

**A Canonical Correlation Analysis of the Myers-Briggs Type Indicator and the
Instinctive Drives™ System**

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ABSTRACT

The number of profiling tools within organisational environments is increasing rapidly, so it is important to consider whether these supposedly different tools are actually measuring different aspects. This study examined the relations between the Myers-Briggs Type Indicator and the Instinctive Drives System™. The study consisted of 50 participants, who completed both personality measures. Canonical correlation analysis, as well as bivariate correlation analysis was used to determine significant relations between the scales. Canonical correlation was found to be a useful analytical tool, highlighting the fact that whilst there is a small connection between the two measures, they are essentially measuring different aspects of personality. The results of the study highlight the need for further research in this area.

Keywords: Canonical Correlation Analysis; Personnel Psychology; Survey; Human Resources Management; Regression

BACKGROUND

Personality psychology has undergone many changes from its initial beginnings more than 100 years ago (Smith, 2005). However, throughout the years all research in the field of personality psychology has been interested in one question: How do people differ from each other? This question is also vital in an organisational setting, as business managers look for effective ways to manage different types of employees. Whilst working towards an answer to this question, many tests and psychometric tools have been developed, but few have endured as long and as successfully as the Myers-Briggs Type Indicator (MBTI) (Myers, McCaulley, Quenk & Hammer, 1999). However, despite the widespread usage of the MBTI, many claim that the test lacks reliability and validity, and should only be used with caution, if at all, in organisational environments (McCrae & Costa, 1989; Pittenger, 1993; Boyle, 1995; Pittenger, 2005).

Recently, a new psychometric test known as the Instinctive Drives (ID) System™ was developed by Paul Burgess (Fitzgerald & Fitzgerald, 2004). Early reports of this tool indicate that it lacks the shortcomings of the MBTI, and also provides more useful feedback for employees and employers when conducted in the workplace. The purpose of this exploratory study is to use modern statistical analyses to

determine whether or not correlations exist between the scales of the MBTI and the scales of the ID system™. The results will benefit business managers by providing them with a clear comparison of personality tools which could be implemented within the workplace.

The Myers-Briggs Type Indicator

Many organisations around the world have utilised the MBTI for a variety of reasons, including team building exercises, management training, and as a part of their recruitment procedure. The MBTI was developed more than 50 years, using Jung's theory of psychological types (Myers et al., 1999). Through application of Carl Jung's work from the 1920's onwards, 4 distinct scales, each with 2 distinct directions, were created to measure a person's type: Extraversion-Introversion (EI), Sensing-Intuition (SN), Thinking-Feeling (TF) and Judging-Perceiving (JP) (See Appendix A for a more detailed description of these scales). The MBTI combines these four scales and measures them by using a number of dichotomous multiple choice questions. The MBTI provides simple and practical feedback, which has undoubtedly assisted in the MBTI in achieving the popularity it has at present, however, not all agree that the results participants receive are meaningful.

Pittenger (1993) questions many aspects of the MBTI, from its theoretical background and its construction, to its reliability, validity and overall usefulness in organisational environments. He agrees with McCrae & Costa (1989) that the tool does not correctly apply Jung's type theory, and also points out that the MBTI does not display the bimodal distribution on each scale predicted by the underlying theory. However, the face value that the MBTI has attained over the years cannot be discounted, nor can its reported success in the workplace (Myers, McCaulley, Quenk & Hammer, 1999).

