this type of analysis in mind, and a sufficiently large writing sample from each respondent was not obtained to be able to properly assess the data initially nor address deficiencies in the results.

For future studies, asking respondents to describe their own learning process, (e.g., Which language learning tasks do you enjoy? What are the steps you take when asked to write a paragraph in the language you are learning? Are there classroom activities you would prefer to skip if you could?), rather than the more general "What comes to your mind when you think about language learning?" may elicit responses which allow better categorization when using the *Characteristics of Learners by Psychological Type* (Figure 4). By narrowing the questions, the responses may provide better clues which allow the researcher to tease out whether the respondent is a, for example, collaborative, visual, left hemisphere or holistic learner, and may find greater success in categories respondents into type. There is a high probability that many participants in this or similar future studies will not have specifically studied how learning takes place, nor will they be aware of their own learning styles. Asking a respondent "Do you consider

yourself a concrete sequential or abstract conceptual learner?" and supply a brief definition of each would likely introduce issues of self-report biases into the responses.

6.5 Applications for Classroom Use and Curricula Development

Both the MBTI and the SILL are tools which can be used by educators when they consider how learners gather and process information. Instructing learners on the various types of strategies which can be used, particularly in a broad sense, (cognitive, memory, etc.) and then providing examples of each through the SILL statements may encourage students to expand their strategy use. It also gives learners an understanding that others may learn differently (not necessarily better or worse).

Even with a limit of sixteen categories, the MBTI, when introduced formally into a classroom setting, provides learners with a common framework and vocabulary to discuss their own preferences, and to understand how a classmate may approach an assignment in a different way. The MBTI takes a value-neutral approach to personality type, that is preferences are neither regarded as good or bad (Hayes, 2017; Myers et al., 1998). Therefore, type can be a non-confrontational tool to open up dialogue within a group or classroom around preference which may allow a learner to feel more comfortable in articulating their needs and permitting them to listen to the needs of others with less judgment.

In the conclusion to their 2002 study in which the MBTI was given to 116 students taking the introductory chemical engineering course at North Carolina State University, Felder et al., note that the MBTI does not provide a complete picture of a student's learning style model nor will it predict their success or failure in a particular course but it may offer useful clues with respect to compatibility between their learning style and the instructor's teaching style. However, "The goal is … not to determine students' learning styles and teach each student exclusively in

the manner that either he or she prefers. It is rather to "teach around the cycle," making sure that every style is addressed to some extent in the instruction" (p. 14). I would anticipate that where instructors work to include activities and instruction that lean into the strengths of the each of the dichotomous poles would be reflected in better results in student perception surveys.

The idea of "teaching around the cycle" should not be limited to classroom instruction. Hwu's (2007) study used the computer's tracking capability to record learners' behaviours with a grammar application and found that Sensing and iNtuitive students differed in how they preferred to receive and assimilate new information. While these different learning behaviours were not related to knowledge gains, a future study looking for correlation between student perception of online course effectiveness and type may yield valuable information for online course construction.

7. References

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8. Appendices

Appendix A – e-learning Platform Online Recruitment Letter

Recruitment Letter
for Online Language Students
on Waterloo LEARN

RESEARCH PARTICIPATION OPPORTUNITY

Hello, my name is Elizabeth Milne, and I am an MA student in the Department of German and Slavic Studies. I am currently working on my thesis under the supervision of Dr. Emma Betz. I am studying to determine whether the distribution of personality types in a second language class differs from the personality type distribution in the general population. I am also looking at the learning strategies language students typically implement during their studies. This research will hopefully lead to curricula development and course construction that is more individualized and geared to leverage how students prefer to gather information. In other words, the hope is this will lead to an enhanced language learning experience for students.

If you volunteer to be a participant in this study, you will be asked to complete two online surveys and one online assessment. In total you can expect it will take about 1 hour of your time. You are not expected to complete all three tasks at once. You choose the time(s) that best fits your schedule. You will receive $10 for your time regardless of whether you complete one, two or all three tasks.

To receive the results of the online personality type and language learning assessment, you will sign up to a 30 minute online webinar. Results are only available if you have completed all three tasks.

I would like to assure you that this study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee. However, the final decision about participation in this study is yours.

The Information Letter is available for your review at www.typeandlanguage.ca.

To participate, you can access the consent form and first survey here: Language Biography Survey.

If you have any questions, please contact me, Elizabeth Milne, at ewmilne@uwaterloo.ca.

Appendix B – Information Letter

UNIVERSITY OF WATERLOO

September 2017

Title of Project: ***Personality Type and Second Language Learning***

You are invited to participate in a research study conducted by ***Elizabeth Milne***, an MA student at the University of Waterloo, under the supervision of ***Professor Emma Betz, Department of German and Slavic Studies*** of the University of Waterloo, Canada. The objective of the research study is ***to explore the relationship between personality type, as defined by the Myers-Briggs Type Indicator® "MBTI®"*** **and the preferred learning strategies of undergraduate foreign language learners in a university setting using the Strategic Inventory for Language Learning© v. 5.1 (SILL©) questionnaire.** The study is for an MA thesis.

If you choose to volunteer, you will be completing three online surveys/questionnaires.

1. **Language Biography Survey.** This is a ***5-10*** minute language biography survey. The questions focus on your experience speaking and studying a language other than English.

2. **The Myers-Briggs Type Indicator® Instrument.** This questionnaire consists of 93 questions which ask you to choose between two possible answers. (E.g., When you go somewhere for the day, would you rather (a) plan what you will do and when, or (b) just go? Which word appeals to you more? (a) build or (b) invent?) The instrument requires you to log-into a third-party website, Psychometrics Canada, and takes approximately **20** minutes to complete. You will be given the opportunity to read Psychometrics' terms and conditions of use and provide consent prior to beginning the instrument. In order for this assessment to be valid, participants must answer all questions. There are no options to skip questions in this assessment. For purposes of report generation, you will be asked to specify a gender. Gender information is not collected but used when pronouns are included in generated reports. Identifying information is neither collected nor retained by the third party. At login you will be asked to use your UWaterloo email as a user name. This will allow the researcher to return your results and to correlate results to the other surveys. The MBTI® instrument sorts for preferences based on psychological traits as theorized by C.G. Jung.

   Note: The University of Waterloo Counselling Services offers students the MBTI assessment for a cost of $10. Participants of this study do not have to pay any fee for the assessment. Participants receive the instrument at no cost, a $10 value. The Student Researcher is an MBTI® Practitioner and certified to administer this psychometric assessment.

3. **The Strategic Inventory for Language Learning© v 5.1 (SILL©).** This survey asks you to read 80 statements, and rate how much the statement reflects the way you learn a second language. (E.g., I imitate the way native speakers talk. You choose one of five options ranging "Almost always true of me" to "Almost never true of me.") The survey takes approximately **30** minutes to complete.

Upon completion of the three tasks, participants attend a **30** minute online feedback session with Elizabeth Milne at which time results of both the MBTI® Instrument and SILL© Profile will be explained and returned.

When information is transmitted over the internet privacy cannot be guaranteed. There is always a risk your responses may be intercepted by a third party (e.g., government agencies, hackers). University of Waterloo researchers will not collect or use internet protocol (IP) addresses or other information which could link your participation to your computer or electronic device without first informing you.

Participation in this study is voluntary. You may decline to answer any questions in the email survey or SILL© survey. There are no known or anticipated risks from participating in this study. You can withdraw your participation at any time by informing the researchers or by not submitting survey responses. In exchange for your participation, you will be given $10. The amount received is taxable. It is your responsibility to report this amount for income tax purposes

It is important for you to know that any information you provide will be coded and stored in such a way that potential identifiers are not made available to University of Waterloo professors, staff or students. Elizabeth Milne is the sole individual with access to all information. All collected data will be coded and summarized in such a way that no one could be identified from the summarized results.

Student Investigator: ***Elizabeth Wendy Milne***
Department of German and Slavic Studies
University of Waterloo
ewmilne@uwaterloo.ca

Research Supervisor: ***Dr. Emma Betz***
Department of German and Slavic Studies
University of Waterloo
embetz@uwaterloo.ca
519-888-4567, Ext. 33360

The purpose of this study is to investigate whether the distribution of personality types, as defined by the "MBTI®", of foreign language or second language learners differs from the that of the general population. The study also seeks to investigate whether there is a relationship between personality type, and language learning strategies as defined by the SILL ©. Determining statistical correlations between personality type and student language learning strategies will provide language departments information which may permit a greater degree of individualization in curricula creation, in turn, enhancing student engagement.

University of Waterloo undergraduate students enrolled in Croatian, Dutch, French, German, Italian, Portuguese, Russian and Spanish are being offered the opportunity to participate in the study. As the study is dependent on volunteers, the final number of participants in the study is unknown at this time. You may withdraw from the study at any time without penalty by indicating this to the researcher or not submitting survey results. There are no known risks associated with participating in this study.

