PERSONALITY AND POSITIVE PSYCHOLOGY IN SOCIAL MEDIA AND POST-SECONDARY EDUCATION

PERSONALITY AND POSITIVE PSYCHOLOGY:

A STUDY IN SOCIAL MEDIA AND POST-SECONDARY EDUCATION

By

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Declaration of Academic Achievement

This major research project was used to fulfill the requirements of a CMST 4A03 independent honours thesis. CMST 4A03 independent theses are typically undertaken for only one academic semester, or four months; this major research project was undertaken from August 2011 to April 2012.

The author of this major research project is the sole contributor to the presented material. As the primary author, contributions included: study and questionnaire design, literature review, obtaining the MBTI and CAVE psychometric instruments, correspondence with and recruitment of 70 participants, administration and invigilation of 15 participant study sessions, data collection and analysis, and manuscript preparation.

This major research project was conducted with Myers-Briggs Type Indicator (MBTI) and Content Analysis of Verbatim Explanation (CAVE) psychometric instruments. The author was given permission to use these instruments by Psychometrics Canada and the University of Pennsylvania's Positive Psychology Centre.

The results of this study were presented at the Department of Communication Studies and Multimedia's peer-reviewed upper-undergraduate and graduate symposium *Fresh*. The study is currently under review for publication in peer-reviewed journals including the *Journal of Professional Communication*.

Abstract

This study combines the fields of communication studies and psychology in order to determine the relationship between personality type, academic background, and social media content. Ten participants from each of McMaster University's seven undergraduate faculties completed a Myers-Briggs Type Indicator (MBTI) to determine their personality type, and submitted 10 personally written status updates or comments from the social media platforms of Twitter or Facebook. The Content Analysis of Verbatim Explanation (CAVE) method was used to analyze 630 social media content to determine overall positive or negative explanatory style.

The dominant personality types at McMaster University as determined by the 70 participants are: INFP, ENFJ, and ISTJ. In type preference it was found that 68% of the participants prefer the attitude of Introversion (I), 70% prefer the perceptive function of Intuition (N), 54.3% prefer the judging function of Thinking (T), and 61.4% prefer the orientation of Judging (J). The following personality preferences were found to be correlated with the CAVE's explanatory dichotomies: Internal/External with Sensing (S) / Judging (J), Stable/Unstable with Extraversion (E) / Sensing, Global/Specific with Sensing/Thinking, and Controllable/Uncontrollable with Sensing.

Of the 630 submitted social media content, 68.4% of them were found describing positive events. It was found that 92.1% of the social media content contained an optimistic explanatory style. These findings strongly suggest that the majority of content written and uploaded on social media is positive and that personality type plays a minor role in content and explanations produced. It is concluded from these results that social media is an inherently positive medium for university students. The primary reason for this is believed to be a result of social media being an immensely public sphere forcing all individuals, regardless of personality type, to engage in higher levels of self-monitoring.

Acknowledgements

This entire study would not have been possible without these 70 undergraduate students volunteering an hour of their time to participate. Seventy participants were arguably too many to manage alone in an undergraduate major research project, but each of the participants displayed a great deal of interest and accommodation with this study. Each and every one of you has my sincerest thanks for helping to make this major research project, a combination of communication studies and psychology, neuroscience, and behaviour, a reality.

Although I had never taken a course with him before, Dr. Alexandre Sévigny was very receptive towards the proposal of this CMST 4A03 major research project when I approached him in March of 2011. Alex provided me with 70 Myers-Briggs Personality Test inventories and gave me the freedom and responsibility to pursue this research in any manner that I desired. Instead of limiting me to a four-month structured undergraduate thesis relating solely to the field of communication studies, Alex provided me with the opportunity to dedicate over eight months on this interdisciplinary major research project. As a result of Alex taking a chance on me, I was able to gain more practical, theoretical, and applied knowledge and experience in this course than any other I have taken during my undergraduate career McMaster University.

Alongside Dr. Alexandre Sévigny, Drs. Terence (Terry) Flynn and Philip Savage have been among the most influential professors and mentors I have ever throughout my academic and professional career. Through both Philip Savage and Terry Flynn's teaching, mentorship, and support I have decided to pursue higher education and a professional career in the fields of professional communications and public relations after my undergraduate career at McMaster. Without the foundation of qualitative and quantitative research skills that I gained through

Philip's classes, I would not have been able to administrate study sessions for 70 volunteers, and I would have had a great deal of difficulty in analyzing all the collected data.

I would also like to thank Dr. Martin Seligman, the founding father of Positive Psychology, and the head of the Positive Psychology Centre at the University of Pennsylvania. Dr. Seligman encouraged my research, and gave me written permission to use both his Attributional Style Questionnaire (ASQ) as well as the Content Analysis of Verbatim Explanation (CAVE) psychometric tools. Without these tools this research project would not have been possible, and it was an honour to receive encouragement from him.

I would like to thank Dr. Richard (Dick) Day for introducing me to the fields of both positive and personality psychology. I took both of Dr. Day's 3CB3 (Positive Psychology) and 2B03 (Theories of Personality) courses during my 3rd year at McMaster and was so inspired by them that I wanted to combine them with my passion of communications. Dr. Day's passion for these psychological fields was very contagious and I was encouraged by this passion to take my foundations in these subjects and go even further.

Although I was unable to gain clearance to begin my research until the middle of December 2011, Dr. Brian Detlor and the McMaster Research Ethics Board (MREB) members took a significant amount of their time to work with me in setting realistic and attainable research goals. I feel more than prepared in clearing ethics at Royal Roads University and any future professional research as a result of what I learned through them. The MREB board also provided some great words of encouragement, which gave me further motivation to complete this major research project.

I would like to give special thanks to Rob Huang, a 4th year Multimedia student and friend at McMaster who illustrated and designed the posters that I used to recruit the 70

participants. Without Rob's professional assistance it would have been very difficult to meet the participant quota for this major research project.

A final thanks to Dr. Joanne Buckley who I have worked with for the past two years at the McMaster Student Accessibility Services (SAS). Joanne was always willing to offer her insight and suggestions to my academic and professional work, and for that I am extremely grateful. Alongside Drs. Savage, Flynn, and Sévigny, Joanne has been one of my primary sources of support and encouragement throughout my undergraduate career at McMaster. I will miss our chats and working with you and the other counselors and marketing officers at the SAS.

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Introduction

When entering their undergraduate studies students gravitate towards a variety of different academic paths. Some students study the arts, some the sciences and some students study a combination of both—among many other fields. There are a myriad of factors that can lead a student to study a particular field: parental pressure, cultural background, aptitude—but what about personality? It is no surprise that students with different academic backgrounds appear to be explicitly and implicitly different from one another; furthermore and that each faculty contains departments that are categorically different from each other. Students in medical radiation sciences learn in active hospitals environments with patients, while students in chemistry learn through labs and textbooks in controlled environments; both however, are enrolled in the same faculty of Science. The same can be said for visual arts students who learn with a brush and canvas and English students who learn with a novel: their education is different, but they are both enrolled in the same academic faculty of Humanities.

Though students explicitly learn different material through different methods, is there an implicit commonality between the many departments of a single academic faculty? Though one student may study the environment, a second chemistry, and a third medical radiation, is there a unifying personality type between them common to their faculty; whether it be a full type, an attitude, function, or orientation? One unifying tool that is used by the majority of undergraduate students is social media. Social media has drastically changed the communication landscape of the developed world. Platforms including Facebook and Twitter allow people to connect and interact at any time and from any place in the world, arguably allowing individuals to put their 'best faces forward' and cultivate different personas. This may be a result of the panopticon

effect of social media resulting in a looking-glass self, or there may be no positive influence of social media and people post according to their personality and level of self-monitoring.

The goal of this CMST 4A03 major research project is to discover the strength of the correlations between the dominant personality types and attributional/explanatory styles within 70 undergraduate students from seven different academic faculties. This multidisciplinary major research project draws upon the fields of professional communication, personality psychology, and positive psychology to discover the reasons and valences of these relationships. The relationship between personality and explanatory style in regards to social media is still relatively unexplored as little research has been completed in this area so far.

The primary researchers of this CMST 4A03 major research project are Mr. Dustin Manley and Dr. Alexandre Sévigny. Dustin Manley is currently a 4th year student at McMaster University majoring in Communication Studies and English with a minor in Psychology. Dr. Alexandre Sévigny is the Director of Professional Communications, Associate Professor in the Department of Communication Studies and Multimedia, and Adjunct Professor in the Department of Psychology, Neuroscience and Behaviour at McMaster University.

A total of 70 undergraduate students in their 3rd and 4th year were recruited for this study. Ten students were recruited from each of the following academic faculties: Humanities, Social Sciences, Commerce, Arts & Science, Science, Health Science and Engineering. To determine specific personality type, each participant was asked to complete a Myers-Briggs Type Indicator (MBTI) personality inventory. For information concerning optimistic or pessimistic explanatory styles, participants were asked to submit their own personal 10 most recent Facebook or Twitter updates which were later analyzed for using the CAVE (Content Analysis of Verbatim Explanation) method.

In order to assess and categorize the personalities of the participants involved in this study, Carl Jung's theory of psychological type was utilized through the MBTI personality inventory. For Jung, personality was a combination of functions and attitudes that led to a total of eight different personality types. Katharine Briggs and Isabel Myers expanded upon Jung's original theory of psychological type, establishing 16 different personality types outlined in the MBTI personality inventory which was first published in 1932 (Pearman, 1997). Personality types involve qualitative differences between individuals, for example: extraverts and introverts are two different categories of people. Trait theories focus on quantitative differences within personality, for example: introversion and extraversion being opposite ends of a single continuum.

It is important to note that while many different definitions and measurements of personality exist, personality in itself is a hypothetical construct. Keeping that in mind, the psychodynamic MBTI assessment of psychological types was chosen over other theories and models of personality measurement for several reasons. The MBTI is one of the world's most popular personality assessments with over two million assessments administered annually (CPP Products, 2009), and has shown high construct-validity, internal consistency and test-retest reliability (Thompson, 1986). The self-scorable and forced-choice format of the MBTI questionnaire made it ideal for administrating to undergraduate participants in an efficient and timely manner, and expedited data collection. The 16 different personality types available through the MBTI are stable in accuracy and allow for stronger comparison to academic background and attributional style. As discussed in the literature review, trait theories like the popular Five Factor Model are ineffective in determining the personality types of undergraduate-

aged students, and many of the factors are already highly related to the attitudes, functions, and orientations the MBTI offers.

The recently founded field of positive psychology is used in the analysis the social media content of the participants in this study. Positive psychology came into the mainstream of psychology in 1998 when Dr. Martin Seligman was made President of the American Psychological Association (APA) (Seligman, 2000). Positive Psychology is essentially the opposite of the much studied Abnormal Psychology; positive psychologists seek "to find and nurture genius and talent", and "to make normal life more fulfilling" (Compton, 2005) rather than focusing on mental illness and treatment. Few studies have been completed regarding positive psychology in social media, even in areas including flow, attribution and optimism enhancement. This study will explore the effects attribution and explanatory style in social media through the CAVE method, and the strength of its correlation with personality type.

Literature Review

Recent literature surrounding the fields of personality and positive psychology and their associations with performance in post-secondary institutions were selected for critical review in this MRP. A total of nine studies have been selected for critical review. Of the selected literature, six deal with empirical studies on personality while three deal with the relatively new field of positive psychology. Literature concerning personality or positive psychology within social media was not readily available; however, a study using the CAVE approach is reviewed and shows promise for deriving accurate ratings of optimism and pessimism from social media updates.

A prevalent trend found in studies of personality and academic achievement was that the majority of studies used variations of Costa and McCrae's Five Factor Model which studies trait

personality in domains of: Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. This trend was also the primary shortcoming of most of the studies; the only moderately significant correlation between personality and academic achievement was conscientiousness. An encouraging trend found in the majority of the reviewed literature was that optimism and optimistic coping methods/explanatory styles were significantly positively correlated with academic background and achievement.

The reviewed literature supports the use of the MBTI, the Expanded Attributional Scale Questionnaire (E-ASQ) and the CAVE approach in this study. Perhaps the strongest encouragement found from the available literature is that this study will be exploring new ground as the majority of previous studies concerning personality, explanatory/attributional style and post-secondary background have relied on the Five Factor Model of personality.

Big Five personality predictors of post-secondary academic performance

O'Connor and Paunonen at the University of Western Ontario performed a meta-analysis on then-recent empirical literature concerning the correlations of personality effect on post-secondary achievement. The goal of this study was to gain deeper knowledge on the cognitive and psychological factors that lead to academic success for students, and how to best cater to these different learning styles in post-secondary institutions. The personality model used was the Five Factor Model which categorizes personality under domains of: Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. Post-secondary achievement was determined by participating students' academic achievements measured by their grade point averages (GPA). Several personality inventory subsets of the Five Factor Model were used in this study including the: NEO Five Factor-Inventory, Revised NEO Personality Inventory, and the Big Five Inventory.

A primary motivation the authors gave for studying the effect of personality on academic performance is that while cognitive ability displays what a participant can do, personality sheds light on what a person will do (Furnham & Chamorro-Premuzic, 2004). The meta-analysis concluded that throughout the majority of the reviewed studies, the personality trait of conscientiousness had a moderate correlation with academic performance. Openness to experience and extraversion were found to have respectively weak positive and negative correlations with academic performance (O'Connor & Paunonen, 2007). The meta-analysis also showed that the broad nature of the Five Factor Model was generally ineffective at displaying a significant correlation between personality traits and academic performance. The more sophisticated and narrow versions of the Five Factor Model had empirical advantages but still failed to provide any significant correlations. The researchers used data from studies that follow academic achievement throughout whole semesters which was more beneficial and accurate than achievement in a single course. However, data from longitudinal studies that would have followed students throughout their entire undergraduate studies and possibly into their graduate studies would have given interesting results.

