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Manipulating the EPI. Can knowledge of the traits measured enable psychology

students to influence scores?

ABSTRACT

The Eysenck Personality Inventory, a research and clinical personality inventory, was investigated. A group of twenty-two third level students of mixed age and gender, completed the 57 dichotomous multiple choice questions on both of two forms of the EPI. Before completing the second test (EPI form B), participants were given information relating to the scales measured, and instructed to manipulate their responses in order to influence the results obtained. Participant scores on three measures (neuroticism, extroversion, and lie) on both tests were recorded, and the differences between them analysed for significance, using repeated measures t-tests. A statistically significant difference was found between results on the two tests, on all three measures recorded. This demonstrated that knowledge of the questionnaires construction enabled participants to manipulate the results produced. Possible experimental confounds were discussed, as was this participants experience of the test process. Finally the importance of the Eysenck Personality Questionnaire, situational factors involved in human behaviour, and more recent research into trait theory were discussed, and the usefulness of questionnaires as a research tool, and trait theory as a paradigm were questioned.

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INTRODUCTION

The psychologist Allport pioneered the trait approach to the study of personality. Allport took a nomothetic approach to research into human personality, believing the combination of a variety of measurable quantitive variables could account for the variety and individuality of people (Hayes, 2000). Allport theorised that rather than being a 'blank slate', an instinctless but intelligent creature, socially constructed through conditioning by culture and experience (the dominant behaviouralist paradigm of the time), man was a 'well stocked organism' (Allport, cited in Ziegler, 1988), born with numerous instincts and innate characteristics, which he termed traits. In a seminal paper, "Personality Traits: Their Classification and Measurement" (Allport, 1921) outlined the method he had used to identify man's traits of personhood. Allport had compiled over 17,000 terms used to describe aspects of personality, and through the removal of synonyms reduced this number to 4,500. He had then subdivided these traits into cardinal, secondary, and five to ten central traits (Neil, 2004).

Cardinal traits, possessed by a few driven individuals, were overwhelming motivators, which dominated personality, allowing their possessors to occasionally achieve great or terrible things (for example Hitler's lust for power). Secondary traits were akin to preferences, influential only over specific aspects of life. They were subject to central traits, which dominated the character of the individual, and vitally provided not merely responses to the outside environment but motivation for independent action (AllPsych Online, 2003).

Allport's theories, which combined the concepts of inherited predispositions and environmental experience, were forerunners to modern sociobiological theories of instincts and behaviours expressed through the interaction of genetic diathesis and environmental stimulation.

Later trait theorists concentrated on discerning through statistical means the central personality traits Allport had theorised. Cattell utilised the sophisticated statistical technique of factor analysis to determine 46 'surface traits', which he identified as determinants of personality. Through additional factor analysis he reduced this number to just 16 'source traits' (Marrion University, 2004). From these, Cattell produced the 16 PF questionnaire, still used in personality testing today.

Another theorist influenced by Allport's pioneering research was Eysenck, a nativist, who believed inherited, innate tendencies were the major determinants of development, in which environment played only a secondary role. As professor of Psychiatry at the London Maudsley hospital in the 1950's he developed 'The Maudsley Test' (Eysenck, 1952), by submitting a huge range of personality questions to 700 soldiers diagnosed as neurotic. He then applied factor analysis to their responses to determine which characteristics could be perceived as clustered under wider meta-characteristics.

Eysenck initially identified two key personality dimensions, which he believed motivated human behavior and underlay the many varying facets of personality. One dimension (or continuum), governed impulsivity, and determined how many risks an individual would take and the degree of stimulation they would seek out. This he labeled Introversion-Extroversion, from Jung's terms for individuals who focused on the internal world (introverts) and those who were most interested in things and people outside of themselves (extroverts) (Boeree, 1997).