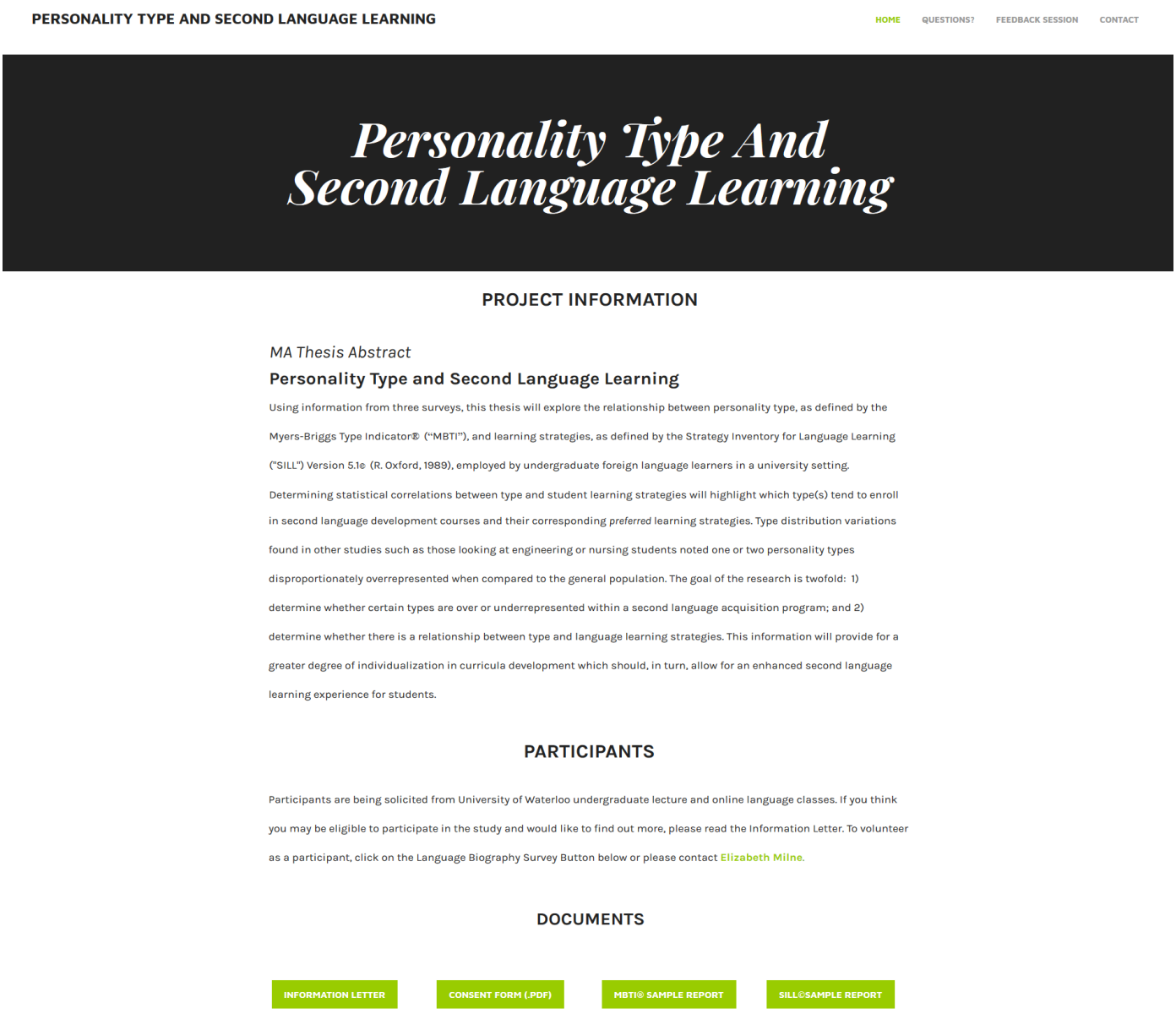
The collected data will be coded with participant numbers (not names) and will be kept in a locked area for five years after publication. After this time, all paper copies will be shredded and computer disks erased. Average data will be presented in all publications, and if an individual participant's data are presented in a figure, names or any identifying information will not be included. We will keep identifying information for a minimum of two years and our study records for a minimum of five years. You can withdraw consent to participate and have your data destroyed by contacting us within this time period. Only those associated with this study will have access to these password protected records. It is not possible to withdraw your consent once papers and publications have been submitted to publishers. All records will be destroyed according to University of Waterloo policy.

This study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE #21734). If you have any comments or concerns resulting from your participation in this study, please contact the Chief Ethics Officer, Office of Research Ethics, at 1-519-888-4567, ext. 36005 or ore-ceo@uwaterloo.ca.

If you have any questions later or require additional information about the study, please feel free to contact either Elizabeth Milne (ewmilne@uwaterloo.ca) or the project supervisor, Professor Emma Betz at 519-884-4567 Ext. 33360.

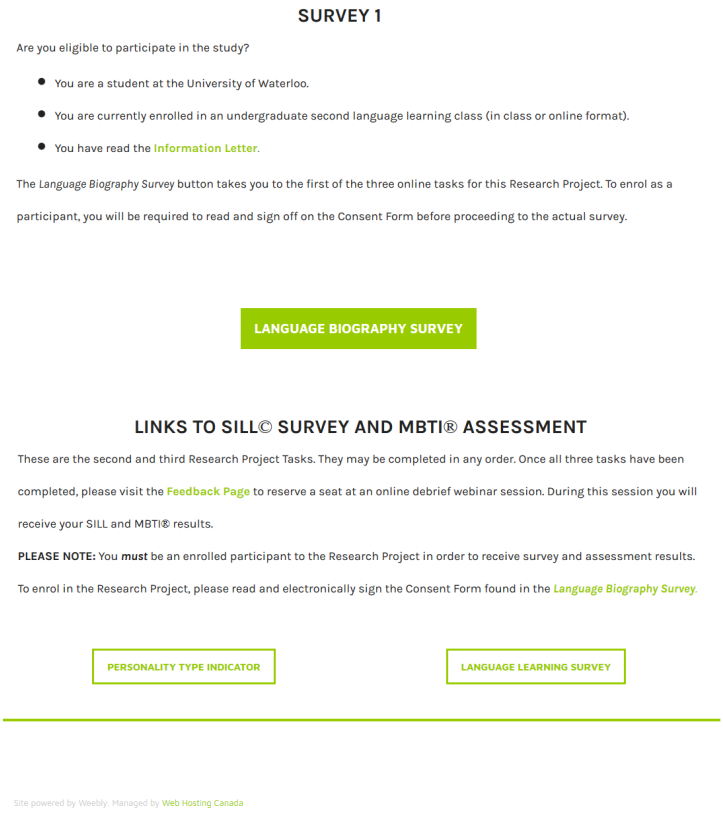
Appendix C – Personality Type and Second Language Website Screenshots

Home page of research website



Note: For legibility purposes, the home page of the *Personality Type and Language Learning* Website has been split in two. The bottom portion of the webpage is available on the following page.

Home page, bottom portion.



SURVEY 1

Are you eligible to participate in the study?

- You are a student at the University of Waterloo.
- You are currently enrolled in an undergraduate second language learning class (in class or online format).
- You have read the Information Letter.

The *Language Biography Survey* button takes you to the first of the three online tasks for this Research Project. To enrol as a participant, you will be required to read and sign off on the Consent Form before proceeding to the actual survey.

LANGUAGE BIOGRAPHY SURVEY

LINKS TO SILL© SURVEY AND MBTI® ASSESSMENT

These are the second and third Research Project Tasks. They may be completed in any order. Once all three tasks have been completed, please visit the Feedback Page to reserve a seat at an online debrief webinar session. During this session you will receive your SILL and MBTI® results.

PLEASE NOTE: You ***must*** be an enrolled participant to the Research Project in order to receive survey and assessment results. To enrol in the Research Project, please read and electronically sign the Consent Form found in the *Language Biography Survey*.

PERSONALITY TYPE INDICATOR

LANGUAGE LEARNING SURVEY

Site powered by Weebly. Managed by Web Hosting Canada

Questions page of the research website

Questions about the purpose of this MA Thesis Project?

Contact
- The Student Researcher: Elizabeth Wendy Milne
- The Research Supervisor: Dr. Emma Betz
  Department of German and Slavic Studies, University of Waterloo

Questions regarding the administration of this MA These Project?
(Confidentiality, provisions for data storage or destruction, research findings, thesis defence, etc.)

Contact
- The Student Researcher: Elizabeth Wendy Milne
- The Research Supervisor: Dr. Emma Betz
  Department of German and Slavic Studies, University of Waterloo

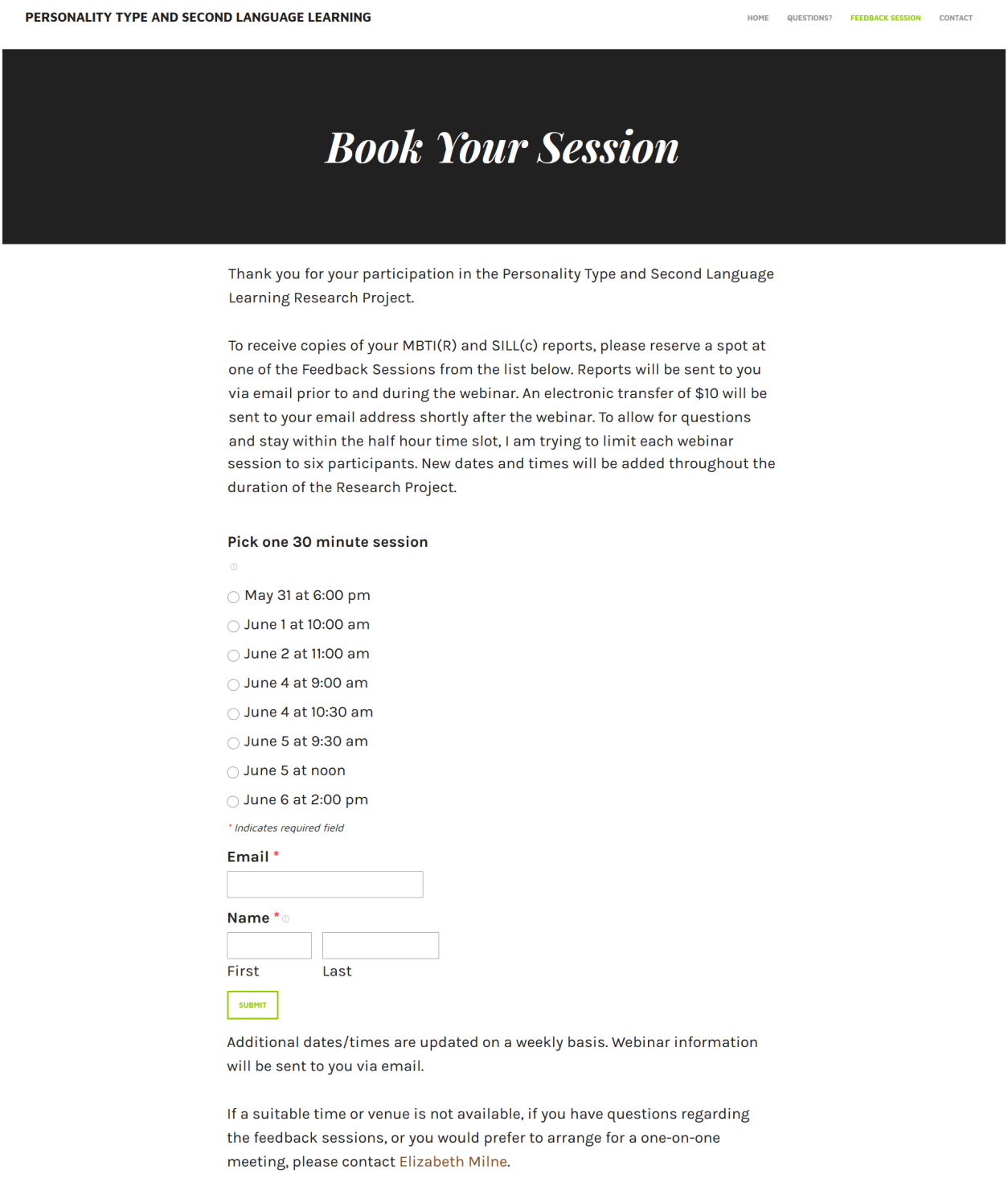
Questions about the results of your Myers-Briggs Type Indicator® (MBTI®) Instrument or Strategy Inventory for Language Learners© v 5.1 (SILL©)?

