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The Influence of Locus of Control and Stress on Performance

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The purpose of this study was to observe whether there is a relationship between locus of control, stress and performance. The hypothesis was that individuals with an internal locus of control will experience less perceived stress and thus will be capable of more successful task performance than individuals with an external locus of control. 40 third-year undergraduate students at the Huron University College participated in the study. Each participant was presented with an eight-page booklet that included a letter of information, a consent form as well as a debriefing form. Each booklet also contained Rotter’s I-E scale to measure for externality, an anagram task, and a scale measuring perceived stress. Half of the booklets included a time constraint of two minutes for the anagram task. A 2 x 2 between-subjects ANOVA showed that there was no significant effect of locus of control and stress on performance. Independent t-tests also produced insignificant results. Results are discussed in terms of past and future research and limitations as well as suggestions for future studies are examined.

Locus of control is a term introduced by psychologist Julian Rotter that represents social learning theory’s concept of internal versus external control of reinforcement (Kormanik & Rocco, 2009). Locus of control refers to a predisposition in the perception of what causes reinforcement (Kormanik & Rocco, 2009). Essentially, it is the degree to which individuals feel that they have control over reinforcements or outcomes of behaviours (Rotter, 1990). One would have an internal locus of control if he or she feels as though consequences of his or her actions are contingent on personal behaviours or characteristics (Rotter, 1990). On the other hand, an individual with an external locus of control would expect that the outcome or reinforcement is a function of luck, fate, or chance and that this consequence is generally unpredictable (Rotter, 1990).
A multitude of research has been conducted regarding Rotter's aspect of locus of control. Kormanik & Rocco (2009) referenced a study that looked at the relationship between locus of control and life stress, as measured by depression and anxiety. It was found that the less internal locus of control an individual perceives, the greater the likelihood for stress and depression (Kormanik & Rocco, 2009). In addition, Bernardi (2001) explained that when an individual perceives that he or she has control over a situation, he or she will be less likely to perceive the situation as stress-inducing. Also, internal-locus-of-control individuals tend to experience lower anxiety than others; therefore, externality may act as a stress buffer (Bernardi, 2001). Likewise, externality was found to be positively correlated with general stress (Bernardi, 2001).

With regard to locus of control and task performance, studies have found that internals tend to perform better than externals (Blau, 1993). However, more concrete and significant results are obtained when a variable such as stress is incorporated into the study (Wolk & Bloom, 1977). Wolk and Bloom (1977) carried out a study where students encountered various levels of stress designed to disrupt their performance on verbal and mathematical tasks. It was found that under the no stress condition, both externals and internals performed similarly (Wolk & Bloom, 1977). However, when under the high stress condition, internal participants made significantly fewer errors on both verbal and mathematical tasks relative to their external counterparts (Wolk & Bloom, 1977). At the same time, the internal participants did not report higher levels of stress or anxiety than the external participants did when they found themselves under the same condition (Wolk & Bloom, 1977). Therefore, it seems as though internality acted as a stress buffer,
allowing these internal-locus-of-control participants to perform better than external-locus-of-control participants.

Anderson (1977) conducted a longitudinal study measuring locus of control, coping behaviours and performance in a stress setting. He found that his internal-locus-of-control participants perceived less stress, used more task-oriented coping behaviours and less defensive coping behaviours, and consequently had better performance (Anderson, 1977). The longitudinal aspect of Anderson’s (1977) study demonstrated that locus of control influences performance, which in turn influences future locus of control orientation. In other words, internals who improved performance during the second phase of this study tended to become more internal, while externals always showed a tendency to become more external, regardless of improvement or decline in performance (Anderson, 1977). Still, regardless of these changes, internal-locus-of-control participants exhibited less stress, better coping behaviours and better overall performance (Anderson, 1977).