Eysenck attributed the variation on this scale exhibited by different people to the sensitivity of their Reticular Activating System, a neurological system that regulates cortical activity. Introverted individuals, Eysenck surmised, needed less stimulation to excite their R.A.S, and so indulged in activities which were less stimulating, and avoided the overly exciting environments of turbulent social situations. Extroverts by contrast had R.A.S's which required a greater amount of stimulation to excite, and remained excited for shorter periods, making them more likely to enjoy high levels of social interaction and less susceptible to rapid conditioning from the over stimulation of their R.A.S and thus less likely to form quick and long lasting judgements and grudges. There may well be a degree of truth to this assertion, however contemporary neuroscience links the R.A.S more specifically with impulsivity than extroversion (Steriade, 1996), and studies have even linked low activation of the R.A.S to criminality (Farley, Steinberger, Cohen, 1979).

Eysenck's second central personality dimension referred to traits such as anxiety, hostility, and hypochondriasis. This dimension he referred to as Neuroticism-Stability, utilising Freud's term for a personality disorder typified by anxiety and an inability to cope with life. Eysenck related this dimension too to a somatic determinant, believing neuroticism to be caused by a highly labile (unstable) autonomic nervous system.

Somewhat later Eysenck added a final attribute to his dimensions of personality. The dimension of psychoticism purported to measure tough mindedness, impulsivity and egocentrism (Eysenck & Eysenck, 1976), and Eysenck linked it biologically to hormone levels, believing higher levels of Psychoticism were linked to higher levels of testosterone. Eysencks final personality inventory, the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975), combined these three personality dimensions into one short questionnaire.

This experiment attempted to assess whether presenting students with information related to the constructs measured by Eysenck's Personality Inventory (Eysenck & Eysenck, 1964) would allow them to 'fool' Eysenck's test, producing a difference in scores for the constructs measured, while avoiding an increased score on the tests lie scale. It was theorised that knowledge of the questionnaires construction would enable participants to manipulate the results obtained.

METHOD

Design

The experiment conducted was a repeated measures study. Participants completed the Eysenck Personality Inventory Form A (Eysenck & Eysenck, 1986) and Form B (Eysenck & Eysenck, 1978), each containing 57 yes / no questions. Participants scored their results on 3 scales, Neuroticism (n), Extroversion (e), and Lie (l) and collated them on a laptop provided by the demonstrators.

Participants

Twenty two first and second year Irish students of Psychology from Trinity Collage Dublin, of mixed age and gender, participated in this experiment as part of a statistics course. All participants completed both forms of the EPI.

Apparatus / Materials

EMac Macintosh Personal computers running Mac OS9.2.2. Data compiled using Microsoft Excel and analysed using SPSS. Overhead projection sheets containing explanations of EPI scoring methods. The EPI Form's A and B, pen and paper personality inventories.

Procedure

Participants were individually tested with two equivalent variants of the Eysenck personality inventory (EPI Form A and EPI Form B) on a self-administered basis. Each participant was initially asked to honestly complete the 57 dichotomous multiple choice questions on EPI Form A, within in a five minute period. Demonstrators then displayed overhead projections containing explanations of the scales tested by the EPI. Participants were instructed to complete the second EPI variant, EPI form B in a ten minute period, while attempting to manipulate their responses, so as to score highly on the extroversion scale and low on the neuroticism and lie scales. Results for both tests were calculated by each student, who then scored each of the two tests on three scales, Neuroticism (n), Extroversion (e), and Lie (l). These results were then inputted into a excel sheet on a laptop provided by the demonstrators, and the groups results projected for participants to write down.

RESULTS

Data were collated for this participant and the group as a whole. This data was compiled into six categories, Extroversion scores for Form A and Form B (ex_a, and ex_b), Neuroticism scores for Form A and Form B (ne_a and ne_b), and Lie scores for Form A and Form B (l_a and l_b).

A variety of tests of normality were used to assess the suitability of an inferential parametric t-Test for assessing the significance of changes in values recorded between the two tests.

SPSS was used to perform tests of kurtosis, skewness, and produce histograms for the six constructs recorded. It was confirmed that four of the six variables displayed a lack of normality. Histograms revealed measures ex_a, ex_b, l_a, and l_b, were not normally distributed (see appendix 1 and 2). By contrast histograms, and tests of kurtosis and skewness for measures ne_a (kurtosis = .199, skewness = .247) and ne_b (kurtosis = .515, skewness = .401) indicated normality.