Contact
- The Student Researcher: Elizabeth Wendy Milne

Comments or concerns resulting from your participation in this study?

Contact
- The Office of Research Ethics, University of Waterloo
  Reference ORE #21734

Feedback page of research website



PERSONALITY TYPE AND SECOND LANGUAGE LEARNING

HOME QUESTIONS? FEEDBACK SESSION CONTACT

Book Your Session

Thank you for your participation in the Personality Type and Second Language Learning Research Project.

To receive copies of your MBTI(R) and SILL(c) reports, please reserve a spot at one of the Feedback Sessions from the list below. Reports will be sent to you via email prior to and during the webinar. An electronic transfer of $10 will be sent to your email address shortly after the webinar. To allow for questions and stay within the half hour time slot, I am trying to limit each webinar session to six participants. New dates and times will be added throughout the duration of the Research Project.

Pick one 30 minute session

- May 31 at 6:00 pm
- June 1 at 10:00 am
- June 2 at 11:00 am
- June 4 at 9:00 am
- June 4 at 10:30 am
- June 5 at 9:30 am
- June 5 at noon
- June 6 at 2:00 pm

* *Indicates required field*

Email *

Name *

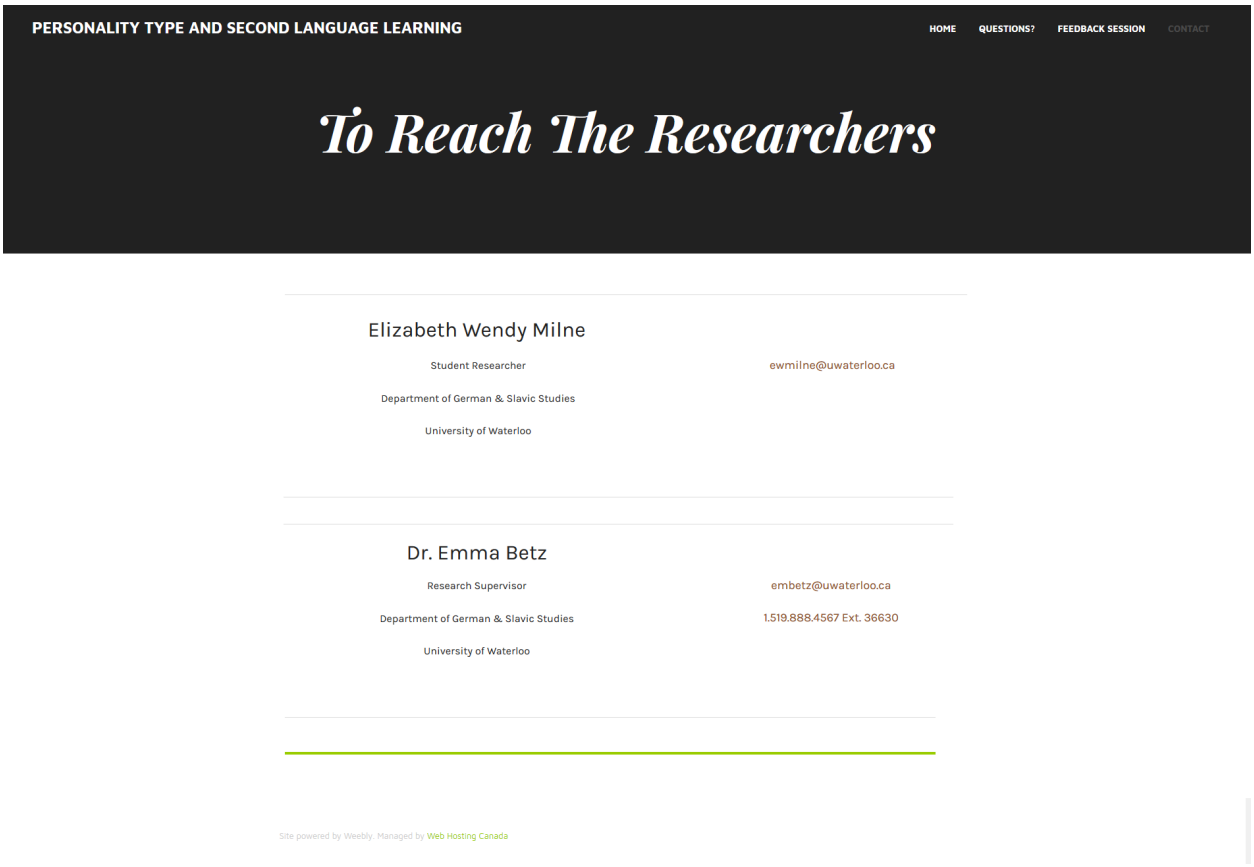
First Last

SUBMIT

Additional dates/times are updated on a weekly basis. Webinar information will be sent to you via email.

If a suitable time or venue is not available, if you have questions regarding the feedback sessions, or you would prefer to arrange for a one-on-one meeting, please contact Elizabeth Milne.

Contact page of research website



Appendix D – Consent Form

Language Biography Survey

Thank you for your interest in participating in the Personality Type and Second Language Learning Research Project. The Information Letter contains details regarding the project, including its scope, remuneration, data collection and usage, your rights as a participant, and how to contact the researchers and the University of Waterloo Office of Research Ethics. You may access the Information Letter and a copy of the Consent Form at any time at the Personality Type and Second Language Learning website.

To enrol as a participant in this research project, your informed consent is required.

CONSENT FORM

PLEASE NOTE, that by filling in your name below, you are not waiving your rights or releasing the investigator(s) or involved institution(s) from their legal and professional responsibilities.

I agree to take part in a research study beting conducted by Elizabeth Milne, student researcher under the supervision of Dr. Mathias Schulze, Department of German and Slavic Studies, University of Waterloo.

I have made this decision based on the information I have read in the Information Letter. All the procedures, any risks and benefits have been explained to me. I have had the opportunity to ask any questions and to receive any additional details I wanted about the study. If I have questions later about the study, I can ask either:

Elizabeth Milne Student Researcher Department of German and Slavic Studies Modern Languages ewmilne@uwaterloo.ca	Dr. Mathias Schulze Research Supervisor Department of German and Slavic Studies 1-519-888-4567 Ext. 36627 mschulze@uwaterloo.ca

I understand that I may withdraw from the study at any time without penalty by telling the researcher. I understand I am entitled to receive $10 remuneration for my participation, even should I not complete all three tasks.

This project has been reviewed by and received ethics clearance through a University of Waterloo Research Ethics Committee. I was informed that if I have any comments or concerns resulting from my participation in this study, I may contact the Cheif Ethics Officer, Office of Research Ethics, at 519-888-4567, ext. 36005 or ore-ceo@uwaterloo.ca.

CONSENT:

I have read the Research Project Information Letter and Consent Form.

I understand that by typing my name and email address into the fields below, I am providing my informed consent to be a participant in the Personality Type and Second Language Learning Research Project.

***First Name:**

***Surname:**

***UWaterloo email:**

Appendix E – Language Biography Survey

Thank you for agreeing to participate in the Type and Second Language Learning Research Project. This is the first of three tasks you will be asked to complete. The purpose of this survey is to gather some basic biographical and language specific information. This survey should take between 5 - 10 minutes to complete.

Gender:
- ◯ Male
- ◯ Female
- ◯ Other
- ◯ Prefer not to answer

Year of Birth:

Program of Study/Major/Minor

Term of Study (1A, 1B, etc.)

Current language classes at UWaterloo or other post secondary institution:

Past language classes at UWaterloo or other post secondary institution:

First language(s) spoken:

Second language(s) plus experience for each (E.g., 1 year at high school, lived 6 months in Mexico, speak with my grandparents occasionally, French immersion from Gr 1 to Gr 6, etc.)

What comes to mind when you think about foreign-language learning?

If you are studying multiple languages, please answer the following two questions based on one language only. Include the name of the language in your answer. Thank you.

What comes to mind when you think about the language you are studying?

What comes to mind when you think about the countries where this language is used? The people? The culture?

Thank you for completing the first survey. You may choose to complete the following two tasks in any order and at any time over the next two weeks. Links to both tasks are available at the Personality Type and Language Learning website www.typeandlanguage.ca.

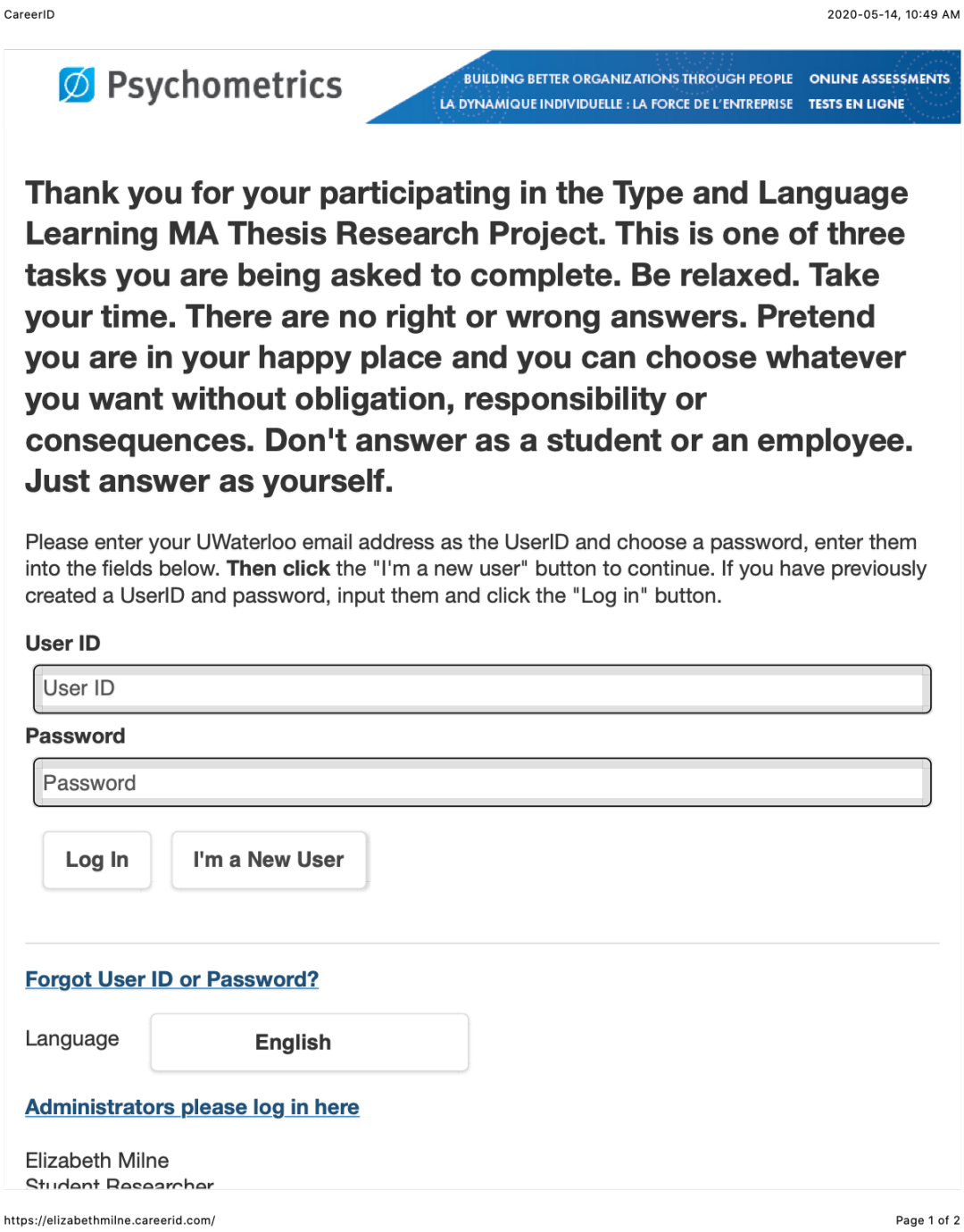
To access the Myers-Briggs Type Indicator(R) questionnaire, please go to elizabethmilne.careerid.com.