Due to the impressive face value that the MBTI has acquired over the years, many studies have compared it with other psychometric tools, for a variety of purposes. Primarily, these comparisons are made to gain a better understanding of what constitutes personality (McCrae & Costa, 1989; Francis &

Jones, 2000; Furnham, Moutafi & Crump, 2003; Filbeck, Hatfield & Horvath, 2005). One of the earliest and most interesting comparisons conducted with the MBTI was a study that examined the correlations between the scales used in the MBTI and the scales used in the NEO PI-R (McCrae & Costa, 1989). In this study, a number of strong correlations were found between the scales of the MBTI and the scales of the NEO PI-R, despite being drawn from very different theoretical frameworks. The strongest correlations found were: EI with *extraversion* ($r = .72$), SN with *openness to experience* ($r = .71$), TF with *agreeableness* ($r = .45$), and JP with *conscientiousness* ($r = .48$). All of these correlations were significant at $p < .001$. These findings were replicated by Furnham et al. (2003), which gave greater support to the theory that there is a significant amount of overlap between the scales used in the MBTI and the scales used in the NEO PI-R. Both McCrae and Costa (1989) and Furnham et al. (2003) recommend that future research be directed towards further comparisons of these tools to gain a deeper understanding of what aspects of personality they are measuring. The present study aims to extend the research presented by the above studies, and compare an existing tool with a relatively new measure, the ID System™.

The ID System™

The ID System was developed in 1991 and has been reportedly growing in popularity ever since (Burgess, 2007). Fitzgerald et al. (2005) provide a detailed discussion of a possible theoretical background for the four scales that constitute the ID System™. The present study focuses mainly on the aspects of the ID System™ that are comparable to the MBTI, for a more complete description of the ID System™, see Burgess (2007). Similarly to the MBTI, the ID System™ utilises 4 distinct scales: the Instinct to Verify™ (Verify), the Instinct to Authenticate™ (Authenticate), the Instinct to Complete™ (Complete), and the Instinct to Improvise™ (Improvise). Also similar to the MBTI, each of the scales has two directions (See Appendix A for a more detailed description of these scales).

Whilst the current research on the ID System™ is limited, there have been a small number of studies that have examined how the ID System™ is applied within organisational environments

(Fitzgerald et al. 2005). Initially, research was done with students, and the effectiveness of the ID System™ was evaluated through the improved performance of a study group (Fitzgerald & Fitzgerald, 2004). This research was then extended to a workplace environment to analyse how the ID System™ was received on a larger scale (Fitzgerald, Dadich, & Fitzgerald, 2006).

Fitzgerald and Fitzgerald (2004) first introduced the ID System™ in a qualitative study aimed primarily at establishing whether or not people would respond positively or negatively towards the instrument. Whilst this study lacks much of the academic rigour found in studies analysing the MBTI, it represents an important first step in the development of a new psychometric tool. One thing that all research regarding the MBTI agrees on is that the main reason the MBTI has prevailed where so many other psychometric tests have fallen is because of its face value. With that in mind, testing the face value of new psychometric tests is extremely relevant to their potential future application. Fitzgerald and Fitzgerald (2004) suggest that the vast majority of students found the ID System™ very useful, and planned on utilising the feedback given to them regarding their own personality.

Building upon this early research, Fitzgerald et al. (2006) took the ID System™ into the workplace, and conducted a more comprehensive qualitative analysis to determine its effectiveness. Interestingly, one of the findings to come out of this study was that many participants considered the ID System™ to be more applicable and more useful than any other personality test they had taken, with a number of participants specifically mentioning the MBTI. Fitzgerald et al. (2006) suggest that people may feel this way due to the concerns regarding the reliability of the MBTI. People were aware that MBTI results could change relatively easily, and felt that the descriptions of the different types could apply to most people. Conversely, the majority of participants felt that the feedback given by the ID System™ was much more accurate, and the general impression was very positive. Not surprisingly, Fitzgerald et al. (2006) suggest that more research needs to be conducted before any definite conclusions can be

established, but early signs indicate that the ID System™ is a reliable and valid psychometric tool with a growing level of face validity that may soon rival that of MBTI.

It should be noted that the ID System™ does not claim to measure ‘personality’, but rather “what drives us to be a certain way” (Burgess, 2007 p.5). However, both the MBTI and the ID System™ use preference-based questions (such as preference for variety over routine) to measure users on four distinct scales. For this reason, and for ease of reading, both the MBTI and the ID System™ will be referred to as measures of personality. The scope of this study does not allow for a comprehensive discussion of the definition of personality, for details on how the concept of personality has changed over the past 40 years, see Dahlstrom (1970), Wiggins and Pincus (1992), and Livesley and Jang (2005).