However as population norms have been found for all scales, they were subjected to parametric analysis. Repeated measures t-test's were used to assess the significance of difference in results between EPI Form A, and EPI Form B, for each of the 3 pairs of constructs (ex_a-ex_b, ne_a-ne_b, and l_a-l_b). The results of the three t-tests were as follows.

Explanation of the extraversion construct measured by the EPI resulted in an increase (m = 9.45, sd = 4.03) in the extraversion score recorded. A repeated measures t-Test showed these differences to be significant; $t(21) = 10.99$, $p<.001$, two-tailed.

Explanation of the neuroticism construct measured by the EPI resulted in a decrease (m = 4.81, sd = 4.95) in the neuroticism score recorded. A repeated measures t-Test showed these differences to be significant; $t(21) = 4.56$, $p<.001$, two-tailed.

Explanation of the lie scale measured by the EPI resulted in a decrease (m = .81, sd = 1.46) in the lie score recorded. A repeated measures t-Test showed these differences to be significant; $t(21) = 2.61$, $p<.05$, two-tailed.

Group Scores on EPI Forms A and B
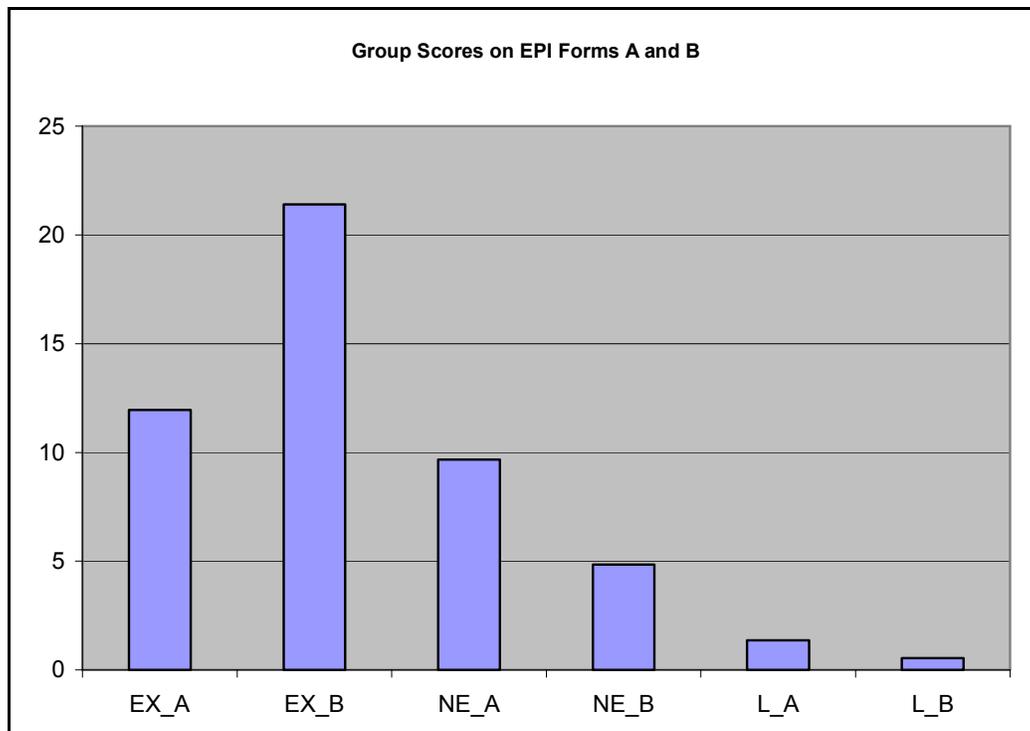
A graph of the groups mean scores on each of the three scales* measured by both EPI Form A and Form B.

* Scales Measured:

EX_A: Extroversion recorded on EPI Form A.

EX_B: Extroversion recorded on EPI Form B.