To access the SILL(c) survey, please go to SILL Questionnaire.

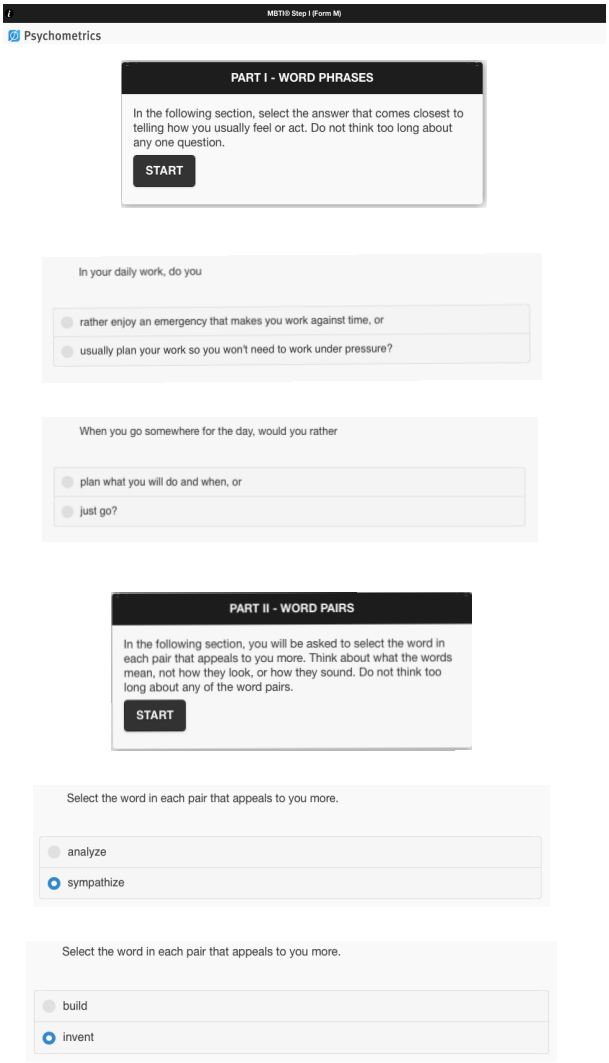
For more information on the project, please go to www.typeandlanguage.ca. If you have any questions, please contact Elizabeth Milne

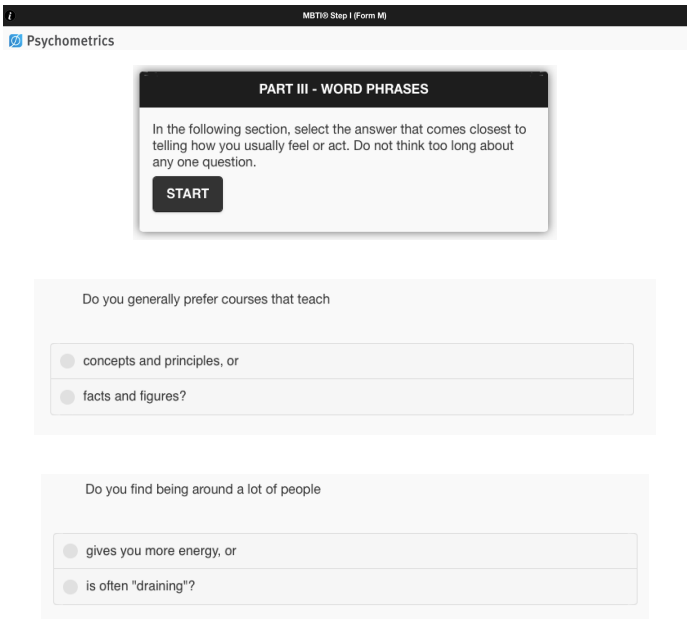
Powered by SimpleSurvey

Appendix F – Psychometrics Canada (MBTI) Login Page

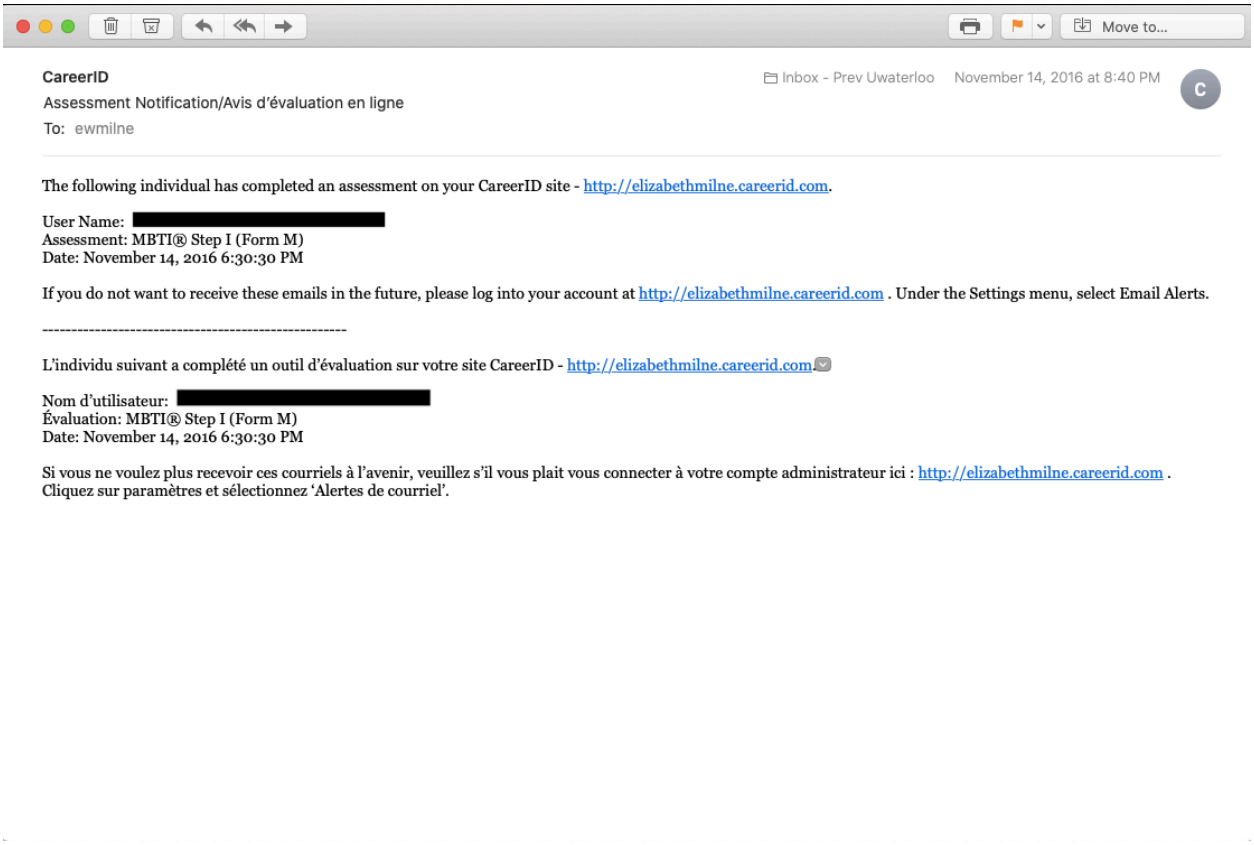


Appendix G – Sample of MBTI Questions




MBTI® Step I (Form M)
Psychometrics
PART III - WORD PHRASES
In the following section, select the answer that comes closest to telling how you usually feel or act. Do not think too long about any one question.
START
Do you generally prefer courses that teach
concepts and principles, or
facts and figures?
Do you find being around a lot of people
gives you more energy, or
is often "draining"?

Appendix H – MBTI Assessment Completion Notification Email



Move to...

CareerID

Inbox - Prev Uwaterloo November 14, 2016 at 8:40 PM

Assessment Notification/Avis d'évaluation en ligne

To: ewmilne

The following individual has completed an assessment on your CareerID site - http://elizabethmilne.careerid.com.

User Name: [redacted]
Assessment: MBTI® Step I (Form M)
Date: November 14, 2016 6:30:30 PM

If you do not want to receive these emails in the future, please log into your account at http://elizabethmilne.careerid.com . Under the Settings menu, select Email Alerts.

L'individu suivant a complété un outil d'évaluation sur votre site CareerID - http://elizabethmilne.careerid.com

Nom d'utilisateur: [redacted]
Évaluation: MBTI® Step I (Form M)
Date: November 14, 2016 6:30:30 PM

Si vous ne voulez plus recevoir ces courriels à l'avenir, veuillez s'il vous plait vous connecter à votre compte administrateur ici : http://elizabethmilne.careerid.com .
Cliquez sur paramètres et sélectionnez 'Alertes de courriel'.

Appendix I – Online SILL Questionnaire

To begin the survey, please enter your UWaterloo email address in the field below.

Are you currently studying more than one language?