Comparing the MBTI and the ID System™

By building on the research discussed above (McCrae & Costa, 1989; Francis & Jones, 2000; Furnham et al., 2003), this study aims to add conceptual and theoretical knowledge to the field of personality psychology. Research such as the present study is necessary in order to gain a better understanding of how the ID System™ relates other tools and theories within personality psychology. McCrae and Costa (1989), and Furnham et al. (2003) demonstrate how comparison studies can be valuable and informative. The previous research in the field, combined with the aims of the present study, led to the following question:

RQ1: What relations, if any, exist between the scales of the MBTI and the scales of the ID System™?

There are many ways in which the two sets of scales could be related, and due to the sheer number of hypotheses that could be made in regards to this research question, as well as the fact that many of them would be contradictory, no specific hypotheses are set forward for this aspect of the study. Instead, as has been the case for a number of other studies comparing psychometric tools (Francis & Jones, 2000;

Fitzgerald et al. 2005), the research question will be sufficient in guiding the direction of this section of the present study.

METHOD

Participants

A total of 50 university students were used as participants in the study (15 male, 35 female). Participants were selected via a convenience sampling technique, and as there were no specific requirements for participation, the first 50 students that agreed to participate were included.

Questionnaires

The MBTI questionnaire and the ID System™ questionnaire were used in this study. The MBTI questionnaire has 93 dichotomous questions, and was filled out on paper. The ID System™ Questionnaire consists of 32 multiple choice questions in which participants rank the four options in order of preference, and was completed on a computer.

Procedure

Each participant was required to complete the MBTI and the ID System™ in the same sitting. The order in which the questionnaires were completed was counter-balanced across all participants, with half receiving the MBTI questionnaire first, and half receiving the ID System™ questionnaire first. These tests were then scored and the results were returned to participants once their scores had been calculated. This usually took 1-2 days. All participants were also given a short debriefing by the researcher, which included an explanation of their individual results.

Design

The study was designed to compare the personality measures by getting the same group of participants to complete both tools at the same time. This allows for the collection of a data set which can

accurately be analysed for similarities and correlations between the two personality measures. Canonical correlation analysis, following the techniques described by Humphries-Wadsworth (1998), was used to analyse the possible relations between the scales of the MBTI and the scales of the ID System™, and a standard bivariate correlation analysis was used to confirm individual relationships. A canonical correlation accounts for the high number of variables being measured, and reduces the chances of obtaining statistically unsound results. Both canonical correlation and bivariate correlation procedures were performed using the Statistical Package for the Social Sciences (SPSS). Due to the fact that canonical correlation analysis is rarely used in this field of study, a brief description of how the analysis works is included in Appendix B.

RESULTS

Assumptions for canonical correlation analysis were met, including normality, linearity, homoscedasticity, multicollinearity, and singularity. No missing data was present, and no outliers were identified. Sample size was judged to be adequate for canonical correlation analysis according to the criteria suggested by Tabachnick and Fidell (2005).

Correlation Analysis

No participants were omitted from the correlation analysis, leaving $N = 50$. A canonical correlation analysis was performed between a set of scales from the MBTI and a set of scales from the ID System™ using SPSS. The scales of the MBTI were EI, SN, TF, and JP. The scales of the ID System™ were Verify, Authenticate, Complete and Improvise. The first canonical correlation was .73 (53% overlapping variance). The remaining three canonical correlations were effectively zero. With all four canonical correlations included, $\chi^2(16) = 43.91$, $p < .001$. Subsequent χ^2 tests were not statistically significant. The first pair of canonical variates, therefore, accounted for the significant relationships between the two sets of scales. Canonical correlations are presented in Table 1.