NE_A: Neuroticism recorded on EPI Form A.

NE_A: Neuroticism recorded on EPI Form B.

L_A: Lies recorded on EPI Form A.

L_B: Lies recorded on EPI Form B.

Group and Participant Scores on The EPI form A and B

EX_A*	NE_A*	L_A*	EX_B*	NE_B*	L_B*
19	9	1	22	6	0
13	4	1	24	5	0
9	9	0	22	2	0
10**	18**	1**	21**	4**	0**
19	4	1	24	6	0
9	5	0	22	5	0
12	9	1	22	6	0
9	18	0	21	4	0
10	6	4	20	3	0
10	10	4	21	4	2
14	14	2	23	1	4
12	13	2	21	3	2
12	10	2	24	10	0
10	11	1	23	5	0
9	9	2	18	4	0
15	8	2	23	7	1
14	10	2	24	2	0
9	12	2	22	5	0
18	12	0	14	8	0
7	2	0	15	6	3
9	12	2	23	7	0
14	8	0	22	4	0

A table describing the group and this participants results on the EPI Form A and B Personality Inventories.

* Scales Measured:

EX_A: Extroversion recorded on EPI Form A.

EX_B: Extroversion recorded on EPI Form B.

NE_A: Neuroticism recorded on EPI Form A.

NE_A: Neuroticism recorded on EPI Form B.

L_A: Lies recorded on EPI Form A.

L_B: Lies recorded on EPI From B.

** Denotes this participants scores.

DISCUSSION

A significant difference was found in the two constructs (neuroticism, and extroversion) and the lie scale measured by the EPI, when participants possessed knowledge of the scales measured. This demonstrated that knowledge of the questionnaires construction enabled participants to manipulate the results. However a number of possible confounds should be mentioned. All participants in this experiment were psychology students, who had previously completed reports on the Minnesota Metaphasic Personality Inventory, and therefore had a pre-existing knowledge of the operation of lie scales, and an awareness of how personality tests/inventories collate constructs from a variety of disordered questions correlated with answers indicative of a given measure. Additionally as Psychology students, participants may have had a pre-existing knowledge of the specific scales measured by the EPI, or may have been able to infer these scales from the questions asked in the tests, or the scoring letters noted on the front of the tests (N, E, and L). As participants were asked to complete the first test as honestly as possible, and because of the reasons previously mentioned, this experiment could not determine whether a group of 'lay' participants would have been able to fool the test, with no knowledge of the measures recorded. Similarly, to assess the nature of the carryover effects of the two tests it would be necessary to perform both tests on a test naïve sample, with instructions to produce ideal scores on both tests, in order to judge whether the experience of the first test provided information enabling the second to be better fooled. Clearly in the case of this experiment, participants were able to manipulate the second test, but it is unclear whether they would have been able to manipulate the first, and to what degree the scales would have differed (especially the lie scale), if both tests had been answered dishonestly.

This participant found it readily possible to produce the manipulation required, scoring higher on the extroversion scale (ex_a = 10, ex_b = 21), and lower on the neuroticism scale (ne_a = 18, ne_b = 4) between the two tests.

It should be noted that the groups lie score significant decreased when participants were specifically instructed to lie ($t(21) = 2.61$, $p<.05$). This was confirmed by this participant's experience (l_a = 1, l_b = 0). This demonstrates that the scale specifically developed to indicate dishonesty in the answering of the EPI, records a

base measure of false positive results, which is higher than that produced when participants do in fact lie.

While the EPI and EPQ (Eysenck, & Eysenck, 1976) were an important contributions to the study of personality, they are no longer considered adequate measures of complete personality. The measure of Psychoticism has been criticised for lack of internal consistency or cross cultural validity (Ray & Pedersen, 1986), and personality theorists now favour a five factor approach, which includes elements of Eysenck's three dimensions of personality, and contributions from other theorists (Wiggins, 1996).