The literature suggests that using the MBTI personality inventory instead of the Five Factor Model would provide stronger correlations between personality and academic performance and background. One of the primary reasons for this hypothesis is that the MBTI is a much narrower instrument compared to the Five Factor Model: the MBTI provides 16 personality types, with four personality dichotomies: Extraversion/Introversion, Sensing/ Intuition, Thinking/Feeling, Judgment/Perception). Traits of the Five Factor Model including Agreeableness also provided little to no meaningful empirical data in the authors' meta-analysis (O'Connor & Paunonen, 2007). The addition of explanatory style data collected through the

CAVE method in this major research project at McMaster will also provide deeper insight into the correlations of personality and academic success.

Reinterpreting the Myers-Briggs Type Indicator from the Perspective of the Five-Factor Model of Personality

Robert McCrae and Paul Costa surveyed 468 individuals using both the MBTI and their own personality inventory: the Five Factor Model. Their findings suggested that the MBTI personality inventory is not an adequate representation of Jung's original typological theory; however, even critical reviewers of the personality inventory acknowledge its empirical effectiveness and popularity in personality research (McCrae & Costa, 1989). The authors found significant correlations between the MBTI and the Five Factor Model, concluding evidence that the MBTI provides a narrower and more specific basis for interpreting four of the five general personality traits posited by the Five Factor Model.

The Extraversion-Introversion (E-I) types of personality are strongly significantly related to the Five Factor trait of Extraversion with a correlation of -0.74. The Sensing-Intuition (S-N) types also share a significant relationship towards the trait of Openness with a correlation of 0.72. The Thinking-Feeling (T-F) and Judging-Perceiving (J-P) types are moderately related to the traits of Agreeableness (0.44) and Conscientiousness (-0.49) respectively (McCrae & Costa, 1989). All four dichotomies of the MBTI displayed no relationship with the trait of Neuroticism, with correlations ranging from -0.06 to 0.16 (see Table 1).

	Extraversion	**Openness**	**Agreeableness**	**Conscientiousness**	**Neuroticism**
E-I	**-0.74**	0.03	-0.03	0.08	0.16
S-N	0.10	**0.72**	0.04	-0.15	-0.06
T-F	0.19	0.02	**0.44**	-0.15	0.06
J-P	0.15	0.30	-0.06	**-0.49**	0.11

Table 1. *Correlations between Five Factor Model and MBTI*

Costa and McCrae conclude that the MBTI is not an effective instrument for measuring Jung's original theory of psychological types and should be avoided by those who embrace Jung's theory (1989). However, each of the MBTI's four dichotomies has demonstrated significant convergence with four of the five dimensions of the Five Factor Model. Costa and McCrae suggest that in order to use and interpret the MBTI without reference to the Jungian typology it does not accurately reflect, it should adopt the perspective of the Five Factor Model.

Aptitude is not enough: How personality and behavior predict academic performance

Conard from Sacred Heart University's Department of Psychology researched the incremental measurement validity of the Five Factor Model of personality for predicting academic achievement (GPA) while controlling for current cognitive ability as determined by participant SAT results. Conard recruited 300 participants from her undergraduate introductory psychology course at Sacred Heart University over the course of three years; the participants were given a course credit for participating in the study.

The Neo Five-Factor Inventory (Form S) was used to determine the personality traits of the participants. SAT scores were reported through a self-report questionnaire and were used to determine current cognitive ability. Behaviour was measured through course performance, participation and attendance. The results of the study showed that conscientiousness was the only significant personality trait of the Five Factor Model in predicting overall course performance and attendance (Conard, 2006). It is important to note that participant SAT and GPA scores were collected through self-report data, and as a result some could be confounded.
Cognitive ability was determined through self-report questionnaires which could have been confounded with false information.

The Five Factor Model's trait of conscientiousness was the only significant trait correlated with academic achievement, and yet consistently yielded only moderate correlations (Conard, 2006). Conard noted the reason for this could be a result of the majority of her participants being within the 18-22 age demographic, and the fact that levels of conscientiousness are only moderately consistent throughout those years in young individuals; as people mature, they become more conscientious. Using the Five Factor Model on older participants would likely yield significantly stronger correlations. Using MBTI to determine personality types on participants aged 18-24 should prove more successful than the Five Factor Model, as several personality types can be correlated with academic achievement instead of just the personality trait of conscientiousness. Conard also only used participants from her introductory psychology classes, suggesting that academic achievement was only studied on students in their early undergraduate careers and enrolled in a psychology program.

Intellectual ability, learning style, personality, achievement motivation and academic success of psychology students in higher education

Busato et al. from the Universities of Amsterdam and Leiden studied the role of cognitive ability, learning styles, and personality and correlated them with student academic achievement measured through GPA. The participants chosen for the study were 409 1st year psychology students at the University of Amsterdam who were required to participate in the study during the Department of Psychology's annual *Testweek*. Data were collected from the 1993, 1994 and 1995 *Testweeks* and analyzed through the Statistical Package for the Social Sciences (SPSS) in order to determine relevant correlations.

For information on intellectual ability, an Index of Learning Style (ILS) questionnaire was completed by participants. For information on personality, the Vijf Persoonlijkheids-

Factoren 5PFT, Five Factor inventory was used. Academic success was measured by test-scores and the overall GPA at the end of each participant's 1st, 2nd, and 3rd year of study. At the end of the study a significantly positive relationship was found between academic success and conscientiousness (Busato et al, 2000).

There are several possible confounds that are apparent this study. Busato et al. used a convenience sample of 1st year psychology students at the University of Amsterdam; no students from different academic faculties or years of study were chosen. Participation was also mandatory for these students; as a result of reactance, a majority of the students may have given false data in attempts to protect their private information or disrupt the study. Additional confounds would be self-presentation bias, confirmation bias and experiment demand as participants knew they were involved in the Department of Psychology's annual *Testweek.* The collected data would not be generalizable to the University of Amsterdam as a whole, but only to its Department of Psychology.

The McMaster study is similar in several aspects to Busato et al.'s; however, it will use an MBTI personality inventory instead of the Five Factor Model. The Five Factor Model is too broad a tool, with only conscientiousness showing any moderate correlation between personality and academic achievement. Each of McMaster University's seven academic faculties instead of only one will be studied in order to gain more generalizable results to the whole of McMaster University. Participation will be voluntary and collected information will be kept confidential in order to reduce self-presentation bias, confirmation bias, false data, and other potential confounds.

Myers-Briggs Type Indicator and Academic Achievement in Engineering Education

O'Brien et al. of North Carolina State University researched the correlation of personality types and academic achievement of engineering students. A sample of 83 engineering students in a mandatory statistics course for all engineering students, CE 214 (Engineering Mechanics Statistics), were administered using a Myers-Briggs Type Indicator (MBTI) test to determine dominant personality types of participants. Demographic information was collected through self-report data, and academic achievement was measured through success (GPA) in CE 214.

The following engineering personality statistics were collected from the study: Extroversion (34%) / Introversion (59%); Sensing-Perception (72%) / Intuitive-Perception (23%); Thinking-Judgment (75%) / Feeling-Judgment (25%); Judgment (61%) / Perception (39%) (O'Brien et al., 1998). The mean average of CE 214 was 73.6%, with grades ranging from 47.1% to 97.6%: a large number of variations in student achievement. The study showed that there was a significant correlation between intuitive personality types and academic achievement, with intuitive personalities consistently maintaining high grade-point averages throughout the course.

O'Brien et al.'s study produced interesting results on the dominant personality traits of engineering students, specifically on the correlation between intuitive personality traits and academic achievement. The sample size was small and only studied engineering students, so the results are not generalizable to the North Carolina State students as a whole. The significant grade variation in CE 214 suggests that the course needed to be restructured in order to cater to a broader range of personality types and student learning styles.

It would be interesting to see the dominant personality types within the Faculty of Engineering at McMaster University and compare the similarities between O'Brien et al.'s study.

It will be important to collect data representative of all disciplines within engineering and all departments within each of McMaster's seven undergraduate faculties in order to receive specific and generalizable results.

Myers-Briggs Type Indicator Score Reliability Across: Studies a Meta-Analytic Reliability Generalization

Robert and Mary Capraro of the Texas A&M University collected data from 210 studies between 1998 and 2001 that used the most current version of the MBTI testing instrument. The data were submitted to a descriptive reliability test to analyze the variability of measurement error within the MBTI. Overall, the study has shown that the MBTI maintains consistent measurements of personality types (Capraro & Capraro, 2002).

Of the 210 analyzed studies that used the MBTI, Capraro and Capraro noted that the vast majority (56%) had no mention of the MBTI's statistical reliability, while 11% of the studies stated that the MBTI was reliable without providing any statistical evidence from current or prior studies (2002). It appears that many of the researchers believed that the MBTI provided consistent results and felt no need to provide any prior statistical evidence concerning their use of the MBTI in their methodology. Regardless of this fact, the analysis showed that there was a consistent measurement in the MBTI throughout the 210 studies. The Thinking-Feeling (T-F) dichotomy was the only measurement that consistently averaged below the cut-off point of 80% accuracy. Thinking-Feeling are also two of the most difficult types to quantitatively measure, so the authors did not find this entirely surprising.

There were several possible confounds in Capraro and Capraro's study. The authors used convenience sample of articles from only two databases: PsychLit and ERIC. Additionally, from their original count of 284 articles they were only allowed access to 210; the majority of the 74

articles they were denied access to were graduate dissertations, suggesting that there is a possibility that a significant number of the 210 articles they analyzed were not extensive studies conducted by experienced researchers.

Who is more proactive, the optimist or the pessimist? Exploring the role of hope as a moderator.

Lopes and Cunha tested the affective role of hope on the affects of optimism and pessimism, as well as individual coping methods. The authors had 343 surveys delivered to participants employed in private business organizations, and had them mail them back after completion. Optimism and pessimism levels were determined with the revised Life Orientation Test (LOT-R), a self-report questionnaire in which participants answer 10 questions (four are filler) on a 5-point likert scale. The LOT-R has a strong predictive relationship with outcomes including starting university (Aspinwall & Taylor, 1992), performance in work situations (Long, 1993) and individual coping styles with diseases like cancer (Carver et al., 1993). Hope was measured through the Adult Hope Scale, which consists of 12 questions on an 8-point likert scale.

The collected results showed that optimism was positively correlated with proactive coping, while pessimism was negatively correlated (Lopes & Cunha, 2008). No evidence was found that indicated hope was correlated with optimism and proactive coping, but there was a correlation between hope and pessimism and passive coping. Optimists tend to use approach-oriented, problem solving strategies to cope including information seeking (including negative information), positive reframing, and acceptance. Pessimists are more avoidant, utilizing coping strategies such as thought suppression, capitulation, and procrastination.

For the McMaster study, participants will actively seek recruitment and be set up with a session instead of the researchers mailing out questionnaires or surveys; only 77% of the questionnaires Lopez and Cuneo mailed out were able to be used (2008). Coping strategies are

very important indicators of academic success in post-secondary education: students who use optimistic coping strategies study effectively and use internal explanations, learning from the experience if they receive a poor exam mark. Pessimistic students procrastinate, give up on a course if they receive a poor exam mark, and use external explanations. Lopes and Cunha's use of and success with the LOT-R are positive news for the researcher's own McMaster study, as the LOT-R and CAVE are highly correlated.

Explanatory Style and Achievement in School and Work

Peter Schulman from the University of Pennsylvania noted that research in the relatively new field of positive psychology has supported the theory that explanatory style and optimism predict achievement in a multitude of domains including school and work. In this article, Schulman reviews eight studies relating explanatory style to achievement: four studies are related to academic achievement and four are related to work achievement in insurance sales--a career with a high turnover rate.

The eight studies each use the Attributional Style Questionnaire (ASQ) to collect data on three primary measures: the composite positive explanatory style (CP), the composite negative explanatory style (CN), and the combination of those two scores (CPCN). Schulman notes that past research indicates that CPCN and CN scores are the most valid predictors of helplessness and pessimistic coping strategies (1995; Peterson & Seligman, 1984). Throughout the four studies, some measures of the ASQ were significant predictors of academic performance while others were not; however, explanatory style was moderately correlated with post-secondary education performance and drop-out rates in all four studies.

On the analysis of participants who worked as insurance salesmen, the ASQ predicted that participants with low production rates but an optimistic explanatory style would last longer

in the field. Participants with low production rates and pessimistic explanatory styles (attributing internal causes to negative events and global causes to positive events) did not last long in the field, as predicted by the ASQ (Schulman, 1995). The ASQ was not useful in predicting survival rates of high producing participants, as many of them left the field for reasons other than helplessness, such as better job opportunities.

The methodologies used in each of the case studies varied, although the use of the ASQ remained consistent throughout. This may explain why different results were found for the varying case studies; however, a moderate correlation of positive explanatory style/optimism was found with academic and professional success and continuation. The McMaster study will be utilizing the CAVE method which is highly correlated with the ASQ (Peterson & Seligman, 1984).

Emerging from the CAVE: Attributional Style and the Narrative Study of Identity in Midlife Adults

Adler et al. use approaches from the cognitive theories of depression, studies of personality traits through the Content Analysis of Verbatim Explanations (CAVE) method. The CAVE method approach is similar to the ASQ and E-ASQ models; all of them are used to assess the optimism and coping methods. However, while the ASQ and E-ASQ work by testing hypothetical life events, the CAVE method tests real lived experiences and assists in explaining adult life narratives in greater longitudinal detail. CAVE correlations with personality trait of neuroticism were conducted using the Five Factor Model.