Table 1: Canonical Correlations of MBTI Scales and ID System™ Scales

Canonical Variate	Canonical Correlations	χ^2 value	<i>df</i>	Sig.
1	.73	43.91	16	.00
2	.41	9.92	9	.36
3	.19	1.83	4	.77

Data on the first canonical correlation appears in Table 2. Shown in the table are correlations between the variables and the canonical variates, standardised canonical variate coefficients, within-set variance accounted for by the canonical variates (proportion of variance), redundancies, and canonical correlations. Proportion of variance and redundancy indicate that the pair of canonical variates was moderately related. With a cut-off correlation of .3 (as suggested by Tabachnick & Fidell, 2005), the scales from the MBTI that were correlated with the canonical variate were SN and JP.

From the ID System™, the scales of Complete and Improvise correlated with the canonical variate. The pair of canonical variates indicates that participants who score high on Sensing (.81) and high on Judging (.75) are more likely to score high on Complete (.85), and low on Improvise (-.97). A bivariate correlation analysis was also conducted to confirm the presence of the relations between the scales, and significant correlations were found for all relations suggested by the canonical correlation analysis.

DISCUSSION

The present study was designed to examine the relations between the scales of the MBTI and the scales of the ID System™. In answering the research question posed, several relations were found to exist between the scales of the MBTI and the scales of the ID System™. However, compared to the results

Table 2: Correlations, Standardised Canonical Coefficients, Canonical Correlations, Proportions of Variance, and Redundancies Between the Scales in the MBTI and the Scales in the ID System™ and Their Corresponding Canonical Variates

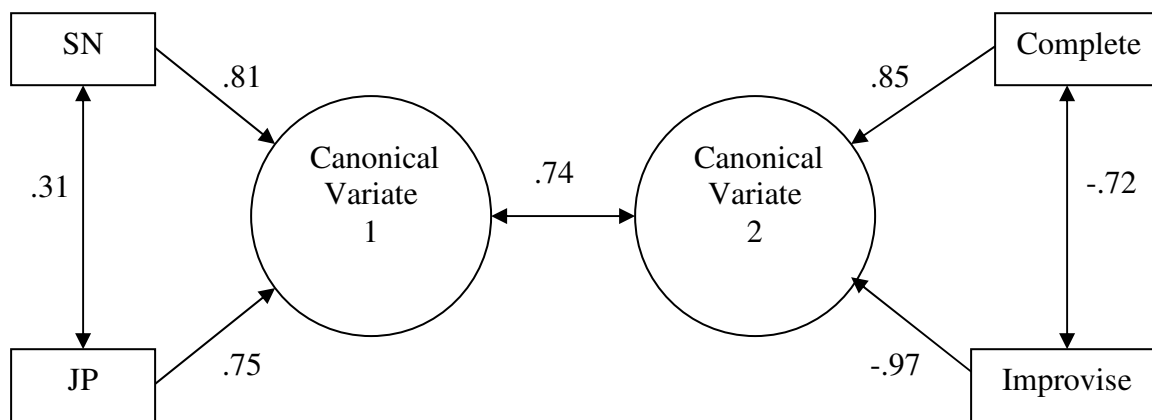
	<u>First Canonical Correlation</u>	
	Correlation	Coefficient
MBTI		
EI	-.37	-.20
SN	.81	.61
TF	.40	-.11
JP	.75	.60
Percent of Variance	.39	
Redundancy	.21	
ID System™		
Verify	.62	.26
Authenticate	.11	.18
Complete	.85	.52
Improvise	-.97	-.39
Percent of Variance	.52	
Redundancy	.28	
Canonical Correlation	.74	

shown by other comparison studies (McCrae & Costa, 1989), there were actually relatively few correlations present. Furthermore, the correlations were only shown to exist between two scales on each of the personality measures. Previous comparisons between the MBTI and other personality assessment tools demonstrated correlations between all of the scales in both measures being studied (Furnham et al., 2003).

The canonical correlation analysis suggests that there is a significant correlation between high scores on Sensing (low on Intuition) and high scores on Judging (low on Perceiving) with high scores on

Complete, and also with low scores on Improve. The bivariate correlation analysis provides additional support for this interaction, demonstrating that the Complete and Improve scales were negatively correlated, and the Sensing and Judging scales were positively correlated. This relationship can be seen illustrated in Figure 1. These findings have many implications for both application and prospective future research; however, the individual correlations will firstly be discussed in more detail.