Research, as well as everyday experience, indicates situations have as much of an effect of personality as fixed traits (Allen & Smith, 1980). Much current research also focus's on the effects of situational factors upon the expression of character or trait disposition (Brandstaetter, Hermann, Eliasz, Andrzej, 2001). Although Eysencks three-factor theory did not address situational factors, later trait theorists like Albert Mehrabian have developed theories that involve a situational component (Boerre, 1997).

More recently researchers have begun to construct taxonomies of trait and situational interaction, in an attempt to quantatively describe a few key situational dimensions which determine the interaction of traits with situations (Berge, & De Raad, 2001). Despite the debate about the degree of importance of traits as a motivating factor for human behaviour, and even their existence (Harman, 1999), personality tests such as the EPQ are ever more widely used, for example in employment selection or clinical assessment. However as they can only provide information in the context of an existing theoretical framework, their utility as methods of researching (rather than providing evidence for) the nature of personality is possibly overstated. For example, the five factor model has as one its assumptions the lexical hypothesis, that all important aspects of personality are encoded in language, making research like Allports dictionary collation a valid method of the identification of all personality traits (Acton, 2001). If however, components of personality were to exist outside the lexicon used, they could not be theoretically inferred by the five-factor approach.

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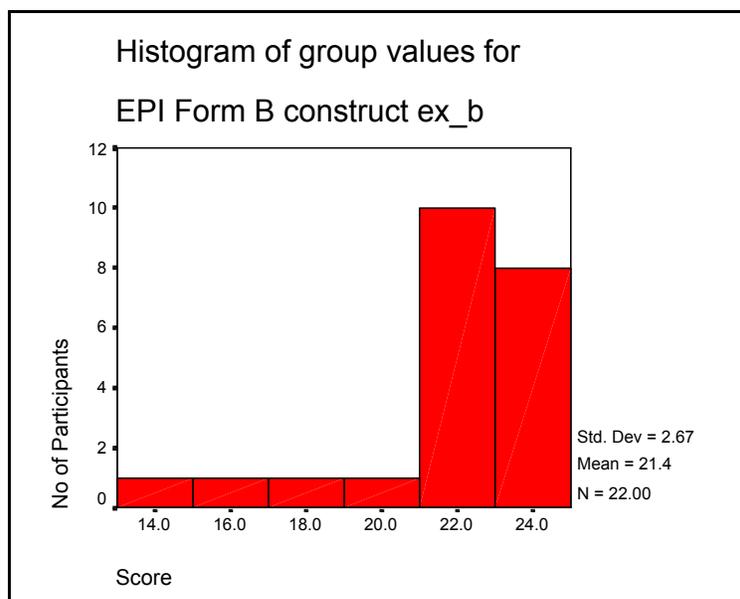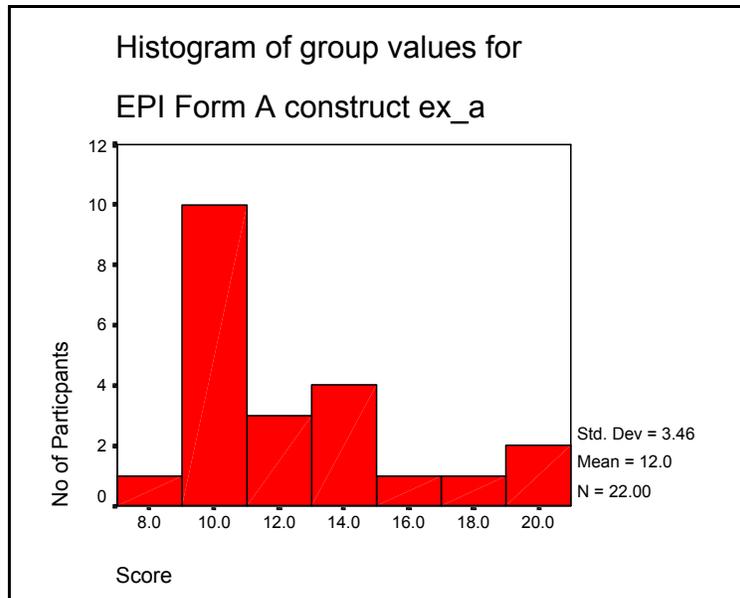
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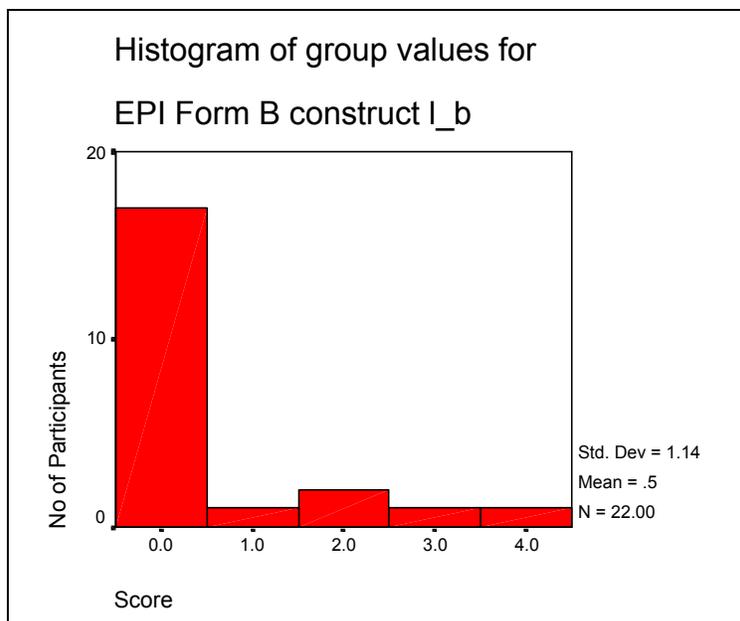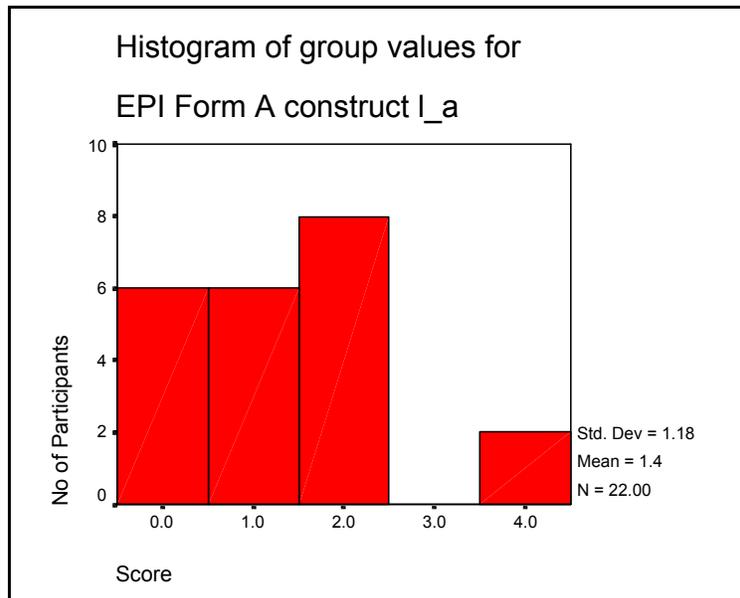Steriade. M. (1996). Arousal: Revisiting the reticular activating system. Science, 272, 225-227.

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Appendix 1

Histogram of group values for

EPI Form A construct ex_a

Std. Dev = 3.46
Mean = 12.0
N = 22.00

No of Participants

Score

Histogram of group values for

EPI Form B construct ex_b

Std. Dev = 2.67
Mean = 21.4
N = 22.00

No of Participants

Score

Histograms detailing group scores of Extroversion on EPI Form's A and B.

Appendix 2

Histogram of group values for

EPI Form A construct l_a

Std. Dev = 1.18
Mean = 1.4
N = 22.00

No of Participants

Score

Histogram of group values for

EPI Form B construct l_b

Std. Dev = 1.14
Mean = .5
N = 22.00

No of Participants

Score

Histograms detailing group Lie scores on EPI Form's A and B.