The participants selected for this study were 70 adults (aged 35-64) whom had also participated in a study by Dr. McAdams at Northwestern University which studied psychological adaptation and generativity among mid-life adults in the community (2001). Participants were

asked to fill out self-report questionnaires that had them divide their life into meaningful chapters and write eight significant events that occurred during their lives. These life narratives were coded for stable and global attributions in response to negative life events, and were scored along with measures of personality traits collected by the Five Factor Model. For the CAVE technique, events were identified as causal if they: 1) described a specific event with a detailed beginning and end; 2) the event the self and was a negative experience; 3) phrased with words such as: "because," "since," "as a result of" etc. These detailed markers for causal events led to 90% accuracy rates in determining causal statements (Zullow et al., 1988).

The results of this study showed that pessimistic attributional styles were significantly positively correlated with depression, and significantly negatively correlated with subjective well-being. Additionally, pessimistic attribution styles were positively correlated with the personality trait of neuroticism.

Using the CAVE methodology in the McMaster study will give deeper clarity on the E-ASQ responses of participants, as well as provide deeper insight into the demographic information they will provide on the self-report surveys. Use of the CAVE should prove to be very useful in collecting and analyzing self-report data from social media sites such as Facebook and Twitter.

Research Design and Implementation

This study required 10 undergraduate participants from seven different academic faculties. In order to be eligible for participation in the study, each student had to be registered in their 3rd year, or above, of study. The primary reason that the cut-off for participation was registration in 3rd year was to significantly limit the possibility of potential confounds in the overall personality type of both students and faculty. For most faculties 1st year is a general year

for students, and students enter their academic major in 2nd year. Students registered in their 3rd year or above in a program of study are more likely to have a stronger foundation and affiliation with their area of study, and be less likely to change their major; conversely, 1st and 2nd year students generally have a weaker foundation in their areas of study and are significantly more likely to change their academic majors or programs of study.

Participants for this study were recruited through a variety of methods. Approximately 50 11x17 recruitment posters (see Appendix A) for the study were posted around the campus of McMaster University. The posters described the study as research in personality and social media, and that participants would be able to complete a free MBTI personality inventory if they participated in this hour-long study. Interested participants would contact either Dustin Manley and/or Dr. Alexandre Sévigny via email through the contact information available on the posters. Participants were also recruited through McMaster's undergraduate forum *MacInsiders*, using the same poster and information that was physically posted throughout campus. Recruitment through *MacInsiders* did not pose any confound to this study as the forum consists of users from a variety of academic backgrounds; recruited participants were also expected to have experience with social media.

Dr. Richard Day, Associate Professor of the Department of Psychology, Neuroscience and Behaviour also posted a link to the study on the online homepages of his courses (Psych: 2AP3, 2B03, 3AB3, 3BA3, and 3CB3) which are accessible to approximately one thousand students. This information was made available to the Social Science (BA) and Science (B.Sc.) psychology students, as well as students in all other faculties who take psychology classes to fulfill a minor, or for an elective. In order to limit the potential confounds of having both Social

Science and Science psychology students registering in the study, only students registered in the other five faculties were accepted into the study.

In order to limit potential participant confounds recruitment did not take place through presentations to classes. Students recruited from a classroom presentation are likely to be enrolled in the same faculty, department, and academic year, limiting the diversity of applicants. Participants were also not recruited from Dr. Alexandre Sévigny's undergraduate classes (CMST: 3SM3, 4N03, and 1A03) as students may have felt pressured into participation. The poster and *MacInsiders* recruitment methods were also used to limit possible confounds and ensure as random a sample as possible.

Participants were accepted on a basis of rolling admissions. Once prospective participants had contacted either Dustin Manley or Dr. Alexandre Sévigny through email, they were given options of different sessions to register for. Once a prospective participant had registered for a study session, the seat for the faculty quota was filled and further prospective participants were put on a waiting list. If a registered participant dropped out of the study, the next applicant on the waiting list would be contacted to take their place for the faculty.

The compensation that students received for participating in this study was completing an official MBTI personality inventory and receiving accurate information about their own personality types. In normal circumstances, it costs upwards of $100 to take an MBTI, which has to be administered by an individual with an academic background in psychology/psychometrics who is certified to administer the MBTI instrument (Psychometrics, 2007). Seventy MBTI Form M (College Editions) were ordered from Psychometrics Canada, a division of CPP inc., the exclusive publisher of the MBTI. In order to be certified by the CPP to administer the MBTI personality inventory an applicant must have an academic degree in the field of psychology, a

requirement Dr. Alexandre Sévigny fulfilled. Dr. Sévigny's academic background in psychology includes a PhD in Cognitive Linguistics and Content Analysis from the University of Toronto from 1995-2000. Sévigny was also a pensionnaire etranger at l'Ecole normale supérieure in France from 1997-1998.

Each of the sessions was one-hour in duration and were held in either the Communications Metrics Laboratory (COMM-Lab) or the Humanities Media and Computing Labs in TSH 206. When the participants arrived they were asked to take a seat at a desk which contained a letter of consent/information, a short demographic survey, an MBTI questionnaire, and stationery to complete the forms. Participants in the COMM-lab sessions were asked to bring their own laptops; participants who did not have their own laptop were provided with one for the duration of the session.

At the beginning of each session the primary investigators went through the letter of information/consent (see Appendix B) with the group of participants. Participants were reminded that all participation was voluntary, that they could refuse to fill out any question they did not wish to answer, and that all of their information would be kept confidential and secure. After the letter of information/consent had been reviewed and signed by each participant, they were given instructions on how to complete the session which was organized into three parts: demographic survey, MBTI, and social media data collection.

For the demographic survey (see Appendix C) participants were asked to complete a 7-question inventory consisting of nominal variables. Questions to be filled out on the form included: age, gender, year of study, faculty, racial/ethnic background, and international student status. After the demographic survey had been completed, participants were then asked to complete the MBTI personality inventory and score their own personality type. Once that had

been completed, participants were asked to log into either their Facebook or Twitter accounts (whichever they prefer), copy and paste their ten most recent status updates/comments and email them to the primary investigators through a secure Microsoft Word document. Social media data were requested to be original and individual written content only. Retweets were not accepted, and photos were discouraged unless accompanied by a description or explanation by the participant.

After participants had completed the survey, they were thanked for their time and participation, and told that their individual results with further information would be emailed to them at a later date. Within these emails, participants received further information on their personality type as well as an invitation to an information and debriefing session held by Dr. Alexandre Sévigny and Mr. Dustin Manley explaining the MBTI personality inventory in further detail. Each participant was also extended an invitation to the Department of Communication Studies and Multimedia's annual peer-reviewed symposium, *Fresh 2012*, held on April 5th, 2012 where the results and summary of the study were presented.

Personality Instrument

Myers-Briggs Type Indicator (MBTI), Self-Scorable College Edition Form M

Seventy copies of the six-page MBTI Self-Scorable College Edition personalities were purchased from the CPP through Psychometrics Canada for this study. Each individual booklet cost $9.95 for a total cost of $696.95 plus applicable taxes; Dr. Sévigny's research funds from McMaster University helped to cover these costs. The booklets were quick and easy to administer, and provided on-the-spot results for participant interpretation. Participants answered the 93 forced-choice questions of the MBTI by filling in checkboxes; once the questionnaire was complete, participants opened up the booklet and added up the checks that bled through the page to determine their personality types and preferences.

Jung's original psychodynamic approach to personality describes two attitudes and four functions of personality that led to a total of eight basic personality types (Hall, 1999). The two different attitudes that Jung described were extraversion and introversion. Jung divided the four functions, how an individual processes an experience, into categories of rational (Thinking and Feeling) and irrational (Sensing and Intuiting). Jung argued that individuals must be balanced in their attitude, so an individual with an explicit/conscious extraverted attitude would have an implicit/unconscious introverted orientation to achieve this balance. Like the attitudes, if a dominant conscious function is rational (i.e. Thinking or Judging), it is accompanied by an irrational subconscious function (i.e. Sensing or Intuiting).

The eight different Jungian personality types that are available from a combination of the two attitudes and four functions are the following:

Thinking extrovert Objective, emotionally cool and live according to fixed rules. Positive and dogmatic in thinking.	**Thinking introvert** Strong desire for privacy, and socially inhibited with poor practical judgment. Intellectual.
Feeling extrovert Emotional, respectful of authority and tradition. Sociable and seeks harmony.	**Feeling introvert** Quiet, thoughtful and sensitive. Tends to be childish and indifferent to feelings and thoughts of others.
Sensing extrovert Hedonistic, positive and socially adaptive. Interested in sensual pleasures like art and food.	**Sensing introvert** Artistic, passive and calm. Detached from society, and goes with the flow of events.
Intuiting extrovert Makes decisions based on instinct. Creative and a high self-monitoring individual. Very familiar with unconscious.	**Intuiting introvert** Eccentric and creative individual, misunderstood by society but indifferent to their opinions.

Table 2. *Jungian Typological Summaries* (Myers et al., 1998)

The MBTI personality inventory builds off of the Jungian personality typology with 16 different personality types available from a combination of four dichotomies. The MBTI uses the

same attitudes and functions that Jung used, but divides the established functions into perceiving (Sensing and Intuition) and judging (Thinking and Feeling) processes. The MBTI also adds a third dimension of lifestyle/orientation, which consists of judging and perceiving (Myers, 1998). Similar to Jung's theory, each dominant dimension is complemented for balance. For attitudes, an individual whose dominant dimension is extraversion would be complemented by unconscious introversion. For functions, an individual dominant in sensing would be complemented by the auxiliary function of thinking (Briggs & Meyers, 1995).

(E) Extraversion People who prefer Extraversion tend to focus on and get their energy from the outer world of people and things.	**(I) Introversion** People who prefer Introversion tend to focus on and get their energy from the inner world of ideas and impressions.
(S) Sensing People who prefer Sensing tend to focus on tangible and concrete information gained from their five senses.	**(N) Intuition** People who prefer Intuition tend to focus on more abstract and theoretical information that can be associated with other information.
(T) Thinking People who prefer Thinking tend to base their decisions primarily on logic and objective analysis of cause and effect.	**(F) Feeling** People who prefer Feeling tend to base their decisions primarily on values and subjective evaluation of person-centered concerns.
(J) Judging People who prefer Judging tend to like a planned and organize approach to life and prefer to have things settled.	**(P) Perceiving** People who prefer Perceiving tend to like a flexible and spontaneous approach to life and prefer to keep their options open.

Table 3. *MBTI dichotomy summaries* (Myers et al., 1988)

Within the MBTI personality inventory 16 different personality types are available through a combination of the four dichotomies. It is important to note that none of these types are better or worse than one another; however, it is theorized that individuals naturally prefer one overall type combination. Certain cultures and societies however do prefer and encourage certain

personality types. Extraversion and independence is celebrated in the western hemisphere, while Introversion and cooperation are encouraged in Eastern, collectivist societies.

ISTJ
Quiet, serious, earn success by thoroughness and dependability. 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.

ISFJ
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 and orderly and harmonious environment at work and at home.

ISTP
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.

ISFP
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, do not force their opinions or values on others.

INFJ
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 to best serve the common good. Organized and decisive in implementing their vision.

INTJ
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 a job and carry it through. Skeptical and independent, have high standards or competence and performance—for themselves and others.

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

INTP
Seek to develop logical explanations for everything that interests them. Theoretical an 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.

ESTP
Flexible and tolerant, they take a pragmatic approach focused on immediate results. Theories and conceptual explanations bore them—they 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.

ESFP
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.

ESTJ
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.

ESFJ
Warm-hearted, 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 for what they continue.

ENFP
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 their verbal fluency.

ENTP
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 things the same way, apt to turn to one new interest another.

ENFJ
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.

ENTJ
Frank, decisive, assumes 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 ideals.

Table 4. *MBTI personality type summaries* (Myers et al, 1998)

One of the largest potential confounds of administering the MBTI personality inventory is that it is a self-report inventory. Individuals may engage in the social-desirability bias, and may answer questions in order to be viewed favourably. Some cultures explicitly prefer certain personality types: Western individualist society prefers extraverts; Eastern collectivist societies prefer introverts. This societal influence may have an influence on individuals completing the MBTI, as they may answer in accordance of how society expects them to act, instead of how they act in reality. In order to reduce social-desirability bias in the study, participants were briefed that it was a study on personality and social media. Individuals were not given specific details on the positive psychology aspect of the study, and how it relates to their personality type and academic background.

Social Media Analysis Instrument

Content Analysis of Verbatim Explanative (CAVE)

The Content Analysis of Verbatim Explanation (CAVE; Seligman, Peterson, 1992) method of quantitative text analysis is used to assess the causal attributions of participants' social media (Facebook and Twitter) updates and comments. The CAVE method and its training manual were obtained from the Positive Psychology Centre at the University of Pennsylvania. Mr. Dustin Manley and Dr. Alexandre Sévigny were given written permission (see Appendix D) to use the CAVE method by Dr. Martin Seligman, director of the University of Pennsylvania's Positive Psychology Centre, former APA President (1998) and founder of Positive Psychology.

Each participant was asked to provide their 10 most recent social media updates and comments. A total of 63 participants provided 630 social media updates to have explanatory styles analyzed with the CAVE analysis in order to discover individual predisposition towards optimism or pessimism. Explanatory style is defined as the "habitual pattern of explanations an

individual makes for good and bad events" (Schulman et al., 1989). To be properly analyzed, social media content must be able to have a causal relationship inferred. For example: "I got in a fight with a good friend [event] because I had a tough day and was in a bad mood [attribution]".

Each explanation is assigned to one of four dimensions: Internal/External, Stable/ Unstable, Global/Specific, and Controllable/Uncontrollable. Each dimension is rated by a trained coder and/or researcher on a 7-point scale: ratings of 7 represent the most internal, stable, global, and controllable explanations; ratings of 1 represent the most external, unstable, specific and uncontrollable explanations (see Appendix E). It is important to note that the majority of studies that utilize the CAVE method only use the first three dimensions and omit the fourth dimension of Controllable/Uncontrollable. Ratings of 4 are given for events that are neutral, or lack sufficient explanation for proper analysis. The event is then rated by the coder as either positive or negative from the author's point of view. The highest possible positive total attribution score for the CAVE method is 28. The lowest possible negative total attribution score is 1. A neutral attribution is identified by a total attribution score of 14.