Figure 1: Relation between scales, canonical variates, and canonical correlation



How the MBTI and ID System™ may be related

The analysis used in the study helped to address the first research question posed, by identifying several relations between the scales of the MBTI and the scales of the ID System™. This finding, combined with discussion of the relations found, help to achieve a better understanding of how the two measures of personality may be related.

The relation between SN and Improve can be explained by the underlying theory of each personality test. People who score high on sensing are said to put more emphasis on what is real and what they can physically sense, rather than underlying feelings and emotions. People who score low on Improve are said to put emphasis on logical deductions and what is certain. These characteristics can be

viewed as relatively similar, which helps to explain correlation found to exist between high Sensing and low Improvise.

The relation between JP and Complete is also relatively well supported by the underlying theory. People who score high on Judging are said to be quite organised and prefer to work by a schedule. This is similar to people who score high on Complete, who are said to function best in well organised environments and have a talent for bring harmony to chaotic situations. The description of both of these scales helps to explain the positive correlation found to exist between these two scales. The correlation found between JP and Improvise can be explained in a similar manner, as a preference for order and organisation (high Judging) fits well with a preference for logic and certainty (low Improvise). Also, one could argue that feelings and emotions are less stable than things than things you can touch or see, so someone with a preference for stability and harmony (high Complete) would probably have a preference for things readily detected by the senses over underlying feelings and emotions.

Limitations and Delimitations

As noted previously, this research is still in its infancy, and further studies will need to be conducted before a conclusive statement can be made regarding the relative value of the two different tests in organisational settings. The scope of this study was such that a relatively small sample size had to be used. Whilst this sample size was still deemed to be statistically significant, further support for these findings could be achieved by replicating this study with a larger sample size. Due to the time constraints of this study, several delimitations were incorporated in order to focus the study specifically on the research questions posed. No analysis was made regarding any demographic information, such as gender, age, culture, religion, education, and potentially many other variables. Further research into any of these factors would make for highly interesting and informative results.

Implications and Considerations for Future Research

This finding has many implications, particularly for the application of personality psychology. Combined with the previously presented research (McCrae and Costa, 1989; Furnham et al., 2003; Fitzgerald et al., 2005; Fitzgerald et al., 2006), the findings of this study suggest that the ID System™ and the MBTI are only minimally related. If the two personality measures were actually measuring the same thing, there would have been many more correlations found, and they would have been present across all of the scales in the two measures, rather than just two from each.

This finding comes despite the fact that many of the aspects described in the scales of the two personality measures seem to be very similar. A possible reason for the lack of a strong connection between these two measures lies in the type of questions included in each of the questionnaires and the instructions given to participants. The instructions of the MBTI are likely restricting the results to only observed behaviour, whereas the instructions of the ID System™ questionnaire, combined with ranking system used in the questions in the may allow some degree of motivation to be measured. In short, a possible difference between these two measures could be that the MBTI is limited to measuring what people do, and the ID System™ is attempting to measure why people do what they do.

Future studies could be directed at further examining this possible difference in the two measures, possibly through extensive qualitative research examining participant motivation. Additionally, future research could build upon the present study's findings and compare the ID System™ to other prevalent psychometric tools or theories of personality.

Conclusion

The present study examined the relations between the scales of the MBTI and the ID System™, and found only one significant canonical correlation, suggesting that whilst there is a minimal amount of overlap between the two scales, they are most likely measuring different things. As this study also

demonstrated results that were supported by conventional bivariate correlations, it can be concluded that canonical correlation analysis can be an effective way to compare two tools that use multiple scales as a way of measuring personality. The limited amount of literature regarding the ID System™ can be seen as a limitation of the current study, although it also demonstrates the importance of further research into this personality tool. The results of this study therefore provide valuable information about this new assessment tool to the field of personality psychology. Furthermore, when applied to an organisational setting, the results of this study demonstrate to business managers that using more than one personality profiling tool can be beneficial. The two measures examined in this study appeared similar at face value, but evidently gave different results to participants. Whilst many more studies are required before conclusive statements can be made about any of the concepts discussed in the present study, the results provide an interesting and promising starting point for future research.