In addition to the above research experiments, Cohen (1980) described various studies that provide further evidence that greater perceived control leads to better coping with stress and consequently, more successful performance. In one study, half of the participants were given control over terminating an aversive noise by pressing a button (Cohen, 1980). Following noise exposure, these participants had greater tolerance for frustration and performed better on proof-reading tasks than participants in other conditions (Cohen, 1980). Another study contained a condition where participants were given control over reducing the duration of shocks administered to them (Cohen, 1980). Those participants that had this perceived control and used it for shock reduction
performed better on subsequent Stroop tests than participants in other conditions (Cohen, 1980). Furthermore, research on learned helplessness has resulted in similar findings. Compared to participants with the ability to escape or avoid a stressful situation, participants lacking control had poorer performance on anagrams (Cohen, 1980). Similar results have been concluded by various researchers in terms of performance on reading tasks, coding tasks, and other measures of performance (Cohen, 1980). Overall, research has supported the role of perceived control over stressors in improving stress aftereffects and subsequent task performance (Cohen, 1980).

The present research study is a variation of the above studies. The hypothesis is that internal-locus-of-control individuals will better cope with induced stress and thus exhibit more successful performance than external-locus-of-control individuals.

Method

Participants

The participants of this study included 40 third-year undergraduate students at both the University of Western Ontario and Huron University College. Specifically, the participants were sought out from the Huron University College Library. Therefore, background majors of each participant included arts and social sciences, business, and theology. Altogether, 26 females and 14 males participated. The ages of the participants ranged from 20 years of age to 21 years of age. Each participant currently resides in London, Ontario for educational purposes. However, each student studied originated from Toronto, Ontario. Lastly, race was held at a constant; all of the participants were Caucasian.
Materials

Each participant received an eight-page booklet that began with a letter of information, outlining the procedure of the study and information related to the student's participation. This was followed by a consent form, which gained the permission of the participant to score and calculate his or her responses. Each booklet also included Rotter's I-E scale ("Rotter's Locus of Control Scale", n.d.), serving to determine the level of locus of control of each participant. Next, a list of 15 anagrams was included. Half of the booklets contained anagrams that involved a stress condition, where participants were instructed that they had a time limit of two minutes to solve the given anagrams (see Appendix A). The remaining 20 booklets had no time constraint (see Appendix B). Each booklet also contained a 7-point Likert scale measuring perceived stress (see Appendix C). Finally, a debriefing statement was included that summarized the study, provided further readings, and gave participants the option of contacting the researcher for further information or inquiries. In addition to the booklets distributed to the participants, the time constraint was maintained using a stopwatch available on a Blackberry 8900 cellular phone.

Rotter's I-E scale serves to operationalize the concept of locus of control. The scale includes 23 forced choice items as well as six additional filler items. On the 23 items, participants are forced to choose between an internal statement and an external statement. With regard to reliability, item correlations ranged from .004 to .521, depending on gender and item (Rotter, 1966). Test-retest reliability measures ranged from .49 to .83 while internal consistency scores range from .65 to .79, depending on gender and sample (Rotter, 1966). Rotter (1966) also correlated the I-E Scale with the
Marlow-Crowne Scale and obtained correlations ranging from -.12 to -.41. Las correlations with measures of intelligence ranged from -.22 to .03 (Rotter, 1966).

Procedure

Students were approached at random at the Huron University College. Each participant was then given one of the two available booklets, either involving the stress condition or not. The student had to read the letter of information and sign the consent form prior to advancing to the questionnaires. This communicated to the researcher that he or she has understood the purpose of this study and would like voluntarily to participate in the collection of data. The participant then read the instructions regarding the completion of Rotter’s I-E scale, recorded his or her answers, and proceeded to the anagrams. Here, participants had to solve as many of the anagrams as possible. Half of the participants were under a time constraint of two minutes, while the other half were allowed an unlimited amount of time to complete the task. For those who received the stress condition booklet, the researcher was present with a stopwatch to ensure that the time constraint was abided by. All participants were then asked to indicate their perceived level of stress on a 7-point Likert scale. Following completion of the above tasks, the letter of information and the debriefing form were detached and left with the participant. All booklets were then returned to the researcher for scoring and calculation.