Internal vs. External Dimension

Explanations for this dimension are divided into three different regions: 1, if the individual attributes cause to someone or something external to the self; 7, if the individual attributes cause to any behavioural, physical or mental characteristic about the self; and 2-6, if the individual attributes the cause of an event to a combination of the self and others (Schulman et al, 1988). The scale is not a measure of blame, credit, or responsibility; it is objectively defined by self-caused vs. other caused events (Schulman et al., 1989). Some examples follow:

E: I did well on the assignment
A: because it was for an easy first year course. (Rating = 1)

E: I didn't get the job
A: because they discriminate. (Rating = 1)

E: My friend and I got into an argument
A: because she doesn't like my boyfriend. (Rating = 2 or 3)

E: We're getting a divorce
A: because we're just not compatible. (Rating = 4)

E: I did well on the text
A: because I studied hard (Rating = 7).

E: I didn't get the accounting internship
A: because I'm a Humanities student. (Rating = 7)
Table 5. Internal/External coding examples

Stable vs. Unstable Dimension

Explanations for this dimension are determined by whether the cause of the event is a regular occurrence (stable) or temporary/uncommon (unstable). What is being assessed is the stability of the cause, not the event itself. Four criteria are used to help determine the rating of stability or instability of a cause: 1) the tense of the cause [past tense is unstable], 2) the probability of the cause recurring, 3) intermittent [weather] vs. continuous [physical trait] cause, 4) characterological [personality type] vs. behavioural cause [I did a bad thing] (Schulman et al, 1988). Some examples follow:

E: I can't go to class
A: because my mother just went into the hospital (Rating = 1)

E: I have difficulty sleeping
A: when it's hot (Rating = 3)

E: I find it difficult to express my frustration
A: but that's just the way I was raised (Rating = 5)

E: I didn't get the job
A: because I'm blind (Rating = 7)
Table 6. Stable/Unstable coding examples

Global vs. Specific Dimension

Explanations for this dimension are measured to the extent that the causes have on an individual's whole life (global) or whether they only affect a few areas (specific). When globality of a cause is being rated, time is held constant and the globality of the cause is rated at a specific point in time. Conversely, stability of a cause is rated given that the event, common or unique, has already occurred. Although stable and global dimensions are significantly inter-correlated it is important to rate each of these two dimensions independently of each other (Schulman et al, 1988). Some examples of globality follow:

E: I got a D on the exam
A: because I was really sick that day (Rating = 1)

E: My relationships never last
A: because I am afraid of commitment (Rating = 2 or 3)

E: I've been extremely depressed
A: since my fiancé died (Rating = 6 or 7)
Table 7. Global/Specific coding examples

Controllable vs. Uncontrollable Dimension

Explanations for this event measure an individual's perception of their own control over a cause. It was the last dimension created for the CAVE method and is meant to measure the locus of control of an event, and is the closest of the dimensions to the original model of learned helplessness (Schulman et al., 1988). Some examples follow:

E: My dog attacked their cat
A: I was unable to do anything (Rating = 1)

E: I managed to pass the exam
A: but it must have been a fluke (Rating = 2 or 3)

E: I got accepted into McMaster University
A: because I am very strong and motivated student (Rating = 6 or 7)
Table 8. Controllable/Uncontrollable coding examples

One of the largest potential confounds of using the CAVE method on written content from social media platforms is that a significant proportion of the written content lack both an explanations and an attribution. Fortunately the positive or negative classifications of events are unaffected by this. The CAVE method is particularly useful for longitudinal research, allowing any social media updates and comments, not just limited to the 10 most recent, to be analyzed in order to gain accurate information on participants' unique explanatory styles.

Quantitative Data Analysis

Statistical Package for the Social Sciences (SPSS)

IBM's Statistical Package for the Social Sciences (SPSS) 19 was used to analyze participant data in this study. The primary tools used in the data analysis were the univariate analysis of frequencies, as well as bivariate and cross-tabulation analysis using Pearson's r to show the strength of correlations between nominal variables. The following 70 cases were used for each faculty on the y-axis: Humanities (1-10), Science (11-20), Arts & Science (21-30), Health Science (31-40), Engineering (41-50), Social Science (51-60), and Commerce (61-70). The x-axis was comprised of 58 variables including personality type, attributional style and academic background.

Summary of Findings

Correlations between Personality and Explanatory Style

External/Internal Dimension

The Internal/External explanatory style is moderately correlated with the sensing personality function with a correlation of 0.348; individuals who prefer Sensing are more likely to have internal attributional styles. The Internal/External attributional style is somewhat negatively correlated with the judging personality orientations with a correlation of -0.251 (see table 5); individuals who prefer judging are more likely to have external attributional styles.

The internal explanatory style is the most prevalent among the personality types with 52.4% of participants found using it; however, the pessimistic external explanatory style was found to be used almost as often. The following personality types are most significantly positively correlated with internal attributional styles: INFJ (75%), INTP (66.5%), and ISTJ (62.5%). Each of these personality types are dominated by introverted attitudes so this finding is not unexpected. Conversely, the following personality types are most positively correlated with external attributional styles: ENTJ (75%), ISFJ (75%), and ENFP (60%). A possible explanation for ISFJ's external attributional style is that while they are introverted they focus on the requirements of the external world and people around them (Myers et al., 1998).

Stable/Unstable Dimension

The Stable/Unstable explanatory style is strongly positively correlated with the extraverted personality type with a significant correlation of 0.463; individuals who prefer extraversion are more likely to attribute causes as stable. The Stable/Unstable attributional style is slightly negatively correlated with the sensing personality type with a correlation of -0.182 (see Table 5); individuals who prefer sensing are more likely to attribute causes as unstable.

The unstable explanatory dimension is the most prevalent with a moderately significant 65.1% of the total participants being found to consistently use it. The following personality types are most significantly correlated with the attributional style of stability: ISFJ (75%), and ENFJ (60%). Both ISFJs and ENFJs are also identified with the *Benevolent Administrator* FJ type. FJs focus on organization and working within a structured environment (Myers et al., 1998). The personality types most significantly correlated with the pessimistic attributional style of instability are: ENFP (100%), INTJ (100%), and INFJ (75%). ENFPs externalize their intuition

giving them a tendency to act and make decisions spontaneously while INTJs are frustrated by the routine and casual (Myers et al., 1999).

Global/Specific Scale

The Global/Specific explanatory style is correlated with the sensing personality type with a correlation of 0.277; individuals who prefer sensing are most likely to use global explanatory styles. The Global/Specific attributional style is negatively correlated with the personality type of thinking with a correlation of -.211 (see Table 5); individuals who prefer thinking are more likely to use specific explanatory styles and brood on details.

The global attributional dimension is the most consistently used by a moderately significant 65.1% of participants. The ENFJ personality type is most significantly correlated with the attributional style of Globality (80%). Although uncommon, when under stress ENFJs may become critical and fault-finding towards others (Myers et al., 1998 pp. 100). The ENFP personality type is most significantly correlated with the attributional style of specificity (80%). When under stress, ENFPs are known to focus on insignificant or self-distorted details, letting it overwhelm and consume their focus and energy (Myers et al., 1998).

Controllable/Uncontrollable Scale

The Controllable/Uncontrollable explanatory style is correlated with the sensing personality type with a correlation of 0.306 (see Table 5); individuals who prefer sensing are more likely to use Controllable explanations. The Controllable/Uncontrollable attributional style is not significantly negatively correlated with any personality type.

The attributional dimension of controllability is the most prevalent among the participants in this study (57.1%). The following personality types are most significantly correlated with the attributional style of controllability: ENTJ (75%), INTJ (75%), and INFJ

(75%). All three of these personality types are described as being analytical, logical, clear and assertive; taking responsibility for their own actions and environments.

	Internal	**Stable**	**Global**	**Controllable**
Extravert	0.056	**0.463**	0.148	0.78
Introvert	-0.197	-0.050	-0.252	0.05
Sensing	**0.348**	**-0.182**	**0.277**	**0.306**
Intuiting	0.119	-0.061	-0.173	0.180
Thinking	-0.094	0.003	**-0.211**	-0.022
Feeling	0.083	0.020	0.012	-0.004
Judging	**-0.251**	-0.006	0.102	-0.021
Perceiving	0.180	0.245	0.102	0.120

Table 9. *Correlations between personality and explanatory style*

Personality and Explanatory Results
McMaster University

Seventy undergraduate students from McMaster University participated in one-hour research sessions held from January to March 2012. Within these sessions participants completed an MBTI personality inventory, a demographic survey, and submitted their ten most recent social media status updates or comments. The seven faculties and programs surveyed in this study are: Humanities; Science, Arts and Science, Social Science, Engineering, Health Science and Commerce. Within these seven faculties, 31 different programs of study were represented (see Chart 1).

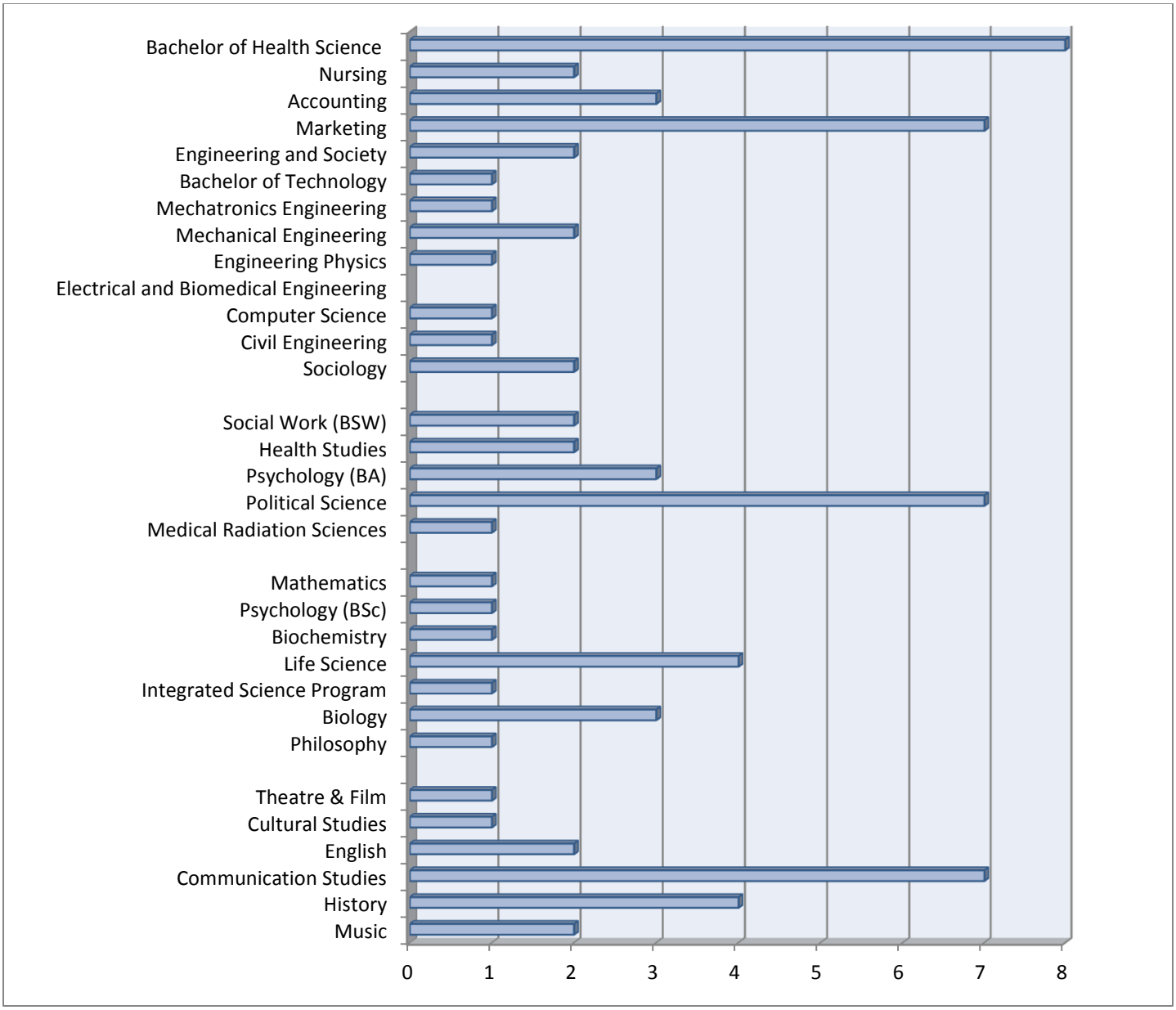

Chart 1. *Program of studies within the McMaster University participant sample*

The dominant gender represented in this study were females with 40 (57.1%) participants; males represented the remaining 30 (42.9%) of the sample size. Caucasian was the dominant racial background identified with 40 (57.1%) of the participants, while Asian racial backgrounds were the second most frequent with 22 (31.4%) of the participants identifying as such. Only four (5.7%) participants reported being international students making the status insignificant to the study. A significant majority of the participants (85.9%) fell within the age

bracket of 20-22 years of age; as a result, the personality types and attributional styles surveyed suffer minimal confounds from significant age ranges. Academic years were represented fairly evenly with 37 (52.9%) participants reporting being in their 3rd year and 30 (42.9%) of participants being in their 4th year.

A significant amount of the participants, 27 (38.6%), reported that they were enrolled in a combined honours or double-major. The majority of double-majoring students at McMaster are in the Humanities and Social Sciences; students enrolled in the Arts & Science program also reported significant amounts of double-majoring from their represented sample. For the purposes of this study specialization such as origins research (Faculty of Science) and global health (Faculty of Health Science) also counted as double-majoring; five-year engineering programs (e.g. management, biomedical, society) were also included. Although the Faculty of Commerce offers six streams of specialization for students, these were not included in the criteria for double-majoring. Academic minors (completing eight courses in an area of study) were also not used in this study as students do not declare minors until convocation and usually only take approximately two courses in these fields per year.