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APPENDIX A – Description of the scales used in the MBTI and the ID System™

The first scale, Extraversion-Introversion (EI) came from Jung's initial observation that all people seemed to display one of two attitudes: extraversion or introversion. Extraverts focused on the outside world, and like to talk things out, as opposed to introverts, who focused on the inside world, and preferred to think things out.

The second scale, Sensing-Intuition (SN) came from Jung's notion that there were two ways in which people perceived information. Firstly, some people were described as perceiving objects and events primarily through the senses, and gave their attention mainly to what was real and present. Secondly, some people were described as perceiving the possibilities and meanings underlying particular objects or events. These methods of perception became known as sensing and intuition respectively.

The third scale, Thinking-Feeling (TF) was derived from what Jung termed 'rational functions', or processes that are governed by reason. In essence, a distinction is made between people who base decisions upon logic in an objective, impersonal manner, and people who base decisions upon values in a subjective personal manner. These two types of rational processes were named thinking and feeling respectively. Myers et al (1999) make specific note of the fact that the SN scale measures subconscious tendencies that account for all information perceived, whilst the TF scale works in a more constraining manner, as the functions involved are personally directed.

The fourth scale, Judging-Perceiving (JP) is the only scale in the MBTI to not be drawn directly from Jungian theory. This scale was derived from work by Katherine Briggs, who suggested that along with a preference for the previous three scales, people were also dominant in either SN or TF, and the JP scale helps to highlight this preference, as well as giving an indication a person's attitude to the external world. People who are more dominant in the TF scale were more likely to be concerned with making decisions, seeking closure and planning day to day activities, and were described as judging types. People who were more dominant in the SN scale were more likely to be attuned to perceiving information, watch for new possibilities and see patterns in existing information, and were described as perceiving types. (Myers et al., 1999)

The first scale used in the ID System™ is known as the Instinct to Verify™. A score of 6-9 on this scale indicates that a person is driven by the Instinct to Verify™, whilst a score of 1-4 indicates that a person is driven to avoid the Instinct to Verify™. People driven by the Instinct to Verify™ are described as natural problem solvers that are determined to 'get it right' by careful checking and prioritising. On the other hand, those driven to avoid the Instinct to Verify™ are described as naturally accepting people who function best when just given the bottom line, and not getting bogged down in detail.

The second scale used in the ID System™ is known as the Instinct to Authenticate™. A score of 6-9 on this scale indicates that a person is driven by the Instinct to Authenticate™, whilst a score of 1-4 indicates that a person is driven to avoid the Instinct to Authenticate™. People driven by the Instinct to Authenticate™ are described as open, honest communicators who need to be personally involved in whatever they are working on. Alternatively, people driven to avoid the Instinct to Authenticate™ are described as being naturally intuitive and big picture thinkers who can delegate when necessary and not be tied up in maintaining personal control.

The third scale is known as the Instinct to Complete™. A score of 6-9 on this scale indicates that a person is driven by the Instinct to Complete™, whilst a score of 1-4 indicates that a person is driven to avoid the Instinct to Complete™. People driven by the Instinct to Complete™ are described as being naturally good at finding and maintaining structure and harmony, and are constantly striving to keep things normal. Conversely, those who are driven to avoid the Instinct to Complete™ are described as being naturally flexible and thrive on constant change and variety.