When answering the following questions, please focus on only one of the languages you are currently studying. Please identify that language in the space provided.

A1	On learning a new word, I create associations between new material and what I already know.
A2	On learning a new word, I put the new word in a sentence so I can remember it.
A3	On learning a new word, I place the new word in a group with other words that are similar in some way (for example, words related to clothing, feminine sounds, function, etc.)
A4	On learning a new word, I associate the sound of the new word with the sound of a familiar word.
A5	On learning a new word, I use rhyming to remember it.
A6	On learning a new word, I remember the word by making a clear mental image of it or by drawing a picture.
A7	On learning a new word, I visualize the spelling of the new word in my mind.
A8	On learning a new word, I use a combination of sounds and images to remember the new word.
A9	On learning a new word, I list all the other words I know that are related to the new word and draw lines to show relationships.
A10	On learning a new word, I remember where the new word is listed on the page, or where I first saw or heard it.
A11	On learning a new word, I use flashcards with the new word on one side and the definition or other information on the other.
A12	On learning a new word, I physically act out the new word.
A13	When learning new material, I review often.
A14	When learning new material, I schedule my reviewing so that the review sessions are initially close together in time and gradually become more widely spread apart.
A15	When learning new material, I go back to refresh my memory of things I learned much earlier.

B1	I say or write new expressions repeatedly to practice them.
B2	I imitate the way native speakers talk.
B3	I read a story or dialogue several times until I understand it.
B4	I revise what I write in the new language to improve my writing.
B5	I practice the sounds or alphabet of the new language.
B6	I use idioms or other routines in the new language.
B7	I use familiar words in different combinations to make new sentences.
B8	I initiate conversations in the new language.

B9	I watch TV shows/movies, stream content or listen to the radio in the new language.
B10	I try to think in the new language.
B11	I attend and participate in out-of-class events where the new language is spoken.
B12	I read for pleasure in the new language.
B12	I write personal notes, messages, letters, or reports in the new language.
B14	I skim the reading passage first to get the main idea, then I go back and read it more carefully.
B15	I seek specific details in what I hear or read.
B16	I use reference materials such as glossaries or dictionaries to help me use the new language.
B17	I take notes in class in the new language.
B18	I make summaries of new language material.
B19	I apply general rules to new situations when using the language.
B20	I find the meaning of a word by dividing the word into parts which I understand.
B21	I look for similarities and contrasts between the new language and my own.
B22	I try to understand what I have heard or read without translating it word-for-word into my own language.
B23	I am cautious about transferring words or concepts directly from my language to the new language.
B24	I look for patterns in the new language.
B25	I develop my own understanding of how the language works, even if sometimes I have to revise my understanding based on new information.
C1	When I do not understand all the words I read or hear, I guess the general meaning by using any clue I can find, for example, clues from the context or situation.
C2	I read without looking up every unfamiliar word.
C3	In a conversation, I anticipate what the other person is going to say based on what has been said so far.
C4	If I am speaking and cannot think of the right expression, I use gestures or switch back to my own language momentarily.
C5	I ask the other person to tell me the right word if I cannot think of it in conversation.
C6	When I cannot think of the correct expression to say or write, I find a different way to express the idea; for example, I use a synonym or describe the idea.
C7	I make up new words if I do not know the right ones.
C8	I direct the conversation to a topic for which I know the words.
D1	I preview the language lessons to get a general idea of what it is about, how it is organized, and how it relates to what I already know.
D2	When someone is speaking the new language, I try to concentrate on what the person is saying and put unrelated topics out of my head.
D3	I decide in advance to pay special attention to specific language aspects; for example, I focus on the way native speakers pronounce certain words.

D4	I try to find out all I can about how to be a better language learner by reading books or articles, or by talking with others about how to learn.
D5	I arrange my schedule to study and practice the new language consistently, not just when there is the pressure of a test.
D6	I arrange my physical environment to promote learning; for instance, I find a quite, comfortable place to review.
D7	I organize my language notebook (handwritten or electronic) to record important language information.
D8	I plan my goals for language learning, for instance, how proficient I want to become or how I might want to use the language in the long run.
D9	I plan what I am going to accomplish in language learning each day or each week.
D10	I prepare for an upcoming language task (such as giving a presentation in the new language) by considering the nature of the task, what I need to know, and my current language skills.
D11	I clearly identify the purpose of the language activity; for instance, in a listening task I might need to listen for the general idea or for specific fact.
D12	I take responsibility for finding opportunities to practice the new language.
D13	I actively look for people with whom I can speak the new language.
D14	I try to notice my language errors and find out the reasons for them.
D15	I learn from my mistakes in using the new language.
D16	I evaluate the general progress I have made in learning the language.
E1	I try to relax whenever I feel anxious about using the new language.
E2	I make encouraging statements to myself so that I will continue to try hard and do my best in language learning.
E3	I actively encourage myself to take wise risks in language learning, such as guessing meanings or trying to speak, even though I might make some mistakes.
E4	I give myself a tangible reward when I have done something well in my language learning.
E5	I pay attention to physical signs of stress that might affect language learning.
E6	I keep a private diary, journal or blog where I write my feelings about language learning.
E7	I talk to someone I trust about my attitudes and feelings concerning the language learning process.

Appendix J – Sample SILL Report

PROFILE OF RESULTS
STRATEGY INVENTORY FOR LANGUAGE LEARNING

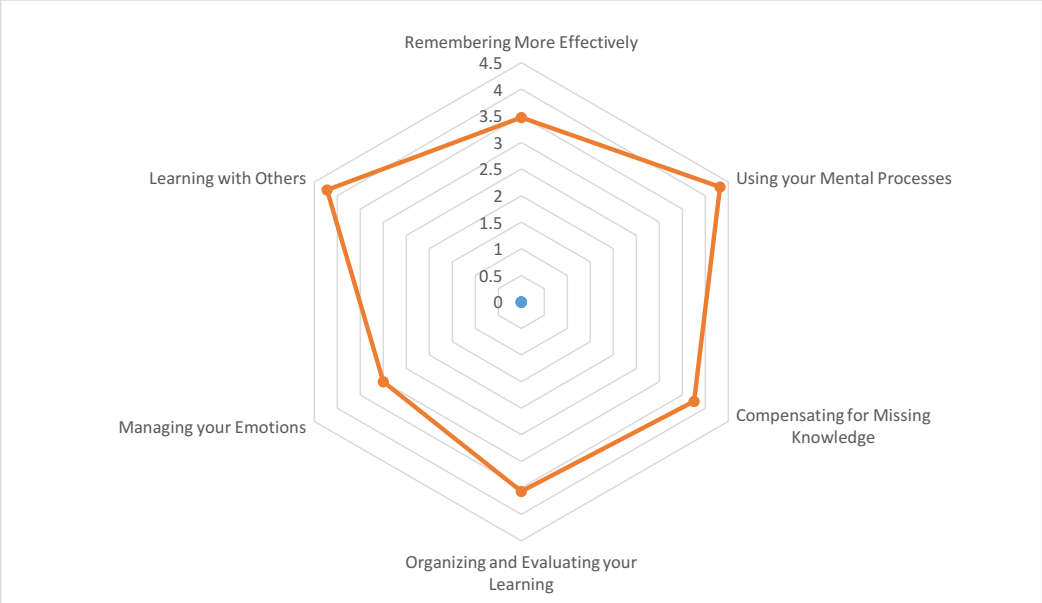
Version 5.1 © R. Oxford, 1989

This Profile summarizes your results on SILL and shows the kinds of strategies you use in learning a new language. Please note: ***There are no right or wrong answers and NO "best" average scores for each part***. People learn languages differently.

STRATEGIES COVER:	YOUR AVERAGE
Remembering More Effectively Grouping; making associations; placing new words into a context to remember them; using imagery, sounds, sound-and-image combinations, actions, etc. in order to remember new expressions; reviewing in a structured way; going back to review earlier material.	3.5
Using your Mental Processes Repeating; practicing with sounds and writing systems; using formulas and patterns; recombining familiar items in new ways; practicing the language in a variety of authentic situations; involving the four skills (listening, reading, speaking and writing); skimming and scanning to get the idea quickly; using reference resources; taking notes; summarizing; reasoning deductively (applying general rules); analyzing expressions; analyzing contrastively via comparisons with another language; being cautious about word-for-word translating and direct transfers from another language; looking for language patterns; adjusting your understanding according to new information.	4.3
Compensating for Missing Knowledge Using all possible clues to guess the meaning of what is heard or read in the new language; trying to understand the overall meaning and not necessarily every single word; finding ways to get the message across in speaking or writing despite limited knowledge of the new language; for instance, using gestures, switching to your own language momentarily, using a synonym or description, coining new words.	3.8
Organizing and Evaluating your Learning Overviewing and linking with material you already know; deciding in general to pay attention; deciding to pay attention to specific details; finding out how language learning works; arranging to learn (schedule, environment, notebook); setting goals and objectives; identifying the purpose of a language task; planning for a language task; finding practice opportunities; noticing and learning from your errors; evaluation your progress.	3.6
Managing your Emotions Lowering your anxiety; encouraging yourself through positive statements; taking risks wisely; rewarding yourself; noting physical stress; keeping a language learning diary; talking with someone about your feelings/attitudes	3.0
Learning with Others Asking questions for clarification or verification; asking for correction; cooperating with peers; cooperating with proficient users of the new language; developing cultural awareness; becoming aware of others' thoughts and feelings	4.2

Key to understanding your averages:

High	Always or almost always used	4.5 – 5.0
	Generally used	3.5 – 4.4
Medium	Sometimes Used	2.5 – 3.4
Low	Generally not used	1.5 – 2.4
	Never or almost never used	1.0 – 1.4



YOUR OVERALL AVERAGE 3.8

The overall average indicates how frequently you use language learning strategies in general. The averages for each part of the SILL show which groups of strategies you tend to use the most in learning a new language. You might find the averages for each part of the SILL are more useful than your overall average.

Optimal use of language learning strategies depends on your age, personality, stage of language learning, purpose for learning the language, previous experience, and other factors. Nevertheless, there may be some language learning strategies you are not using which might be beneficial to you. You may request a copy of your individual survey results. You may also which to research information on language learning strategies.

JANE SAMPLE / **ENFP** / August 1, 2010

MBTI® Profile
COLLEGE EDITION

This profile presents your results on the MBTI® assessment and reports which of sixteen different personality types best describes you, based on the responses you gave when taking the assessment. Your personality type is made up of your preferences in four separate categories that together describe how you typically go about noticing and thinking about things and interacting with people and the world. As shown below, each category is composed of two opposite preferences.