The most prevalent personality types found throughout all 70 participants at McMaster University are as follows: INFP, ENFJ, and ISTJ with 12 (17.1%), 10 (14.3%), and 8 (11.4%) participants respectively. McMaster's ISTJ of 11.4% population is strongly correlated with a previous study of Ontario universities that found a sample of 10.3%; McMaster's INFP and ENFJ populations were weakly correlated with the Ontario university findings of 9.3% and 6.7% respectively. Additionally, the McMaster study yielded no ESFP and ESFJ personality types which represented 3.4% and 7.3% of the sample in the Ontario universities study (CAPT-MBTI Atlas, 1986). Reasons for the variance in type populations can be attributed to the significant difference in sample sizes of the studies as well as the

number of universities surveyed.

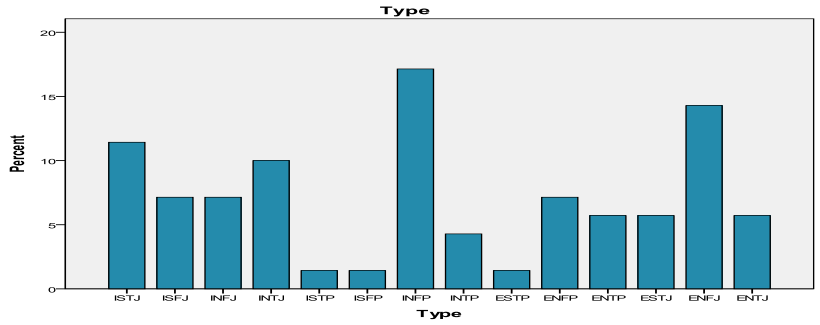

Chart 2. *Distribution of personality types throughout McMaster University*

The MBTI Form M used also included a preference clarity category which is used to determine how consistently a participant prefer a type dichotomy over its opposite. Each of the 93 questions on the personality inventory is allocated as a raw point used to determine the valence of a personality dichotomy. Each dichotomy has four possible valences: Slight, Moderate, Clear, and Very Clear. These raw points can also be used to determine the overall valence/clarity of an individual's complete personality type. The personality types with the strongest overall valence are as follows: ISTJ (80.2%), INTP (78.5%), and ISFP (78.5%). The total range for McMaster's type valence is 65.6% to 80.2% (see Appendix F) representing a fairly significant personality clarity within the McMaster University participant sample.

In the Extraversion/Introversion dichotomy it was found that a significant number of participants, 42 (68.6%), held introverted attitudes. This result is surprising as McMaster University is located in North America, an individualistic society which prefers extraverted personalities and only five participants in the study were listed as international or visiting students. An even larger range was found between the Sensing/Intuition dichotomy where 49 (70%) participants were intuiting (N) types. This preference is not unexpected as students in university are expected to engage in great deals of contemplation, skepticism and develop critical

thinking skills. Intuition is popularly associated with ‘right-brain’ intuitive and aesthetic processes, and has also been associated with scientific innovation (Holton, 1997).

The Thinking/Feeling dichotomy was the most closely related with 38 (54.3%) of the participants identified as feeling types. This finding was expected given the diverse range of academic backgrounds, both in the arts and sciences, recruited for the study. The Judging/Perceiving dichotomy yielded the second largest range with 43 (61.4%) of the participants identified as judging types. This preference is not unexpected as the majority of students in university are taught to think critically, be skeptical and innovate in their fields.

The majority of the events found within the written content of the 630 social media content were positive; 431 (68.4%) of the identified events were determined to be positive. An overwhelming 92.1% of the participants in this study demonstrated an explanatory style of Internal/Stable/Global/Controllable on the social media platforms of Facebook and Twitter. These results indicate that social media as a medium is inherently positive; allowing people to put their best faces forward and share positive content. Conversely, as social media is public space the significant positive effect could be a result of the panoptical qualities of the medium. If this is the case it would appear that individuals, regardless of their personality types engage in high self-monitoring on social media.

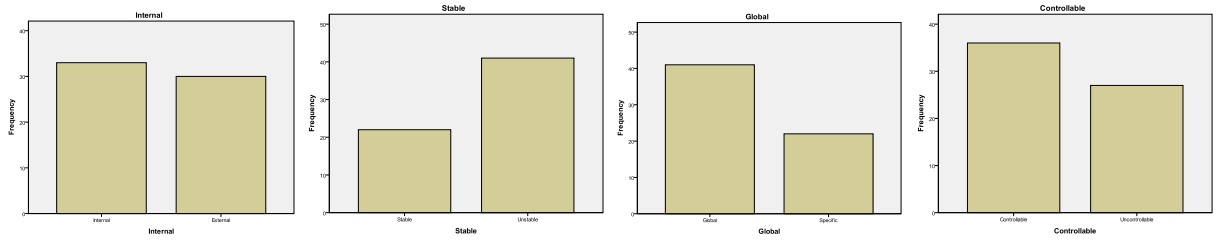

Chart 3. *Explanatory Styles at McMaster University*

Humanities

Five males and five females enrolled in this study as participants for the Faculty of Humanities. Two of the participants were in their 4th year while eight of the participants were in their 3rd year of study. Seven of the 18 programs of study are represented in this sample: Music, Theatre and Film, Communication Studies, English, Philosophy, Cultural Studies, and History. The most prevalent personality types from the sample in the faculty of Humanities are: ISFJ (20%), INFJ (20%) and INTJ (20%). Eight (80%) of the total respondents had a dominant attitude dimension of introversion, and a dominant perceiving function on intuition; although there is no clear preferred personality type from this data for the faculty of humanities, introversion and intuition preferences were very high. The total raw points of each participant's MBTI personality inventory indicate that the overall personality valence for the Faculty of Humanities is a moderate 69.5%.

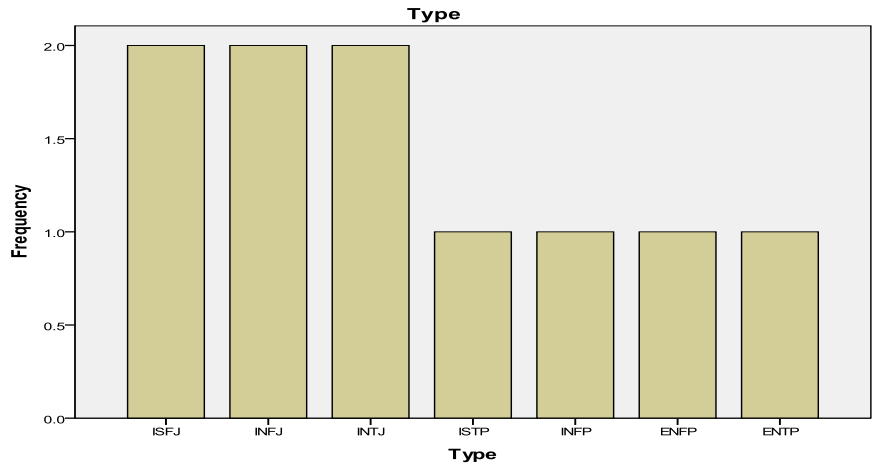

Chart 4. Personality type distribution in the Humanities

A prevalent personality trend within the participants studied in the Faculty of Humanities is a prevalence of the Introverted Judging (IJ) type, with a 60% representation. IJs are defined with a dominant introverted perceiving function that is complemented with an auxiliary extraverted judging function. The personality qualities of the IJ include introspection,

perseverance and resistant to persuasion. IJs are appear resistant to persuasion because they extravert their preferred auxiliary function of thinking or feeling, causing them to state their conclusions rather than presenting the data and research for their conclusions (Myers et al, 1998).

The IJ type preference, the *Decisive Introvert*, is as an accurate fit for the Faculty of Humanities. The goal of the Humanities is to prepare students to engage in critical thinking, and understanding of the meaning, purpose and experience (Levi, 1970). As a result, students in the Humanities state their conclusions rather than providing evidence of absolute truth because there is no established quantitative truth in their humanist studies, in contrast to their sister studies in the physical sciences.

The IN type preference, the *Thoughtful Innovator* is represented by 50% of the participants studied in the Faculty of Humanities. Keeping in line with the general definition of the studies in Humanities, as well as the IJ preference, these types are defined by their introspective and scholarly qualities. They are interested in knowledge, theories, and understanding for its own sake—appropriate definitions of humanists. In contrast to the assumptions of physical sciences, INs are the least practical and pragmatic of all types, and prefer the complexity of theory to pragmatic and logic-based areas of study. Studies have shown that INs receive higher grades in courses that were abstract and theoretical—much like the Humanities (DiTiberio, 1996).

Each participant in the Faculty of Humanities used social media, and submitted 10 status updates for analysis. While 68/100 events analyzed were determined to be positive, and all 10 participants displayed an overall optimistic explanatory style of 15.15. Interestingly, 40% of the participants reported pessimistic explanation styles of instability which correlated with the IN type preference at a correlation of 0.8. This may be a result of the IN's preference for complexity

as opposed to linear areas of study (Myers et al., 1998). The overall positive explanatory style of students in the Faculty of Humanities is a very interesting occurrence and may be heavily related to introspective qualities and engagement in learning for the sake of learning. Keeping in mind the non-reified career opportunities for graduates of the humanities, in comparison to students in fields of nursing, engineering, mathematics etc, it has been shown that INs are significantly dissatisfied with future career opportunities available to them (Hammer, 1996).

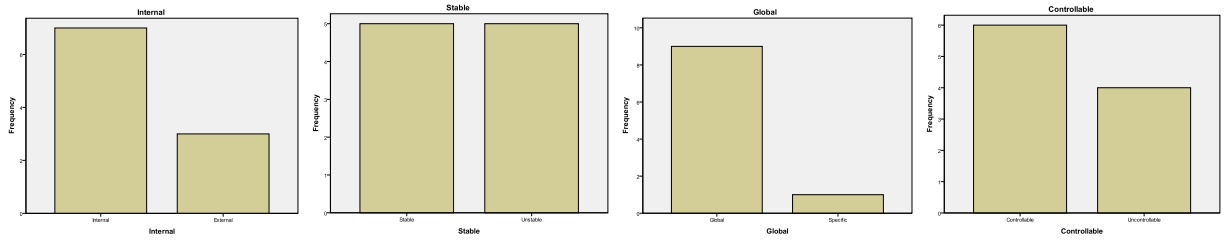

Chart 5. *Explanatory Styles in the Faculty of Humanities*

The areas of study within the Faculty of Humanities are diverse, which aid in explaining the significant range of personality types and type preferences. Out of the entire study, 14 (20%) participants reported at least one major in the faculty. The significant prevalence of introversion and intuition along with IN and IJ type preferences are highly correlated with classical definitions of humanists, and the collected data supports this.

Faculty of Science

Three males and seven females enrolled in this study as participants for the Faculty of Science. Three of the participants were in their 4th year while seven of the participants were in their 3rd year of study. Seven of the 15 programs of study are represented in this sample: Biochemistry, Biology, Integrated Science Program, Psychology Neuroscience and Behaviour, Life Science, Mathematics, and Medical Radiation Sciences. The most prevalent personality type was ENFJ (40%). Only three other personality types were represented in this sample, all of which are dominant introverts: ISTJ, INFJ, and INFP. Six (60%) of the total respondents had a

dominant attitude dimension of introversion, and eight (80%) had a dominant perceiving function of intuition. Eight (80%) of the participants had a dominant judging function of feeling, while eight (80%) of the participants were identified with the lifestyle dimension of judging. The total raw points of each participant's MBTI personality inventory indicate that the overall personality valence for the Faculty of Science is a strong 75.4%.

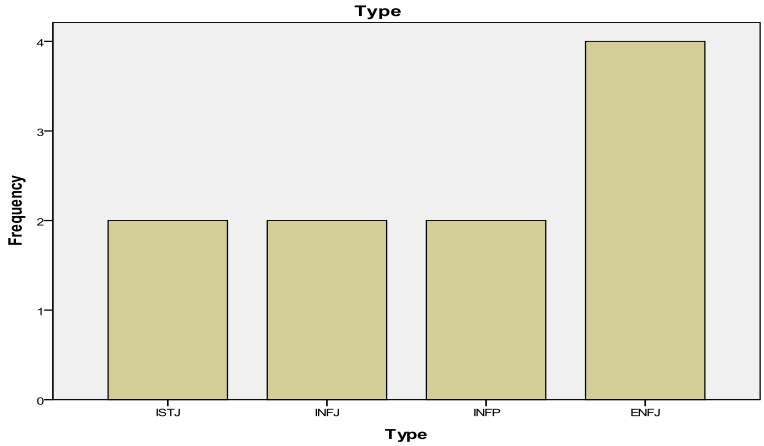

Chart 6. Personality type distribution in the Faculty of Science

The academic subjects reportedly preferred by the ENFJ and INFP personalities are dominated by the Humanities: Visual Art, English, and Music (Myers & McCaulley, 1985). Interestingly, the ENFJs in this study are enrolled in the Life Sciences, Biology and Psychology (B.Sc.)—all of which place a heavy emphasis on deductive reasoning. The remaining 40% of the Science sample made up of the ISTJ and INTJ personality types are more aligned with the expected academic preferences in science, preferring Mathematics and Science respectively (Myers & McCaulley, 1985).

The most prevalent type combination in the Faculty of Science is NF; a combination of the functions of Intuition and Feeling identified as the *Idealist* temperament. The *Idealist's* core values are for the meaning and significance that come from having a sense of purpose and working toward an identifiable goal and greater good. This is an appropriate description of the

discipline of Science as each individual within is working towards identifiable goals that will benefit society (e.g. creating vaccines, assisting patients) (Myers et al., 1998). This is contrasted with areas of study like the Humanities where goals are not clearly and specifically defined, and progress is more difficult to be quantifiably measured. Additionally, in contrast to SJ and SP temperaments, studies have shown that NFs are highly dominant in right-brain hemisphere activity that is favoured by innovators in the physical and natural sciences (DiTerberio, 1996).

