How does the Regulatory Focus affect Problem-solving among Undergraduate Students?

The current study aimed at exploring if regulatory Focus – Promotion vs. Prevention - affects problem-solving among undergraduate students in The Hashemite University. The hypotheses were that promotion focus students outperform prevention focus students in ill-structured problems but underperform them in well-structured problems, and prevention focus students outperform promotion focus students in well-structured problems but underperform them in ill-structured problems. The participants (n=85) were allocated into four groups according to their mindsets and the problems assigned to them (promotion with ill-structured problems, promotion with well-structured problems, prevention with ill-structured problems, prevention with well-structured problems). After the groups solved all the assigned problems, their work was scored according to Measuring Problem Solving Instrument was designed (MPSI). The findings confirmed the hypotheses that the regulatory focus affects the way by which the problems were solved.

Keywords: regulatory focus, promotion, prevention, mindset, problem-solving

Introduction

In his Regulatory Focus Theory (RFT), Higgins (1997) distinguished between two types of motivational regulation, promotion, and prevention focus. Promotion focus emphasizes attention to desires and possible gains, but prevention focus emphasizes attention to obligations and possible losses. Regulatory Focus Theory supposes that promotion and prevention focus utilize distinct means to strive desired goals, so individuals with a promotion focus utilize approach strategic means for attaining their goals. Conversely, individuals with a prevention focus use strategic avoidance means to attain their goals (Higgins, 1997; Higgins et al., 2001). Moreover, Summerville and Roese (2008) specify two ways to identify promotion and prevention focus under the title of "self-guide definition (SGD).” Thus, in the SGD, promotion confirms internal standards and is defined in terms of a focus on attaining personally important ambitions, ideals, and aspirations (i.e., an "ideal-self” guide). On the contrary, prevention confirms external or socially based standards and is defined in terms of a focus on achieving commitments, responsibilities, and duties that are transmitted from parents or any other sources, or are intrinsic to the commitment to social roles, such parenting, or teaching (i.e., an "ought-self” guide).

The regulatory focus has been studied in terms of many themes such as emotional experience (Brockner & Higgins, 2001), feelings (Vaughn, Hesse, Petkova, & Trudeau, 2009), learners’ responses to feedback in the clinical setting (Watling, Driessen, van der Vleuten, Vanstone, & Lingard, 2012), entrepreneurial process (Brockner, Higgins, & Low, 2004), and antismoking...
advertising (Zhao & Pechman, 2007), but there is lack of studies that examine
the effect of the regulatory focus on the problem solving. To this end, the
current study was conducted to examine this effect.

Since regulatory focus directs the way an individual thinks, behaves, and
feels, Higgins (1997) suggests that it is a goal pursuit theory regarding people's
perceptions in the decision-making process, so it is necessary to examine its
role in problem-solving settings. Unfortunately, researchers paid little attention
to the impact of the regulatory focus on problem-solving despite the
importance of these variables, which is considered an additional motive to
conduct this study.