THE FOUR CATEGORIES OF PERSONALITY TYPE	THE PREFERENCES		
Where you focus your attention	E **Extraversion**	or	I **Introversion**
The way you take in information	S **Sensing**	or	N **Intuition**
The way you make decisions	T **Thinking**	or	F **Feeling**
How you deal with the world	J **Judging**	or	P **Perceiving**

The four letters denoting your preferences—E or I, S or N, T or F, and J or P—combine to form a code for your personality type. Based on your responses, your personality type code is **ENFP**.

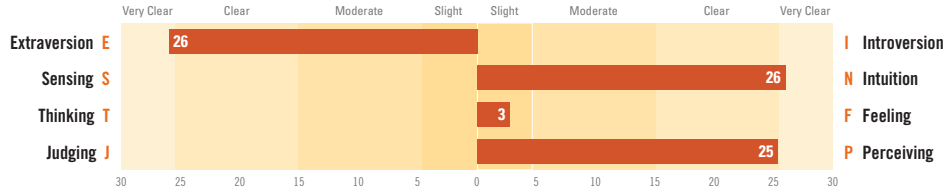
ENFP

Where you focus your attention	**E** **Extraversion** Focusing attention on the outer world of people and things	**I** **Introversion** Focusing attention on the inner world of ideas and impressions
The way you take in information	**S** **Sensing** Taking in information through the five senses, with a focus on the here and now	**N** **Intuition** Taking in information by seeing patterns and the big picture, with a focus on future possibilities
The way you make decisions	**T** **Thinking** Making decisions mostly on the basis of logic and objective analysis	**F** **Feeling** Making decisions mostly on the basis of values and subjective, people-centered concerns
How you deal with the world	**J** **Judging** Taking a planned and organized approach to life, liking things to be settled	**P** **Perceiving** Taking a flexible, spontaneous approach to life, liking to keep options open

MBTI® Profile
COLLEGE EDITION

The MBTI assessment not only reports your preferences but also tells how clear you were in selecting each preference over its opposite. This is called the *preference clarity index*, or pci. The graph below depicts your pci results in each of the four categories.

PCI RESULTS: ENFP



Some of the personality characteristics typically associated with ENFP are summarized below. Do they seem to fit? Many find that their MBTI results describe them quite well. Others find that changing a letter or two helps them arrive at a type that more accurately describes them. Your counselor can give you more insight into the type described and/or help you find a better match if needed.

ENFP SNAPSHOT

ISTJ	ISFJ	INFJ	INTJ
ISTP	ISFP	INFP	INTP
ESTP	ESFP	**ENFP**	ENTP
ESTJ	ESFJ	ENFJ	ENTJ

- Curious, creative, and imaginative
- Energetic, enthusiastic, and spontaneous
- Unusually perceptive of people and of what's going on in the world around them
- Like affirmation from others; support others and readily express appreciation
- Likely to value harmony and goodwill
- Apt to make decisions on the basis of personal values and empathy
- Often seen by others as friendly, perceptive, persuasive, and versatile

Each type, or combination of preferences, tends to be characterized by its own collection of interests, values, and unique strengths. Whatever your preferences, you also behave in ways that may show opposite preferences. For more information on personality type and the impact it can have on important areas of your life, such as learning, careers, and college life, visit www.cpp.com/ITTseries for a list of Introduction to Type® booklets.

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ENFP - Additional Information

To help you on your way to better understand how an ENFP personality type tends to move through the world, I've provided you with a bit of extra information. These quotes come from just two sources. MBTI has a long history and is well known so information is readily available if you would like to learn more.

> ENFPs are outgoing, dynamic, lively, and spontaneous They often have a good sense of humour and their enthusiasm and joy for life can be contagious. ENFPs have rich imaginations and active minds. Their thoughts are always wandering and their moods ever changing. They can be on one track in one minute and on another track in the next. (Baron 134)

> ENFPs see life as a creative adventure full of exciting possibilities. Unusually perceptive about people and the world, they are insightful about the present and future. ENFPs experience a wide range of feelings and intense emotions. They need affirmation from others and readily give appreciation and support. (Kirby and Myers 30)

> ENFPs enjoy telling stories, being centre stage, and having meaningful conversations. They often like attending workshops and classes and belonging to many groups. Quieter activities such as reading, writing, and creative projects are also pleasurable, but they don't like to do them alone for too long. They have a knack for making ordinary events exciting and fun, without much planning. ENFPs enjoy keeping their life active, spontaneous, and pursuing new experiences. (Baron 136)

ENFPs make up 8.1% of the general North American population, and are often referred to as the "imaginative motivators."

A reminder: Everybody is unique. These preferences are applied in broad terms and you may find you resonate more with certain elements that are common of this personality type than others. That's normal and to be expected. Preferences are just that, preferences. As a complex, intelligent and adaptive human being, you can and will learn how to develop and use all facets of the personality traits in different situations as needed. The ENFP is best considered a default position and your starting point when engaging with the world.

WORKS CITED

Baron, Renee. *What Type Am I? Discover Who You Really Are*. New York: Penguin Books, 1998. Print.

Kirby, Linda K, and Myers, Katherine D., eds. *Introduction to Myers-Briggs Type: A Guide to Understanding Your Results on the MBTI Assessment.* Seventh. Sunnyvale CA: CPP, Inc., 2015. Print.

A *very* brief overview of the sixteen MBTI® Personality Types*

Sensing Judging Types (SJ)

ISTJ The Responsible Realist

Quiet, serious, succeed by being thorough and dependable. Practical, matter-of-fact, realistic, and responsible. Decide logically what should be done and work toward it steadily, regardless of distractions. Take pleasure in making everything orderly and organized — their work, their home, their life. Value traditions and loyalty.

ESTJ The Efficient Organizer

Practical, realistic, matter-of-fact. Decisive, quickly move to implement decisions. Organize projects and people to get things done, focus on getting results in the most efficient way possible. Take care of routine details. Have a clear set of logical standards, systematically follow them and want others to also. Forceful in implementing their plans.

ISFJ The Practical Helper

Quiet, friendly, responsible, and conscientious. Committed and steady in meeting their obligations. Thorough, painstaking, and accurate. Loyal, considerate, notice and remember specifics about people who are important to them, concerned with how others feel. Strive to create an orderly and harmonious environment at work and home.

ESFJ The Supportive Contributor

Warmhearted, conscientious, and cooperative. Want harmony in their environment, work with determination to establish it. Like to work with others to complete tasks accurately and on time. Loyal, follow through even in small matters. Notice what others need in their day-to-day lives and try to provide it. Want to be appreciated for who they are and what they contribute.

Sensing Perceiving Types (SP)

ESTP The Energetic Problem Solver

Flexible and tolerant, take a pragmatic approach focused on immediate results. Bored by theories and conceptual explanations; want to act energetically to solve the problem. Focus on the here and now, spontaneous, enjoy each moment that they can be active with others. Enjoy material comforts and style. Learn best through doing.

ISTP The Logical Pragmatist

Tolerant and flexible, quiet observers until a problem appears, then act quickly to find workable solutions. Analyze what makes things work and readily get through large amounts of data to isolate the core of practical problems. Interested in cause and effect, organize facts using logical principles, value efficiency.

ESFP The Enthusiastic Improviser

Outgoing, friendly, and accepting. Exuberant lovers of life, people, and material comforts. Enjoy working with others to make things happen. Bring common sense and a realistic approach to their work, and make work fun. Flexible and spontaneous, adapt readily to new people and environments. Learn best by trying a new skill with other people.

ISFP The Versatile Supporter

Quiet, friendly, sensitive, and kind. Enjoy the present moment, what's going on around them. Like to have their own space and to work within their own time frame. Loyal and committed to their values and to people who are important to them. Dislike disagreements and conflicts, don't force their opinions or values on others.

* Kirby, Linda K. and Myers, Katherine D., eds. Introduction to Myers-Briggs Type: A Guide to Understanding Your Results on the MBTI Assessment. Seventh. Sunnyvale CA: CPP, Inc. 2015

A *very* brief overview of the sixteen MBTI® Personality Types*

Intuiting Thinking Types (NT)

ENTJ The Decisive Strategist

Frank, decisive, assume leadership readily. Quickly see illogical and inefficient procedures and policies, develop and implement comprehensive systems to solve organizational problems. Enjoy long-term planning and goal setting. Usually well informed, well read, enjoy expanding their knowledge and passing it on to others Forceful in presenting their ideas.

INTJ The Conceptual Planner

Have original minds and great drive for implementing their ideas and achieving their goals. Quickly see patterns in external events and develop long-range explanatory perspectives. When committed, organize a job and carry it through. Skeptical and independent, have high standards of competence and performance — for themselves and others.

ENTP The Enterprising Explorer

Quick, ingenious, stimulating, alert, and outspoken. Resourceful in solving new and challenging problems. Adept at generating conceptual possibilities and then analyzing them strategically. Good at reading other people. Bored by routine, will seldom do the same thing the same way, apt to turn to one new interest after another.

INTP The Objective Analyst

Seek to develop logical explanations for everything that interests them. Theoretical and abstract, interested more in ideas than in social interaction. Quiet, contained, flexible, and adaptable. Have unusual ability to focus in depth to solve problems in their area of interest. Skeptical, sometimes critical, always analytical.

Intuiting Feeling Types (NF)

INFJ The Insightful Visionary

Seek meaning and connection in ideas, relationships, and material possessions.Want to understand what motivates people and are insightful about others. Conscientious and committed to their firm values. Develop a clear vision about how best to serve the common good. Organized and decisive in implementing their visions.

ENFJ The Compassionate Facilitator

Warm, empathetic, responsive, and responsible. Highly attuned to the emotions, needs, and motivations of others. Find potential in everyone, want to help others fulfill their potential. May act as catalysts for individual and group growth. Loyal, responsive to praise and criticism. Sociable, facilitate others in a group, and provide inspiring leadership.

INFP The Thoughtful Idealist

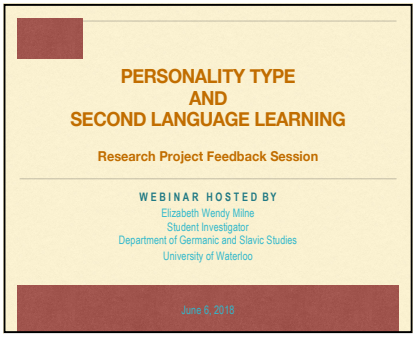
Idealistic, loyal to their values and to people who are important to them. Want to live a life that is congruent with their values. Curious, quick to see possibilities, can be catalysts for implementing ideas. Seek to understand people and to help them fulfill their potential. Adaptable, flexible, and accepting unless a value is threatened.