The fourth scale is known as the Instinct to Improvise™. A score of 6-9 on this scale indicates that a person is driven by the Instinct to Improvise™, whilst a score of 1-4 indicates that a person is driven to avoid the Instinct to Improvise™. People driven by the Instinct to Improvise™ are described as naturally energetic and positive people who thrive on time-pressure and deadlines. In contrast, people who are driven to avoid the Instinct to Improvise™ are described as logical, risk averse people who plan things diligently to avoid the pressure of deadlines. (Burgess, 2007)

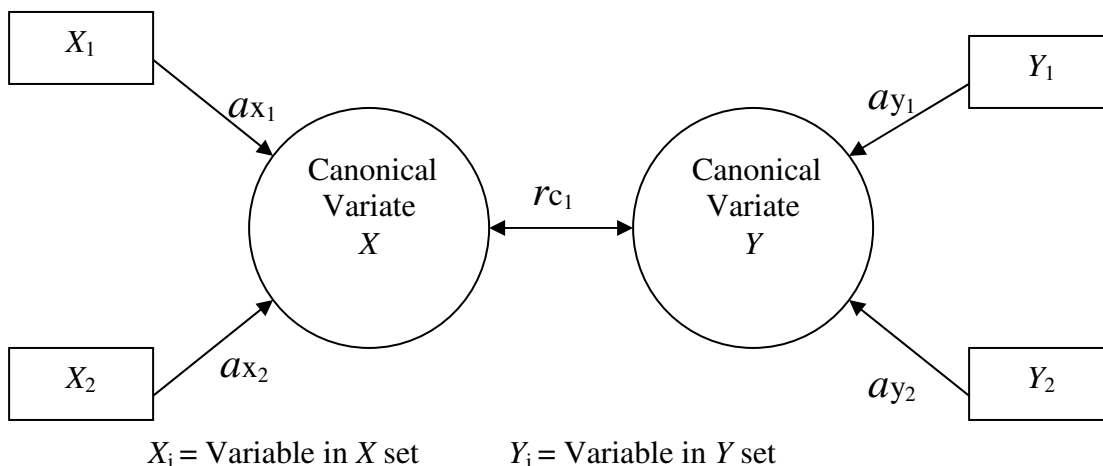
APPENDIX B – Brief Description of Canonical Correlation Analysis

The goal of canonical correlation is to analyse the relationships between two sets of variables. Canonical correlation provides a statistical analysis for research in which each subject is measured on two sets of variables and the researcher wants to know if and how the two sets relate to each other. The easiest way to understand canonical correlation is to think of multiple regression. In regression, there are several variables on one side of the equation and a single variable on the other side. The several variables are combined into a predicted value to produce, across all subjects, the highest correlation between the predicted value and the single variable. The combination of variables can be thought of as a dimension among the many variables that predicts the single variable.

In canonical correlation, the same thing happens except that there are several variables on both sides of the equation. Sets of variables on each side are combined to produce, for each side, a predicted value that has the highest correlation with the predicted value on the other side. The combination of variables on each side can be thought of as a dimension that relates the variables on one side to the variables on the other.

There is a complication, however. In multiple regression, there is only one combination of variables because there is only a single variable to predict on the other side of the equation. In canonical correlation, there are several variables on both sides and there may be several ways to recombine the variables on both sides to relate them to each other. Although there are potentially as many ways to recombine the variables as there are variables in the smaller set, usually only the first two or three combinations are statistically significant and need to be interpreted.

A good deal of the difficulty with canonical correlation is due to jargon. First, there are variables, then there are canonical Variates, and, finally, there are pairs of canonical Variates. Variables refers to the variables measured in research (e.g. EI, Verify, etc.). Canonical Variates are linear combinations of variables, one combination on one side (e.g., EI and SN) and a second combination on the other side (e.g., Verify and Authenticate). These two combinations form a pair of canonical Variates. However, there may be more than one significant pair of canonical Variates. The diagram below illustrates the relationship between variables, canonical Variates, and a pair of canonical variates. (Text and Diagram sourced from Tabachnick & Fidell, 2005).



ax_i = Loading of (correlation with) i th X variable on canonical variate X

ay_i = Loading of (correlation with) i th Y variable on canonical variate Y

rc_1 = Canonical correlation for the pair of canonical variates