Each participant in the Faculty of Science used social media, and submitted 10 status updates for analysis. It was found that 66/100 of the reported events were positive and that the overall explanatory style was optimistic with a total attributional score of 15.13; only three participants were found to have pessimistic explanatory styles. It was found that 50% of the participants reported pessimistic attribution styles of uncontrollability. This uncontrollability may be a result of the ENFJs and NF temperament's disposition to following linear and identifiable goals for themselves, being more cognizant of what is both within and outside of their control and influence. The individuals who had the most optimistic explanatory styles were Introverts: an explanation for this may be that social media offers introverted individuals a more introspective form of socialization as opposed to physical encounters.

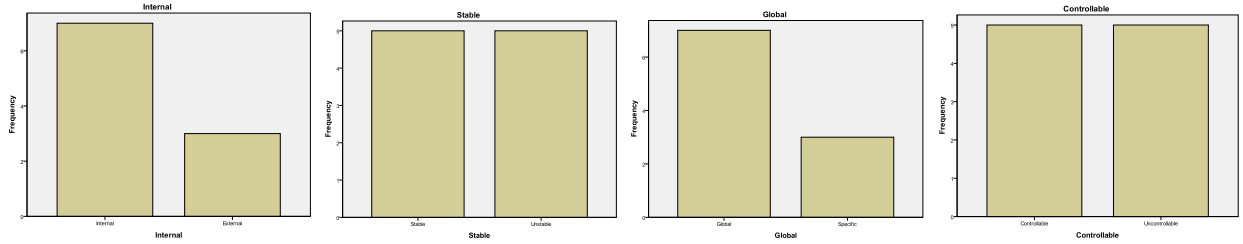

Chart 7. *Explanatory Styles in the Faculty of Science*

Arts & Science

Three males and seven females enrolled in this study as participants for the Arts & Science program. Five of the participants were in their 4th year, one participant was in their 5th

year and four of the participants were in their 3rd year of study. Students in the Arts & Science program are given the opportunity to register in a combined honours degree similar to the popular option of double-majoring within the Humanities and Social Sciences. Six of the possible 31 additional areas of study with the Arts & Science program are represented in this sample. The most prevalent personality type was INFP (40%); the second most prevalent type was ESTJ (20%). Extroversion and Introversion attitude preferences were equally split between participants, as were the lifestyle dimensions of judging and perceiving. Eight participants had a dominant orientation function of intuition. The total raw points of each participant's MBTI personality inventory indicate that the overall personality valence for the Arts & Science program is a moderate 69.1%--the weakest of all seven faculties

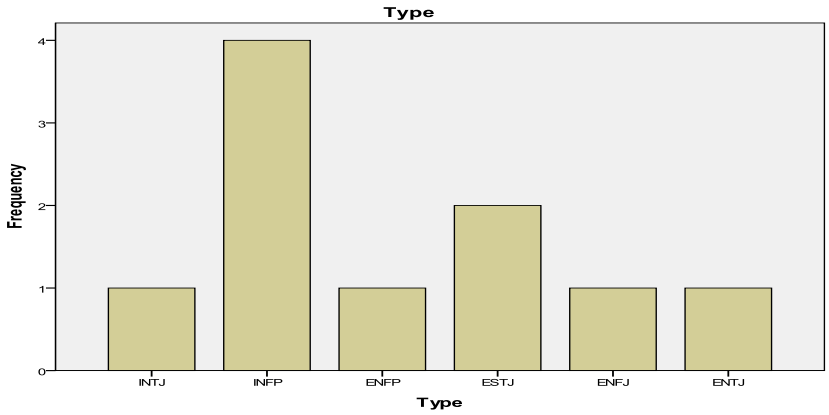

Chart 8. Personality Type distribution in the Arts & Science program.

The dominant personality type of the INFP is a strong match with the Arts & Science program given the available literature and studies. INFPs score significantly high on the scales of independence and flexibility on the California Psychological Inventory (CPI) (Myers et al., 1998); both of which are strong descriptors of the Arts & Science program which maintains a first-year enrollment of 60 high-achieving students and "was designed to provide students with a broad-based, liberal education" (McMaster University). INFPs are flexible in both the arts and

sciences, as demonstrated by their prominence of shared personality types in the Faculties of Humanities and Science.

The most prevalent type combinations in the Arts & Science program are the FP, a combination of feeling and perceiving, known as the *Gentle Types*. The second most prevalent type combination is the NF *Idealist* temperament. Introverted FP Gentle Types are adaptable, seek harmony between the internal and external world, and are concerned with the human aspects of scientific problems (Myers et al., 1998). The NF Idealists core values are also highly prevalent in the Faculty of Science and describe a purpose towards an identifiable goal and greater good. These personality preferences describe the Arts & Science program quite astutely, as the program was created to give students a strong foundation in the physical and natural sciences, while also establishing a firm foundation in the liberal arts.

Each participant in the Arts & Science program used social media, and submitted 10 status updates for analysis. It was found that 76/100 events, a significant amount, were positive and the program's overall explanatory style was optimistic with a total attribution of 16.31; no participants were found to have an overall pessimistic explanatory style. It was found that 60% of the participants reported pessimistic attribution styles of externality and specificity, and 70% instability. This may be a result of the FP and NP preference dispositions to following both linear and identifiable goals for themselves, while also being highly aware of the external world.

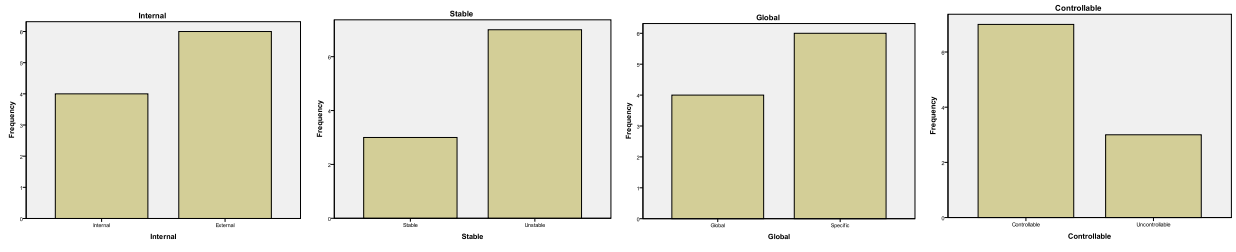

Chart 9. *Explanatory Styles in the Arts & Science program*

Faculty of Health Science

Three males and seven females enrolled in this study as participants for the Faculty of Health Science. The Bachelor of Health Science and Nursing students were used to represent the Faculty of Health Sciences in this study. Seven of the participants were in their 4th year, and three participants were in their 3rd year of study. Bachelor of Health Science students are given the opportunity to specialize in two areas: global health and biomedical studies; only global health was represented in the sample. The most prevalent personality types were ISTJ (30%) and ENFJ (30%). Eight participants (80%) had a dominant lifestyle function of Judging (J). The total raw points of each participant's MBTI personality inventory indicate that the overall personality valence for the Faculty of Health Science was a moderately strong 72%.

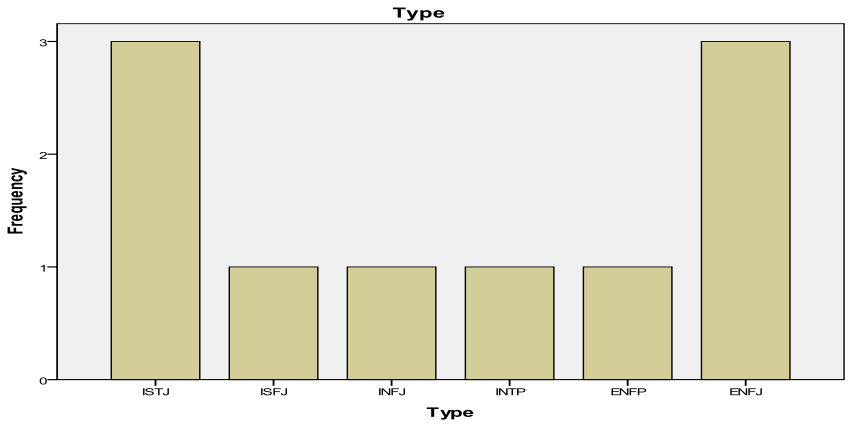

Chart 10. *Personality Type distribution in the Faculty of Health Science*

The ISTJ personality is a strongly relevant to Faculty of Health Science and its students who intend to work in hospitals and medical environments. Typically ISTJs are described as calm, reserved, and serious individuals who value consistency (Myers et al., 1998). ISTJs prefer to work independently but are comfortable working in a team when roles are clearly defined and each member fulfills an assigned responsibility—the template of a hospital environment. ISTJs emphasize thinking, making their decisions objective and logical by focusing on a task rather than an individual. This personality is imperative for individuals like medical doctors or nurses

who must remain emotionally detached from patients and consistently follow standard procedures.

The ENFJ personality type is also strongly relevant to the Health Sciences—specifically in a patient-centered environment. ENFJs are greatly empathetic to the needs of others by externalizing their feeling and focusing on supporting all individuals in their group. This personality type would be expected to be found in nurses; however, of the two nurses in the sample neither of them had this personality type.

The most prevalent type combinations in the Health Sciences are the use of judgment and orientation functions by the FJs: *The Benevolent Administrators*. All Feeling Judging (FJ) types are unique in that they extravert Feeling, regardless of whether or not it is a dominant or auxiliary function in their personality type. As a result of extraverting their Feeling, FJs are highly observant about the needs of people under their care and in their environment. FJs focus on organizing and structuring the environment in order to meet people's need and facilitate the achievement of both individual and group goals (Meyers et al., 1998). These type preferences are ideal in a healthcare and hospital environment, where nurses and medical doctors' primary objectives are to create a harmonious, stable and positive environment for their patients.

Only 8/10 Faculty of Health Science students reported using social media, and each submitted 10 status updates for analysis. It was found that 54/80 (67.5%) of the events were positive, and the overall explanatory style of the faculty was determined to be optimistic with a total attribution of 15.8. Six of the eight participants were determined to have pessimistic explanatory styles in the stability dimension; this may be a result of the constantly changing environment of placements in the hospital and medical centers; each day there are new challenges and patients.

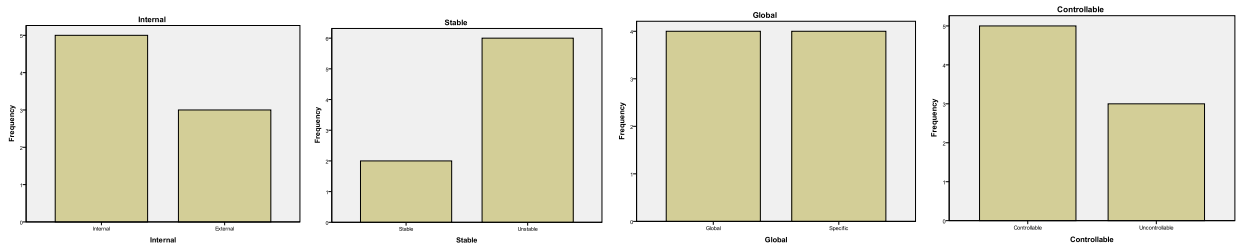

Chart 11. *Explanatory Styles in the Faculty of Health Sciences*

Engineering

Six males and four females enrolled in this study as participants for the Faculty of Engineering. Five of the participants were in their 4th year, one participant was in their 5th year and four of the participants were in their 3rd year of study. Eight of the 17 programs of study were represented in the sample: Civil, Mechatronics, Electrical and Biomedical, Physics, Mechanical, Engineering and Society. Additionally, students registered in the Bachelor of Technology and Computer Science programs were also included in the representative sample for the Faculty of Engineering. The most prevalent personality type was INFP (40%); the second most prevalent type was INTJ (20%). Eight (80%) had a dominant perceiving function of Intuition (N). The total raw points of each participant's MBTI personality inventory indicate that the overall personality valence for the Faculty of Engineering is a moderately strong 72.5%.

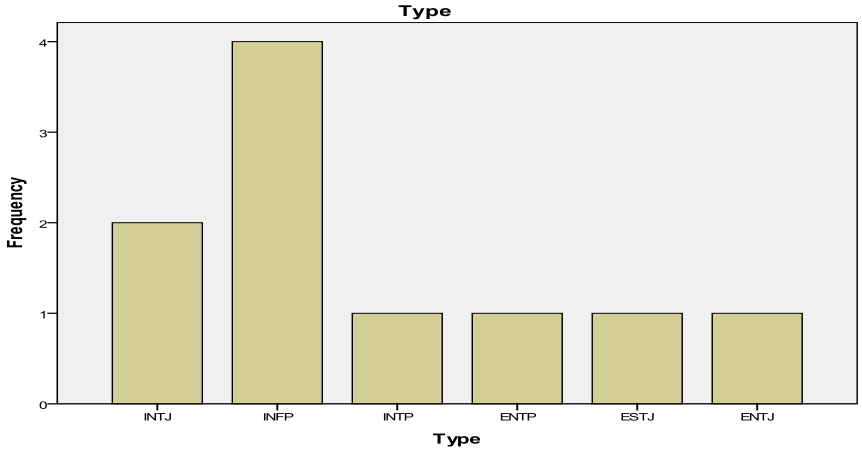

Chart 12. *Personality Type distribution in the Faculty of Engineering*

Engineering shares the dominant INFP personality type along with the Humanities and Arts & Science. This finding is not entirely unexpected as engineering students focus on bringing deductive and scientifically-based skills and designs into the material world. Engineering is an applied science which requires a foundation and understanding of the arts and how they interact with humanity (Ruprecht, 1997); in this respect engineering is understandably related to the Arts & Sciences. The INTJ is also suitable as a dominant personality type in the Faculty of Engineering as they generally possess very strong intuitive understanding and inner motivation that they use to implement long-range global plans to enhance people's lives (Myers et al.).