ENFP The Imaginative Motivator

Warmly enthusiastic and imaginative. See life as full of possibilities. Make connections between events and information very quickly, and confidently proceed based on the patterns they see. Want a lot of affirmation from others, and readily give appreciation and support. Spontaneous and flexible, often rely on their ability to improvise and their verbal fluency.

* Kirby, Linda K. and Myers, Katherine D., eds. Introduction to Myers-Briggs Type: A Guide to Understanding Your Results on the MBTI Assessment. Seventh. Sunnyvale CA: CPP, Inc. 2015

Appendix L – Feedback Session PowerPoint Presentation Slides



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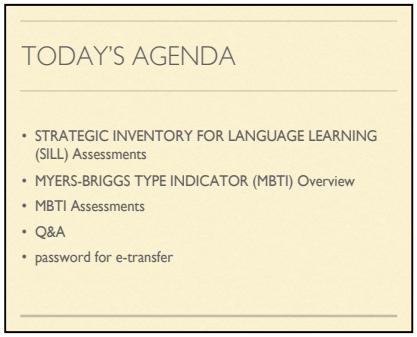

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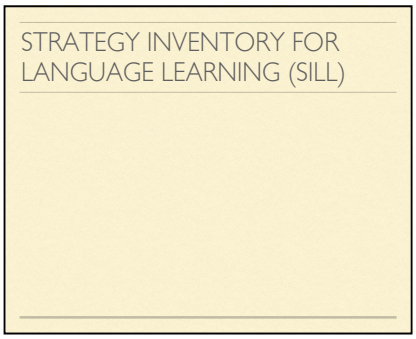

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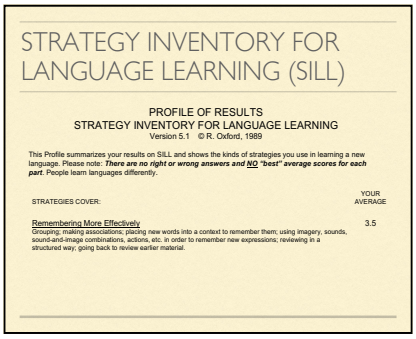

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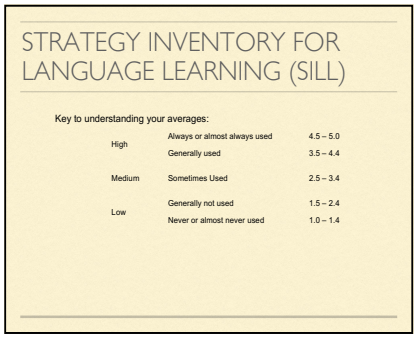
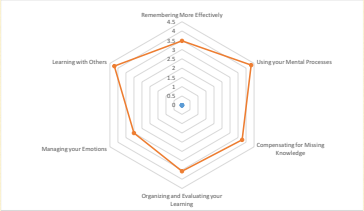


6

1

STRATEGY INVENTORY FOR LANGUAGE LEARNING (SILL)



7

STRATEGY INVENTORY FOR LANGUAGE LEARNING (SILL)

YOUR OVERALL AVERAGE 3.8

The overall average indicates how frequently you use language learning strategies in general. The averages for each part of the SILL show which groups of strategies you tend to use the most in learning a new language. You might find the averages for each part of the SILL are more useful than your overall average.

8

MBTI®

- Based on a theory of personality type developed by Carl Jung (1875-1961) a Swiss Psychiatrist
- Refined over twenty years of study by Katharine C. Briggs (1875-1968)
- Isabel Briggs Myers (1897-1980) developed questions that became the Myers-Briggs Type Indicator Instrument in 1943



9

MBTI®

JUNG'S PERSONALITY THEORY:

- Every person carries out two kinds of mental processes:
  - We take in information
  - Then we make decisions about the information
- Everyone has preferred ways of using these mental processes
- Each person has a preference for the outer world or the inner world
- Each person has a preferred way of orienting themselves to the outside world.

10

MBTI® THEORY

Four pairs of opposites—like our right and left hands. We all use both sides of each pair, but one is our natural preference.

The MBTI® instrument is designed to indicate those inborn preferences.

The MBTI instrument is ***not*** designed to measure skills or effects of environment.

11

MBTI®

The MBTI® instrument indicates preferences on four pairs of opposites, called *dichotomies:*

Extraversion	**E**	*or*	**I**	Introversion
Sensing	**S**	*or*	**N**	Intuition
Thinking	**T**	*or*	**F**	Feeling
Judging	**J**	*or*	**P**	Perceiving

12

EXTRAVERSION (E) OR INTROVERSION (I)

Where we focus our attention and get energy

Source: Introduction to Myers-Briggs® Type (7th ed.), I. B. Myers, p. 5.

13

E – I DIFFERENCES

People who prefer Extraversion:
- Direct their energy and attention outward
- Focus on the outer world of people and activity

People who prefer Introversion:
- Direct their energy and attention inward
- Focus on their inner world of ideas and experiences

We all use both preferences, but usually not with equal comfort.

Source: Introduction to Myers-Briggs® Type (7th ed.), I. B. Myers, p. 5.

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WHERE PEOPLE FOCUS THEIR ATTENTION

People who prefer Extraversion (E)
- Are energized by interacting with others
- Are sociable and expressive
- Prefer to communicate face-to-face
- Work out ideas by talking them through
- Have broad interests in many things
- Learn best through doing or discussing
- Readily take initiative in work and relationships

People who prefer Introversion (I)
- Are energized by opportunity to reflect
- Are private and contained
- Prefer to communicate by writing
- Work out ideas by thinking them through
- Focus in depth on their interests
- Learn best by reflection, mental "practice"
- Take initiative when the situation or issue is very important to them

Source: Introduction to Myers-Briggs® Type (7th ed.), I. B. Myers, p. 5.

15

KEY WORDS ASSOCIATED WITH **E** – **I**

Extraversion
Action
Outward
People
Interaction
Many
Expressive
Do-Think-Do

Introversion
Reflection
Inward
Privacy
Concentration
Few
Quiet
Think-Do-Think

16

SENSING (S) OR INTUITION (N)

The way we take in information and the kind of information we like and trust

Source: Introduction to Myers-Briggs® Type (7th ed.), I. B. Myers, p. 5.

17

S – N DIFFERENCES

People who prefer Sensing:
- Focus on present realities, verifiable facts, and experience

People who prefer Intuition:
- Focus on future possibilities, the big picture, and insights

We all use both ways of perceiving, but we typically prefer and trust one of them more.

Source: Introduction to Myers-Briggs® Type (7th ed.), I. B. Myers, p. 5.

18

HOW PEOPLE TAKE IN INFORMATION

People who prefer Sensing (S)

- Focus on what is real and actual
- Observe and remember specifics
- Are factual, concrete, and sequential
- Build carefully and thoroughly toward conclusions
- Understand ideas and theories through practical applications
- Are specific and literal
- Trust experience

People who prefer Intuition (N)

- Focus on patterns and meanings
- Remember specifics when they relate to a pattern
- Are abstract and imaginative
- Move quickly to conclusions, follow hunches
- Generate ideas and theories; application is secondary
- Use metaphors and analogies
- Trust insight

Source: Introduction to Myers-Briggs® Type (7th ed.), I. B. Myers, p. 5.

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KEY WORDS ASSOCIATED WITH S – N

Sensing		Intuition
Facts	S N	Ideas
Realistic		Imaginative
Specific		General
Present		Future
Keep		Change
Practical		Theoretical
What is		What could be

20

THINKING (T) OR FEELING (F)

The way we make decisions

Source: Introduction to Myers-Briggs® Type (7th ed.), I. B. Myers, p. 6.

21

T – F DIFFERENCES

People who prefer Thinking:

- Make their decisions based on impersonal, objective logic

People who prefer Feeling:

- Make their decisions based on personal priorities and relationships

Both processes are rational and we use both, but usually not with equal ease.

Source: Introduction to Myers-Briggs® Type (7th ed.), I. B. Myers, p. 6.

22

HOW PEOPLE MAKE DECISIONS

People who prefer Thinking (T)

- Step back to get an objective view
- Analyze
- Use cause-and-effect reasoning
- Solve problems with logic
- Strive for an objective standard of truth
- Are "reasonable"
- Can be "tough-minded"
- Are fair—want everyone to be treated equally

People who prefer Feeling (F)

- Step in to identify with those involved
- Empathize
- Are guided by personal and group values
- Assess impacts of decisions on people
- Strive for harmony and positive interactions
- Are compassionate
- May appear "tenderhearted"
- Are fair—want everyone to be treated as an individual

Source: Introduction to Myers-Briggs® Type (7th ed.), I. B. Myers, p. 6.

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KEY WORDS ASSOCIATED WITH T – F

Thinking		Feeling
Detached	T F	Personal
Things		People
Objective		Subjective
Critique		Praise
Analyze		Understand
Firm but fair		Merciful

24

JUDGING (J) OR PERCEIVING (P)

Our attitude toward the external world and how we orient ourselves to it

Source: Introduction to Myers-Briggs® Type (7th ed.),. I. B. Myers, p. 6.

25

J – P DIFFERENCES

People who prefer Judging:

- Want the external world to be organized and orderly
- Look at the world and see decisions that need to be made

People who prefer Perceiving:

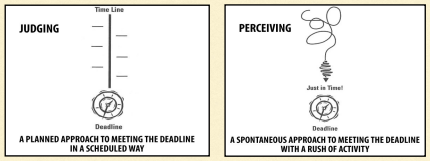
- Seek to experience the world, not organize it
- Look at the world and see options that need to be explored

We all use both attitudes, but usually not with equal comfort.

Source: Introduction to Myers-Briggs® Type (7th ed.),. I. B. Myers, p. 6.

26

J – P ILLUSTRATION



Source: Introduction to Type® and Change, N. J. Barger & L. K. Kirby, p. 5.

27

HOW PEOPLE APPROACH LIFE

People who prefer Judging (J)

- Organized
- Systematic
- Methodical
- Make short- and long-term plans, and then follow them
- Like to have things decided
- Resist reopening decisions
- Try to avoid last-minute stresses

People who prefer Perceiving (P)

- Adaptable and curious
- Casual
- Open-ended
- Adjust flexibly to new information and changes
- Like to explore options
- Resist cutting off options, making decisions too soon
- Feel energized by last-minute pressures

Source: Introduction to Myers-Briggs® Type (7th ed.),. I. B. Myers, p. 6.