Results

Each booklet was scored for locus of control, stress and task performance. A median split was conducted, indicating that individuals with locus of control scores above 12 were externals, while those below 12 were internals. Two participants received a
of 12; one was assigned to the external group, while the other was considered to be an internal-locus-of-control individual.

A $2 \times 2$ between-subjects ANOVA was conducted with performance as the dependent variable and locus of control (external/internal) and stress (stress/no stress) as the independent variables. The results indicated that there was not a significant main effect for locus of control, $F (1,36) = 3.12$, n.s. There also was an insignificant main effect for stress, $F (1,36) = 2.50$, n.s. Finally, an insignificant interaction effect was obtained, $F (1,36) = 0.70$, n.s. An ANOVA summary table is presented in Appendix D.

Two independent sample $t$-tests were conducted to observe the relationship between locus of control and performance, as well as stress and performance. There was no significant difference between externals and internals in terms of task performance, $t(38) = 1.74$, n.s. There was also no significant difference in performance between participants exposed to the stress condition and those who were not, $t(38) = 1.54$, n.s.

Figure 1 illustrates performance scores of internals and externals under both the stress and no stress conditions. Internal-locus-of-control individuals performed better under the no stress condition than when under a time constraint. Similarly, the figure indicates that individuals with an external locus of control also performed better when stress was not induced. Externals, however, were less successful in their overall performance when compared to their internal counterparts. Regardless, differences in performance tasks between the two conditions were not variable enough to be deemed significant.

Discussion

The results of this study demonstrate an insignificant relationship between locus
of control, stress and performance. While previous research was able to find significant relationships between the three variables, various aspects of the current study must have prevented similar findings. One such aspect may have to do with the way in which stress was induced. For example, much of the research Cohen (1980) included in his article provoked stress in the participants through the use of aversive noises or shocks. These stimuli are much more salient and powerful compared to a simple time constraint, which may have accounted for differences in results. Additionally, Wolk and Bloom's (1977) study attempted to disrupt performance by utilizing varying levels of stress (moderate and high), and induced this stress by manipulating the environment. Participants were subjected to stimuli such as aversive noises, uncomfortable objects in the test room, and negative remarks, yelling, and impatience from the experimenter. Perhaps creating a generally stressful environment rather than using a single method of stress-induction allowed for more significant results. Also, Wolk and Bloom (1977) found that under their no stress condition, internals and externals performed similarly on the various tasks. The present study also obtained these findings, further indicating that it may have been the variable of stress that contributed to insignificant results.

Furthermore, analysis of the data collected revealed that the majority of participants were relatively successful at completing the anagram task, regardless of induced stress. This could be due to low difficulty or a time constraint that was too lenient. In addition, Kormanik and Rocco (2009) suggested that past experiences with tasks lead to better performance. It is likely that the majority of participants had experienced anagram tasks in their lifetime. Also, the words included were common and
relatively simple; familiarity with the words as well as the task itself may have contributed to skewed results.

There are a number of limitations with regard to scientific adequacy that may have contributed to the insignificant results. Firstly, there is the issue of sampling. The participants of this experiment were all third-year undergraduate students recruited from the Huron University College Library. Huron University College specializes in the department of theology, however also includes programs within arts and social sciences as well as business. Programs within sciences or music are not available, thus limiting the sample to students within certain majors and departments. Perhaps individual differences among students of all types of programs may have led to more significant results. Furthermore, it would be inappropriate to generalize the results obtained in this study to students belonging to minorities. Only Caucasian participants were included. It is likely that the inclusion of members of other races or ethnicities would encompass all characteristics of various individuals and lead to different results.

Furthermore, the scientific issue of control may have had an effect on the results. All booklets were distributed to students at the Huron University College Library. In these situations, control over extraneous variables is very difficult. The participants may be distracted by their work, computers, or even by fellow students. It is also likely that other individuals may have had an influence on the answers of the participant. Furthermore, the time in which the booklets were distributed was particularly stressful for students. With final exams approaching, the majority of students were busy completing final projects and preparing for exams. The questionnaires thus may have been completed quickly and without much concentration, allowing for the student to return back to his or
her studies. Also, reports of perceived stress may have been affected by the overall level of general stress the students’ were experiencing due to final exams.