The most prevalent type combinations in the Faculty of Engineering are the INs, a combination of orientation and perception, known as the *Thoughtful Innovators* (70%), and the TJ *Logical Decision Makers* (40%). The INs are also well represented in the Humanities, and are defined by their introspective and scholarly qualities. This preference in engineering can be explained by taking abstract and introspective ideas and using these latent ideas to create manifest materials and objects that will benefit the lives of humans. The TJs extravert their thinking in order create logical order in the external world by defining the outer world and environment as rational as possible (Myers et al., 1998). TJs focus on critiquing existing systems, procedures and ideas so that consequences of all actions can be anticipated and resolved quickly. These type preferences are very well equipped with engineers, whose ideas emerge through introspection and are applied into a logical and rational way in the outer world.

Only seven participants in the Faculty of Engineering reported using social media, and each submitted 10 status updates for analysis. It was determined that 47/70 (67.1%) of the events were positive and the overall explanatory style was optimistic with a total attributional style of

15.19. Interestingly, each of the seven participants who submitted social media data were found to have positive explanatory styles in the global dimension (see Chart 13).

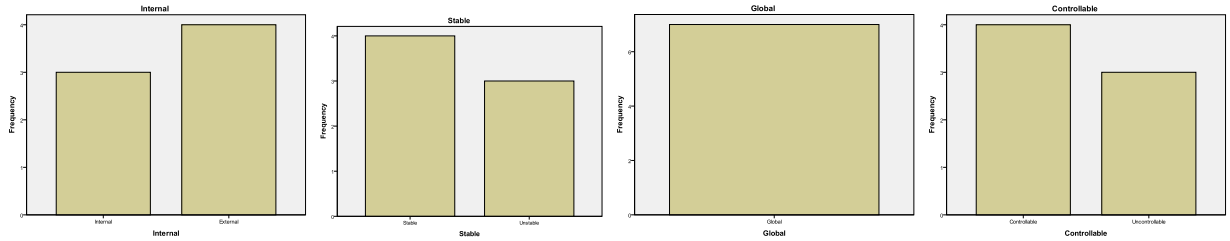

Chart 13. *Explanatory Styles in the Faculty of Engineering*

Faculty of Social Science

Five males and five females enrolled in this study as participants for the Faculty of Social Science. Three of the participants were in their 4th year, one participant was in their 7th year and six of the participants were in their 3rd year of study. Five of the 14 programs of study were represented in the sample: Political Science, Psychology (BA), Health Studies, Sociology, and Social Work. The most prevalent personality type was ISTJ (20%); each of the other eight participants was represented with unique different personality type. As the Faculty of Social Science offers fourteen different areas of study, the diverse range of personality types found in this sample are not unexpected. The most prevalent type function was found to be Intuition (N) within seven (70%) of the participants. The total raw points of each participant's MBTI personality inventory indicate that the overall personality valence for the Faculty of Social Science is a significantly strong 79.1%--the strongest of all seven faculties.

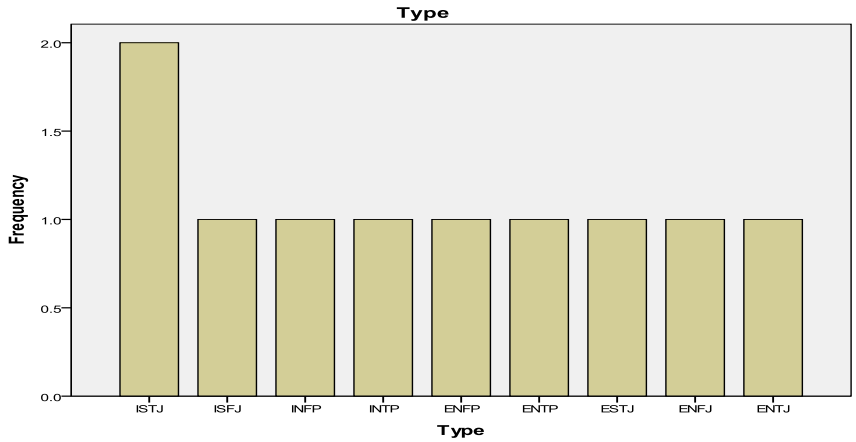

Chart 14. *Personality Type distribution in the Faculty of Social Science*

The most prevalent type combinations in the Faculty of Social Science are combinations of perception and orientations to the outer world: The SJs (40%), known as the *Realistic Decision Makers*, and the NPs, *The Adaptable Innovators*. SJs introvert their sensing function, regardless of whether it is dominant or auxiliary, and focus on taking in new information and integrating it with past memory; this allows them to solve problems by relying on previous experiences. Their goal is to form a solid, substantiated and accurate understanding of the world and communities they live in, along with their role in it. NPs extravert their intuition regardless of whether it serves as a dominant or auxiliary function. This allows them to scan the outer world for new experiences and opportunities to shape their environment (Myers et al., 1998).

Nine of the 10 participants in the Faculty of Social Science used social media, and submitted 10 status updates for analysis. It was found that 62/90 (68.9%) events in each statement were positive, and the overall positive explanatory style was optimistic with an average of 16.03. No participants were found to have pessimistic explanatory styles. It was found that seven of the participants reported pessimistic attribution styles of instability. This may be a result of the NP's desire to constantly seek new experiences.

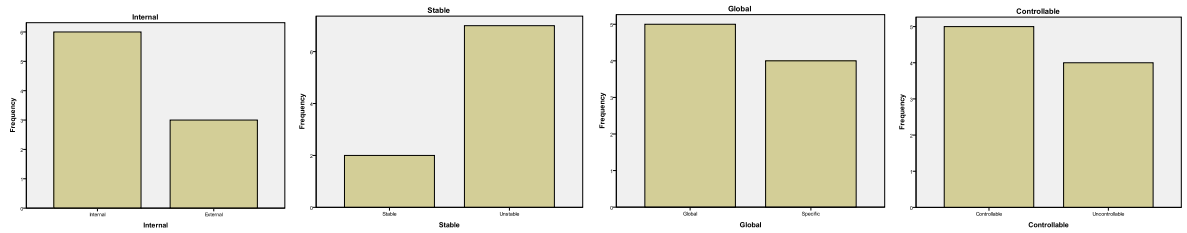

Chart 15. *Explanatory Styles in the Faculty of Social Sciences*

Faculty of Commerce (DeGroote School of Business)

Four males and six females enrolled in this study as participants for the Faculty of Humanities. Four of the participants were in their 4th year while six of the participants were in their 3rd year of study. Two of the six specializations were represented in the sample: Accounting, and Marketing. The most prevalent personality type from the sample in the Faculty of Commerce is INTJ (20%); the other eight participants each had their own unique personality types. A reason for this diverse range in personality types may be attributed to the six areas of specialization that students can take in the Faculty of Commerce. The total raw points of each participant's MBTI personality inventory indicate that the overall personality valence for the Faculty of Commerce is a moderately strong 70.6%.

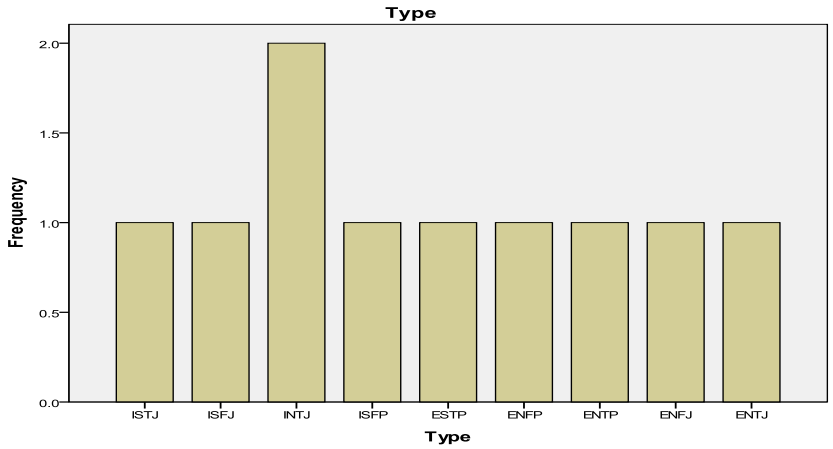

Chart 16. *Personality Type distribution in the Faculty of Commerce*

The INTJ personality type is valued in business settings with an overrepresentation among MBA graduates and female business owners (Sundstrom and Busby, 1997). Like their

peers in the Faculty of Engineering, commerce INTJs are described as rational, detached and critical long-range thinkers. The INTJ places a strong emphasis on competence, achievement, creativity and independence for both themselves and others. The Faculty of Commerce shares a great range of personality types, not unlike the Humanities and Social Sciences which is not unexpected as like the aforementioned areas of study, commerce is a broad study that can be applied to the arts and sciences.

A prevalent personality trend within the participants studied in the Faculty of Commerce is a prevalence of the EN type, *Action-Oriented Innovators* (40%). Extraverts with Intuition (ENs) seek out ways to change existing methods for the better; they see possibilities as challenges to create innovative and lasting change (Myers et al., 1998). The ENs share a strong vision for future possibilities in the world, whether it is for people, structures, or institutions. The EN type preference is a strong fit for students in the Faculty of Commerce, who have a strong desire to improve efficiency and organizational practices in all areas of business.

Nine of the 10 participants in the Faculty of Commerce used social media, and submitted ten status updates for analysis. It was found that 62/90 (68.9%) total events were determined to be positive, and that the nine participants displayed an overall positive explanatory style of 16.04. Interestingly, eight of the participants reported pessimistic explanation styles of both externality and instability. This may be a result of the EN's preference for perception of the external world and their motivation to alter and improve existing methods and institutions.

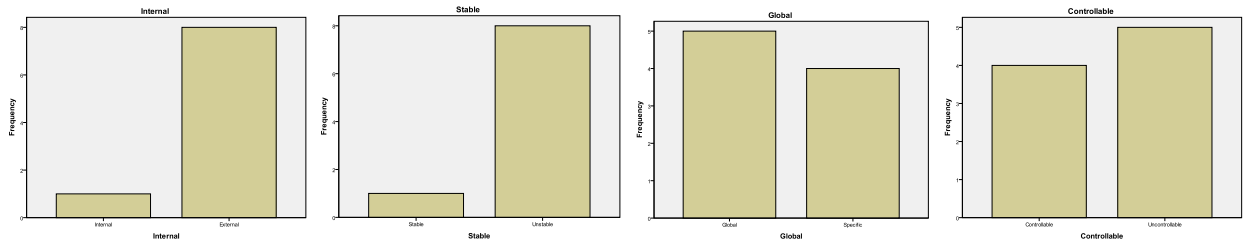

Chart 17. *Explanatory Styles in the Faculty of Commerce*

Research Limitations

Participants

One of the primary limitations in this major research project was getting the 70 participants required for the study. The primary researcher originally planned to hold four sessions in early 2012 on the following dates: January 31st, February 1st February 2nd and February 3rd. Unfortunately, the final session was held on March 5th, 2012 which limited the amount of time that the primary research had to analyze and correlate all of the collected personality and attributional style data. It is understood that 70 participants is not a representative sample size of McMaster University, nor are 10 students from each faculty. However, significant trends were found within the collected data from this study which could be further explored in future studies.

Originally the primary investigator intended to recruit 10 4th year students from specific departments within each of the seven undergraduate faculties that were surveyed: Fine Arts (Humanities); Electrical (Engineering); Sociology (Social Sciences); Accounting (Commerce); Biology (Science); Bachelor of Health Sciences (Health Sciences); and Arts & Science. Although the results would have been department as opposed to faculty specific, more accurate data may have come as a result. Ideally 10 students from each department within each of the seven faculties would have been surveyed; however, that would require significantly more funding as well as the assistance of several additional researchers.

The participants recruited for this study were also not representative of the total population. The majority of the participants were either Caucasian or Asian; very few were African American, Indian or part of any other racial or ethnic groups. As a result of this, demographic information including racial background was not correlated with either attributional style or personality type as the findings would not have been significant.

Ethics Clearance

Participants for this study were originally meant to be recruited by late-October 2011. Unfortunately as result of the McMaster Research Ethics Board (MREB), the research was not cleared until mid-December 2011. As the majority of the primary investigator's areas of study are based in the Humanities, there were few opportunities to complete research studies involving human participants and to understand importance of ethics and detailed research design. The MREB's primary concern was with the collection of participant social media data, which was originally proposed to be collected by the lead investigator himself. This method of data collection was deemed too invasive; a compromise of social media data through participant self-report was eventually attained.

Working with the MREB members was an extraordinarily useful and valuable experience. The importance of setting realistic and attainable research designs, as well as crafting extensively detailed and operationalized methodologies greatly prepared the primary investigator for not only this, but future research projects. Having gone through extensive ethics training for this research project has more than prepared the primary investigator for research at the professional and Masters-level.

Cave Method

Using the CAVE method instead of the Attributional Style Questionnaire (ASQ) for determining the attributional style of each participant was much more labour intensive and potentially produced less accurate findings. The ASQ and CAVE psychometric tools are copyrighted materials which may only be used with the written permission of the author, Dr. Martin Seligman of the University of Pennsylvania. As a result, it was difficult to find specific

information on both psychometric tools before the primary investigator received them after being approved by Dr. Martin Seligman of the University of Pennsylvania's Positive Psychology Centre. The CAVE method was the decided choice for extrapolating explanatory style since the beginning of the major research project; however, the ASQ was requested as well to have on file for future research.