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KEY WORDS ASSOCIATED WITH J – P

Judging		Perceiving
Organized	J P	Flexible
Decision		Information
Control		Experience
Now		Later
Closure		Options
Deliberate		Spontaneous
Plan		Wait

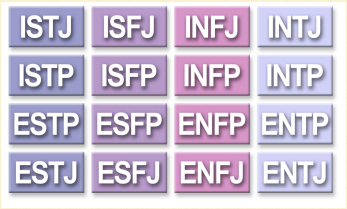
29

PERSONALITY TYPE

When combined, your preferences indicate your personality type.

30

16 PERSONALITY TYPES



31

MEANING OF RESULTS

- The MBTI® instrument does ***not*** measure how much or how well you do something
- It is intended to indicate your innate preferences
- The number or category reported with the letter = the clarity with which you indicated your preference

32

QUESTIONS

33

E-TRANSFER PASSWORD

Hamilton

34

PERSONALITY TYPE
AND
SECOND LANGUAGE LEARNING

Research Project Feedback Session

Thank you!

Elizabeth Milne – June 6, 2018

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Appendix M – Mann-Whitney U Hypothesis Test Summaries

Dependent Variables – Memory Strategy Questions 1 – 15
Independent Variable – SN Scale

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Memory1 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.061	Retain the null hypothesis.
2	The distribution of Memory2 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.858	Retain the null hypothesis.
3	The distribution of Memory3 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.851	Retain the null hypothesis.
4	The distribution of Memory4 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.201	Retain the null hypothesis.
5	The distribution of Memory5 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.277	Retain the null hypothesis.
6	The distribution of Memory6 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.222	Retain the null hypothesis.
7	The distribution of Memory7 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.545	Retain the null hypothesis.
8	The distribution of Memory8 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.978	Retain the null hypothesis.
9	The distribution of Memory9 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.568	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
10	The distribution of Memory10 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.806	Retain the null hypothesis.
11	The distribution of Memory11 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.082	Retain the null hypothesis.
12	The distribution of Memory12 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.522	Retain the null hypothesis.
13	The distribution of Memory13 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.882	Retain the null hypothesis.
14	The distribution of Memory14 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.349	Retain the null hypothesis.
15	The distribution of Memory15 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.226	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Dependent Variables – Memory Strategy Questions 1 – 15
Independent Variable – TF Scale

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Memory1 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.785	Retain the null hypothesis.
2	The distribution of Memory2 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.155	Retain the null hypothesis.
3	The distribution of Memory3 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.851	Retain the null hypothesis.
4	The distribution of Memory4 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.041	Reject the null hypothesis.
5	The distribution of Memory5 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.843	Retain the null hypothesis.
6	The distribution of Memory6 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.989	Retain the null hypothesis.
7	The distribution of Memory7 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.618	Retain the null hypothesis.
8	The distribution of Memory8 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.562	Retain the null hypothesis.
9	The distribution of Memory9 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.846	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
10	The distribution of Memory10 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.744	Retain the null hypothesis.
11	The distribution of Memory11 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.583	Retain the null hypothesis.
12	The distribution of Memory12 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.161	Retain the null hypothesis.
13	The distribution of Memory13 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.543	Retain the null hypothesis.
14	The distribution of Memory14 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.497	Retain the null hypothesis.
15	The distribution of Memory15 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.828	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Dependent Variables – Cognitive Strategy Questions 1 – 25
Independent Variable – SN Scale

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Cognitive1 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.319	Retain the null hypothesis.
2	The distribution of Cognitive2 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.056	Retain the null hypothesis.
3	The distribution of Cognitive3 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.718	Retain the null hypothesis.
4	The distribution of Cognitive4 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.289	Retain the null hypothesis.
5	The distribution of Cognitive5 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.182	Retain the null hypothesis.
6	The distribution of Cognitive6 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.238	Retain the null hypothesis.
7	The distribution of Cognitive7 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.288	Retain the null hypothesis.
8	The distribution of Cognitive8 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.151	Retain the null hypothesis.
9	The distribution of Cognitive9 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.117	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
10	The distribution of Cognitive10 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.089	Retain the null hypothesis.
11	The distribution of Cognitive11 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.205	Retain the null hypothesis.
12	The distribution of Cognitive12 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.108	Retain the null hypothesis.
13	The distribution of Cognitive13 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.248	Retain the null hypothesis.
14	The distribution of Cognitive14 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.640	Retain the null hypothesis.
15	The distribution of Cognitive15 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.516	Retain the null hypothesis.
16	The distribution of Cognitive16 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.840	Retain the null hypothesis.
17	The distribution of Cognitive17 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.206	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
18	The distribution of Cognitive18 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.842	Retain the null hypothesis.
19	The distribution of Cognitive19 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.914	Retain the null hypothesis.
20	The distribution of Cognitive20 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.513	Retain the null hypothesis.
21	The distribution of Cognitive21 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.510	Retain the null hypothesis.
22	The distribution of Cognitive22 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.070	Retain the null hypothesis.
23	The distribution of Cognitive23 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.737	Retain the null hypothesis.
24	The distribution of Cognitive24 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.944	Retain the null hypothesis.
25	The distribution of Cognitive25 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.607	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Dependent Variables – Cognitive Strategy Questions 1 – 25
Independent Variable – TF Scale

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Cognitive1 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.264	Retain the null hypothesis.
2	The distribution of Cognitive2 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.782	Retain the null hypothesis.
3	The distribution of Cognitive3 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.470	Retain the null hypothesis.
4	The distribution of Cognitive4 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.674	Retain the null hypothesis.
5	The distribution of Cognitive5 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.396	Retain the null hypothesis.
6	The distribution of Cognitive6 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.062	Retain the null hypothesis.
7	The distribution of Cognitive7 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.036	Reject the null hypothesis.
8	The distribution of Cognitive8 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.482	Retain the null hypothesis.
9	The distribution of Cognitive9 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.728	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
10	The distribution of Cognitive10 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.256	Retain the null hypothesis.
11	The distribution of Cognitive11 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.334	Retain the null hypothesis.
12	The distribution of Cognitive12 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.621	Retain the null hypothesis.
13	The distribution of Cognitive13 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.849	Retain the null hypothesis.
14	The distribution of Cognitive14 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.067	Retain the null hypothesis.
15	The distribution of Cognitive15 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.839	Retain the null hypothesis.
16	The distribution of Cognitive16 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.573	Retain the null hypothesis.
17	The distribution of Cognitive17 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.460	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
18	The distribution of Cognitive18 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.386	Retain the null hypothesis.
19	The distribution of Cognitive19 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.787	Retain the null hypothesis.
20	The distribution of Cognitive20 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.989	Retain the null hypothesis.
21	The distribution of Cognitive21 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.645	Retain the null hypothesis.
22	The distribution of Cognitive22 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.915	Retain the null hypothesis.
23	The distribution of Cognitive23 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.737	Retain the null hypothesis.
24	The distribution of Cognitive24 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.074	Retain the null hypothesis.
25	The distribution of Cognitive25 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.113	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Dependent Variables – Compensation Strategy Questions 1 – 8
Independent Variable – SN Scale & TF Scale

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Comp1 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.815	Retain the null hypothesis.
2	The distribution of Comp2 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.412	Retain the null hypothesis.
3	The distribution of Comp3 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.978	Retain the null hypothesis.
4	The distribution of Comp4 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.599	Retain the null hypothesis.
5	The distribution of Comp5 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.603	Retain the null hypothesis.
6	The distribution of Comp6 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.175	Retain the null hypothesis.
7	The distribution of Comp7 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.922	Retain the null hypothesis.
8	The distribution of Comp8 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.303	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Comp1 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.159	Retain the null hypothesis.
2	The distribution of Comp2 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.798	Retain the null hypothesis.
3	The distribution of Comp3 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.183	Retain the null hypothesis.
4	The distribution of Comp4 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.250	Retain the null hypothesis.
5	The distribution of Comp5 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.827	Retain the null hypothesis.
6	The distribution of Comp6 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.784	Retain the null hypothesis.
7	The distribution of Comp7 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.834	Retain the null hypothesis.
8	The distribution of Comp8 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.202	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Dependent Variables – Metacognative Strategy Questions 1 – 16
Independent Variable – SN Scale

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Metacog1 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.936	Retain the null hypothesis.
2	The distribution of Metacog2 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.885	Retain the null hypothesis.
3	The distribution of Metacog3 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.246	Retain the null hypothesis.
4	The distribution of Metacog4 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.590	Retain the null hypothesis.
5	The distribution of Metacog5 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.363	Retain the null hypothesis.
6	The distribution of Metacog6 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.122	Retain the null hypothesis.
7	The distribution of Metacog7 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.023	Reject the null hypothesis.
8	The distribution of Metacog8 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.378	Retain the null hypothesis.
9	The distribution of Metacog9 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.850	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
10	The distribution of Metacog10 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.226	Retain the null hypothesis.
11	The distribution of Metacog11 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.681	Retain the null hypothesis.
12	The distribution of Metacog12 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.893	Retain the null hypothesis.
13	The distribution of Metacog13 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.290	Retain the null hypothesis.
14	The distribution of Metacog14 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.967	Retain the null hypothesis.
15	The distribution of Metacog15 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.877	Retain the null hypothesis.
16	The distribution of Metacog16 is the same across categories of SNScale.	Independent-Samples Mann-Whitney U Test	.563	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Dependent Variables – Metacognative Strategy Questions 1 – 16
Independent Variable – TF Scale

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Metacog1 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.546	Retain the null hypothesis.
2	The distribution of Metacog2 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.091	Retain the null hypothesis.
3	The distribution of Metacog3 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.746	Retain the null hypothesis.
4	The distribution of Metacog4 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.657	Retain the null hypothesis.
5	The distribution of Metacog5 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.883	Retain the null hypothesis.
6	The distribution of Metacog6 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	1.000	Retain the null hypothesis.
7	The distribution of Metacog7 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.461	Retain the null hypothesis.
8	The distribution of Metacog8 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.177	Retain the null hypothesis.
9	The distribution of Metacog9 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.293	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
10	The distribution of Metacog10 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.146	Retain the null hypothesis.
11	The distribution of Metacog11 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.742	Retain the null hypothesis.
12	The distribution of Metacog12 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.191	Retain the null hypothesis.
13	The distribution of Metacog13 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.385	Retain the null hypothesis.
14	The distribution of Metacog14 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.730	Retain the null hypothesis.
15	The distribution of Metacog15 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.888	Retain the null hypothesis.
16	The distribution of Metacog16 is the same across categories of TFScale.	Independent-Samples Mann-Whitney U Test	.809	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.