With regard to reliability and validity, Rotter’s I-E Scale has various measures of reliability and validity that have been previously discussed. However, the second questionnaire distributed to participants regarding stress does not have any specific values of reliability or validity. Nevertheless, the reliability and validity of Likert scales have been studied by past researchers. Specifically, an average internal consistency reliability of .66 has been found for Likert scales (Jacoby & Mattell, 1971). In addition, Jacoby and Mattell (1971) found an average test-retest reliability of .82. Lastly, the researchers found an average concurrent validity coefficient of .53 as well as an average predictive validity of .51 (Jacoby & Mattell, 1971). While it can be assumed that there is some reliability and validity through the use of Likert scales, the fact that this questionnaire is a self-report measure could pose problems. Specifically, the perceived level of stress indicated may have been related to circumstances other than solving anagrams under a time constraint, such as final projects or preparations for exams.

Various modifications could be made to this study to allow for greater validity and reliability, as well as the possibility of significant results. Firstly, a larger and more comprehensive sample could be collected. A researcher may be interested in including students from all years of undergraduate school, instead of just the third year. Also, participants of different ethnicities could be used in order to obtain results that could be generalized to the public. Lastly, results could be improved by seating participants in a closed, supervised area such as a classroom. Implementing a time constraint on individuals in a public setting, such as a library, might alleviate the amount of stress.
perceived. Placing the participants in such an area could also contribute to greater control
over extraneous variables, further encouraging greater reliability and validity.

A variety of studies could arise from the present one. A researcher might be
interested in expanding this study to gain insight on academic achievement related to
individual differences and varying levels of stress. Perhaps by analyzing various coping
styles of internals and externals, one may be able to develop a more successful method of
studying and test-taking that can be utilized by university students across the globe. Also,
one might wish to incorporate other variables into this study. For example, it may be
interesting to observe whether there are any other characteristics, in addition to locus of
control, that may help to act as a stress buffer. Or, one can look to see if there are any
characteristics that specifically make individuals more vulnerable to stress and hence
exhibit poorer performance. If such attributes were found, individuals could be provided
with therapy or advice on how to relieve the anxiety and stress associated with that
specific characteristic.
References


Appendix A

Please solve as many of the following anagrams as you can. You have a time limit of 2 minutes.

NIDRK
GICAM
LODOF
ESUHO
PREPA
AEMDR
VOLEN
OCDRW
LNAPT
OUCHC
LRWOD
ILEAM
LETSY
DLCHI
IANRB

http://www.newscientist.com/embedded/anagrams-test-1
Appendix B

Please solve as many of the following anagrams as you can.

NIDRK
GICAM
LODOF
ESUHO
PREPA
AEMDR
VOLEN
OCDRW
LNAPT
OUCHC
LRWOD
ILEAM
LETSY
DLCHI
IANRB

http://www.newscientist.com/embedded/anagrams-test-1
Appendix C

Please circle how stressed you feel at the present moment.

Very Relaxed (1) (2) (3) (4) (5) (6) (7) Very Stressed
### Table 1

**ANOVA Summary Table for Locus of Control, Stress, and Performance**

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Externality</td>
<td>9.03</td>
<td>1</td>
<td>9.03</td>
<td>3.12</td>
<td>.09</td>
<td>.08</td>
</tr>
<tr>
<td>Stress</td>
<td>7.23</td>
<td>1</td>
<td>7.23</td>
<td>2.50</td>
<td>.12</td>
<td>.07</td>
</tr>
<tr>
<td>Externality × Stress</td>
<td>2.03</td>
<td>1</td>
<td>2.03</td>
<td>.70</td>
<td>.41</td>
<td>.02</td>
</tr>
<tr>
<td>Error</td>
<td>104.10</td>
<td>36</td>
<td>2.90</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>