The decision to use the CAVE method alone was an oversight on the part of the primary researcher part. When the CAVE method arrived all participant research sessions were completed and 630 social media updates were submitted. The CAVE method came enclosed with mandatory self-based training guidelines for extracting and rating spontaneous explanations which took several hours in order to become competent to effectively use. These guidelines stated that in order to accurately extract an explanatory style from written information, both an attribution and a cause are needed. As the primary researcher was unaware of this beforehand, no strict guidelines concerning written content were given to participants for the submission of social media updates. As a result, while the majority of each social media update included clearly defined events, a significantly lower amount did not include attributions (e.g. the event was good because…). As a result of this, each faculty's total attribution styles are around 16.0 and the small quantitative differences between faculties were deemed to be statistically significant for this research study.

The ASQ could have been administered along with the MBTI during the participant research sessions, saving time and gathering more accurate data on each individual's personal attributional style. However, personal attributional information gathered from the ASQ may have been very different from the information gathered from public social media updates. The similarity between the attributional styles of each faculty on social media may be evidence that

individuals are relatively more positive on social media, possibly as a result of self-fulfilling prophecy and its panoptical design. Future studies will use both the ASQ as well as the CAVE to determine if there is a discrepancy between privately reported attributional styles and attributional styles posted in public space.

Future Research

The primary investigator intends to continue this research as a PCOM661 major research project within the Master of Arts of Professional Communication (MAPC) program at Royal Roads University. The type of student who attends Royal Roads University is of a different demographic in terms of age and professional experience than that of a traditional student attending undergraduate education at an institution like McMaster University. The majority of the students at Royal Roads University are also enrolled in Masters degree programs; it would be interesting to see if there are significant difference in either personality type or explanatory style between undergraduate and graduate students. Given the rapidly rising popularity of distance education, it would also be valuable to determine what personality type pursues this method of education. Professionals in the fields of the arts, commerce and healthcare would also be recruited for this research.

This major research study will build off of the foundation that was started at McMaster University, but will utilize a more representative sample size. Participants will be asked to complete an ASQ along with the MBTI, and be given more detailed information on acceptable social media updates to be sent for CAVE analysis. Additional researchers may be recruited for the CAVE analysis to provide more accurate data; the seven-point scale may also be shortened to a five-point scale for increased coder accuracy. The primary investigator will have significantly

more time and resources available to work on this major research project and will correlate the findings with those that this McMaster University study produced.

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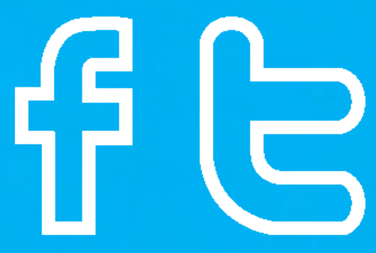
personality

+

social media



Are you in 3rd or 4th year?
Willing to be part of a 1 hour study?
Complelete an official Myers-Briggs (MBTI) Personality Test

Looking for 60 participants

Health Sciences
Humanities
Engineering
Social Sciences
Commerce
Science

To register and for more info:

Dr. Alex Sevigny
sevigny@mcmaster.ca

Dustin Manley
manleydp@mcmaster.ca

LETTER OF INFORMATION / CONSENT

Personality and Positive Psychology
A Study in Organizations and Social Media

Investigators:

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Purpose of the Study
How much of a role does an individual's personality type and optimism levels hold in relation to their academic backgrounds in post-secondary education? This study will determine the dominant personality types, as well as the subjective well-being/optimism scales of 60 undergraduate McMaster students using the Myers-Briggs Type Indicator (MBTI) test. Participant social media data (Twitter and Facebook updates) will be self-reported to the primary investigators for further analysis on optimism and attributional styles.

This study will be completed in 2 parts. The whole study will not take more than 50 minutes for Part 1 and 10 minutes for Part 2.

Procedures involved in the Research
After signing up for this study on the Department of Psychology's Experimetrix website you will choose to attend 1 of 4 meetings in a computer lab. You will be asked to fill out a short demographic survey, and an MBTI test on paper. If you agree, you will also be asked to log in to your Facebook or Twitter accounts and copy and paste your 10 most recent status updates into a secure Microsoft Word document. After your social media data has been compiled into this secure Word document, you will upload it to a secure dropbox account created by the primary investigators for this study. The total time to complete the surveys will be approximately 30-50 minutes. The total time to complete and upload the social media data collection will be approximately 10-15 minutes.

Potential Harms, Risks or Discomforts:
The risks involved in participating in this study are minimal. You may feel uncomfortable and/or frustrated while completing the surveys.

You are not required to answer questions that you do not want to answer or that make you feel uncomfortable (e.g. GPA, parental income, personality questions). You may withdraw (stop taking part) from the study at any time during the process.

Confidentiality
All information that you provide is confidential. The primary investigators will not publish your name or any other information that would allow you to be identified. Participant anonymity cannot be guaranteed as multiple participants taking part in this study will be meeting in the designated computer labs and will see other participants they may recognize.

The physical information you provide (demographic survey and MBTI test) will be kept in a locked desk/cabinet where only the primary student investigator and the faculty supervisor will have access to it. Social media data will be kept password protected on the computers of the primary investigators, as well as on a secure dropbox account. Once the study is complete, an archive of all original and self-reported data will be destroyed within a year (February 2013).

Participation and Withdrawal
Your participation in this study is voluntary. It is your choice to be part of the study or not. If you decide to be part of the study, you can decide to withdraw at any time. If you are required to write a report on this study for a class involving Experimetrix, upon withdrawal you will still be given the necessary information required to complete your assignment.

In cases of withdrawal, any information you have provided will be destroyed unless you indicate otherwise; however, any requests for data to be destroyed after February 15th, 2012 may be no longer possible. If you do not wish to answer any of the questions on the demographic survey and MBTI test, you do not have to. Your decision whether or not to be part of the study will not affect your continuing access to services available at McMaster University.

Information about the Study Results
We expect to have this study completed by approximately April 2012. If you would like to request a summary of your results, please contact either Dustin Manley or Dr. Alex Sévigny through your McMaster email account.

Participant Benefits
Participants will receive the results from an official Myers-Briggs personality type test which costs upwards of $100.

Participants are free to withdraw at any time. Participants have already completed a Myers-Briggs Type Indicator (MBTI) personality inventory before withdrawal will still be available to receive their results through McMaster email.

Questions about the Study
If you have questions or need more information about the study itself, please contact either **Dustin Manley and/or Dr. Alex Sévigny:**

Student Investigator
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Supervisor
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If you have concerns or questions about your rights as a participant or about the way the study is conducted, please contact:

McMaster Research Ethics Secretariat
Telephone: (905) 525-9140 ext. 23142
c/o Research Office for Administrative Development and Support
E-mail: ethicsoffice@mcmaster.ca

CONSENT

I have read the information presented in the information letter about a study being conducted by Dustin Manley, of McMaster University.

I have had the opportunity to ask questions about my involvement in this study and to receive additional details I requested.

I understand that if I agree to participate in this study, I may withdraw from the study at any time.

I have been given a copy of this form. I agree to participate in the study and its procedures:

Signature: _____

Name of Participant (Printed) _____

I agree to take part in the social media aspect of this research study. I agree that the primary researchers may use the social media information that I provided to them. The researchers may use this data only for the procedures outlined in this research study.

Signature: _____

Name (Print): _____

Date: _____

You have been selected among McMaster University Undergraduate students to complete a survey. The purpose of this survey is to determine much of a role does personality type play in relation to academic backgrounds in post-secondary education.

- We guarantee that your name and the information you provide will remain anonymous

For more information on issues of privacy, confidentiality and the benefits or risks of the research, please refer to the Consent Form / Letter of Information.

Please tell us about yourself.

Mark an "X" in the box that best describes you.

1. Are you?
__ Male __ Female

2. To which age group do you belong?
__ Under 18 __ 18-24
__25-34 __35+

3. If you are in the 18-24 age group, are you:
__ 18 __ 19 __ 20 __21
__ 22 __ 23 __ 24

4. In what year are you in your studies at McMaster?
__ First year __ Second year
__ Third year __ Fourth year
__ Other (please indicate): _____

5. In which faculty are you primarily enrolled?
__ Humanities __ Social Sciences __ Science
__ Business __ Engineering __ Health Sciences
__ Other (please indicate): _____

6. What is your racial/ethnic background?
_____

7. Are you an international student (did you move to Canada to attend university)?
__Yes __No

Penn
Arts & Sciences
Director of Education and Senior Scholar
Positive Psychology Center

Positive Psychology Center
[redacted]
Philadelphia PA 19104
Tel [redacted] Fax 215.573.2188
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Martin Seligman
Zellerbach Family Professor of Psychology

Martin Seligman
Zellerbach Family Professor of Psychology

PERMISSION TO USE THE ATTRIBUTIONAL STYLE QUESTIONNAIRE

The Attributional Style Questionnaire (ASQ) is copyrighted material and may only be used with the written permission of the author, Dr. Martin E. P. Seligman. This letter grants you permission to use the ASQ, so please keep it on file. The questionnaire may be used only for academic research or by a clinical psychologist for the diagnosis or treatment of patients. It may not be used for profit or for any corporate-related activities.

Sincerely,

Martin E. P. Seligman

Programs in the Faculty of Humanities

Studio Art Program (BFA)	**Cultural Studies** (1)
Art History	French
Music (2—music cognition)	**History** (4)
Theatre and Film (1)	Comparative Literature
Classics	Peace Studies
Communication Studies (7)	Women's Studies
Multimedia	Linguistics
English (2)	Cognitive Science of Language
Philosophy (1)	Cultural Studies

Programs in the Faculty of Science

Biochemistry (1)	**Biology** (3)
Chemical Biology	Chemistry
Environmental Sciences	Geography/Earth Sciences
Integrated Science Program (1)	Kineseology
Life Sciences (4)	**Psychology, Neuroscience & Behaviour**(BSc) (1)
Mathematics (1)	Statistics
Medical Radiation Sciences Program (1)	Medical Physics and Applied Radiation Program
Physics	

Programs in the Faculty of Social Science

Anthropology	**Political Science** (7)
Economics	**Psychology, Neuroscience & Behaviour** (BA) (3)
Geography	Geography and Environmental Studies (BA)
Religious Studies	Social Psychology Program
Gerontology	**Health Studies** (2)
Health and Aging	**Social Work** (BSW) (2)
Labour Studies	**Sociology** (2)

Programs in the Faculty of Engineering

Chemical Engineering	**Civil Engineering** (1)
Software Engineering	**Mechatronics Engineering** (1)
Computer Science (1)	Business Informatics (BA.sc)
Electrical Engineering	Electrical and Computer Engineering
Electrical and Biomedical Engineering (3)	**Engineering Physics** (1)

Materials Engineering	**Mechanical Engineering** (2)
Bachelor of Technology (B.Tech) (1)	
(Engineering Management)	(**Engineering and Society**) (2)

Specializations in the Faculty of Commerce (DeGroote School of Business)

Accounting (3)	Finance
Marketing (7)	Entrepreneurship
Human Resources	Information Technology

Programs in the Faculty of Health Sciences

Bachelor of Health Sciences (BHsc (H)) (8)	**Nursing** (BScN) (2)
(Global Health)	(Biomedical)

Specializations in Arts & Science program

Anthropology	Art History
Biochemistry (1)	Biology
Molecular Biology and Genetics	Chemical Biology
Chemistry	Classics
Computer Science	Cultural Studies
Economics	English
Environmental Science	French
Geography	Human Geography
Health Studies (1)	**History** (1)
Linguistics	**Mathematics** (1)
Multimedia	Origins Research Specialization
Peace Studies	Philosophy
Physics	**Political Science** (1)
Psychology	Religious Studies
Social Work (1)	Sociology
Theatre & Film Studies	

Participant Demographics:

Age	**Gender**	**Double Major**
19: 3 (4.3%) 20: 24 (34.4%) 21: 23 (32.9%) 22: 13 (18.6%) 23: 1 (1.4%) 24+: 6 (8.6%)	M: 30 (42.9%) F: 40 (57.1%)	Yes:27 (38.6%) No: 43 (61.4%)
Year	**Racial Background**	**International**
3: 37 (52.9%) 4: 30 (42.9%) 5: 2 (2.9%) 6+: 2 (1.4%)	C: 40 (57.1%) A: 1 (1.4%) I: 7 (10%) Ais: 22 (31.4%)	Yes: 4 (5.7) No: 66 (94.3)

McMaster University Types:

Type	**McMaster Percentage**	**Clarity of Type (/93)**	**Canadian English University Students**
ISTJ	8 (11.4%)	74.6 (80.2%)	10.3%
ISFJ	5 (7.1%)	63 (67.7%)	5.5%
INFJ	5 (7.1%)	63.6 (68.4%)	5.4%
INTJ	7 (10%)	66.3 (71.3%	5.6%
ISTP	1 (1.4%)	62 (66.7%)	3.3%
ISFP	1 (1.4%)	73 (78.5%)	3.3%
INFP	12 (17.1%)	69.7 (74.9%	8.2%
INTP	3 (4.3%)	73 (78.5%)	7.9%
ESTP	1 (1.4%)	61 (65.6)	3.9%
ESFP	0		3.4%
ENFP	4 (5.7%)	65.2 (70.1%)	10%
ENTP	4 (5.7%)	67 (72%)	5.8%
ESTJ	4 (5.7%)	71 (76.3%)	7.4%
ESFJ	0		7.3%
ENFJ	10 (14.3%)	65 (69.9%	6.7%
ENTJ	4 (5.7%)	62.8 (67.5%)	4.9%

Personality Type Valences

	E	**I**	**S**	**N**	**T**	**F**	**J**	**P**
Total:	**28**	**42**	**21**	**49**	**32**	**38**	**43**	**27**
Slight	6	11	5	12	6	9	6	15
Moderate	11	15	7	22	10	12	13	5
Clear	8	7	8	11	11	15	17	6
Very Clear	3	9	1	4	5	2	7	