Problem-solving refers to the process of finding solutions to problems
encountered in life (Brandell, 1997). It has been defined as a higher-order
cognitive process and intellectual function that requires modulation and control
of more routine or fundamental skills (Goldstein & Levin, 1987). Selçuk,
Comprehending the problem 2. Choosing the strategy related to the solution
(planning for the solution) 3. Implementing the selected strategy (applying the
plan) 4. Assessment of the solution. Other steps were stated by Çam and
Tümkaya (2007) that can be described as follows: 1. defining the problem
properly, understanding its structure in order to set goals of the solution, 2.
identifying different solution paths as possible, 3. deciding the most
appropriate solution, 4. implementing solution paths and evaluating the results
obtained in a logical framework (2007). Furthermore, Ellis and Hunt (1993)
identified a number of stages for solving problems including: 1. understanding
the problem, 2. generating solutions, and 3. evaluating the solution. With
regard to problem-solving strategies, Heppner et al. (1983) identified the
following five strategies, which included in his general scale for solving
problems, they are: 1. general orientation towards the problem, 2. definition
and analysis of the problem, 3. generation of alternatives, 4. decision-making,
and 5. evaluation and validation of the solution. Zaytoun (2004) also added that
the problem-solving strategies affect the educational benefits for the students.
In this strategy, there is a goal for the student which tries to achieve in order to
reach a creative solution to the problem; this solution creates educational
meaningfulness to the teaching of the student; because it connects between
what he/she learns and what he/she applies in his daily life. In a study by Song
et al. (2006), he showed that problem solving includes elements such as the
ability to represent the problem, develop the solution, evaluate it and monitor
it, which are also included in the educational objectives and thus logically and
theoretically can be positively linked with problem solving strategies; because
the strategies used to solve the problem are related to cognitive strategies such
as: cognitive processing strategies, self-monitoring strategies, and self-
regulation strategies, which in turn benefit the students in their daily lives.
Farahat (2015) also indicated that providing students with the skills to solve
problems results in developing their relatedness to their values and homeland,
improving their self-reliance, increasing confidence in their abilities, and
esteeming themselves.
Any problem has a goal to be reached, and how one achieves depends upon problem orientation (problem-solving coping style and skills) and systematic analysis (Robertson, 2001). The problem-solving process depends on some personal properties of the problem solver, such as personal understanding of the problem, representing the problem, and goal-oriented activities for developing a solution to the problem (Uysal, 2004). Besides, Elliott et al. (2000) believe that individuals can develop their problem-solving skills by paying close attention to the nature of the problem, understanding their thinking processes, and using the mistakes they have made. In addition, there are individual differences in solving problems, some solve problems mentally, others use paper and pen and develop a plan for the solution. Hokanson (2017) stated that one of the essential skills required in the twenty-first century is creative problem solving; because the problems are differed but not end. The development of the students’ abilities to solve problems assist to increase the students’ self-confidence and develop their social relations with their peers and colleagues, enhancing their scientific performance and developing social and mental skills (Daunic, Smith, Robinson, & Landry, 2000).

Among the different kinds of the problem-solving there is what is called social problem-solvings, which were used in the current study. Social problem-solving refers to a mental process to find functional solutions for problems encountered by ordinary people in their everyday lives (D’Zurilla, Nezu, Maydeu-Olivares, 2021). Social problem-solving refers to ones in the real life and persons try to find functional adapting responses for life situations problems (Eskin et al, 2013).

In real-life situations, there are two kinds of problems, ill-structured problems, and well-structured problems. Simon (1973) describes ill-structured problems that they are the ones that students encounter repeatedly in their daily lives; they include economic, political, social, and scientific problems. To resemble situations in the real world, ill-structured problems have vague goals and insufficient information and vaguely stated with unclear solution procedures and vague evaluation standards (Snowman & McCown, 2012; Voss, 1988). Snowman and McCown (2012) also defined well-structured problems as clearly formulated problems with known solution procedures and specified evaluation standards, such as those found in mathematics, science, engineering, or business, because they have the right answers.

Several studies conducted on regulatory focus in general, specifically on promotion and prevention mindsets in addition to the topic of problem-solving. Friedman and Forster (2001) provided evidence by four experiments that promotion focus bolsters both creative foresight and creative generation relative to prevention. Vaughn, Hesse, Petkova, and Trudeau (2009) pointed out that when relating RFT to persuasion, it is substantial to know that RFT is a goal-attainment theory and that it can create feelings of rightness/wrongness, which in turn may produce formulations for judgments. Herman and Reiter-Palmon (2011) found that individuals with a promotion focus showed more risk-taking and flexibility, while those with a prevention focus were risk-averse.
and more indelible. They also found a relationship between regulatory focus and creativity. This study also suggested that the effect of regulatory focus on creativity has influences in the idea evaluation stage rather than with the idea generation stage. Kao (2012) found that individuals with promotion focus desire to develop more favorable attitudes to weak argument quality ads than strong argument quality ads. In contrast, individuals with prevention focus tend to develop more favorable attitudes to strong argument quality ads than weak argument quality ads. Watling et al. (2012) found a relationship between regulatory focus theory and response to feedback, that positive feedback is prompting under promotion focus, whereas negative feedback is prompting under prevention focus. Zaal, Vann Laar, Stahl, Ellemers, and Derks (2015) found that individuals with promotion focus tended to behave in their self-interest at the expense of their group than individuals with prevention focus when self-interested goals were not convenient with cooperation, and there was no effect of regulatory focus on group fidelity was found when cooperation was the only viable way to individual success. Beuk and Basadur (2016) pointed out that promotion focus results in higher levels of creative potential, and regulatory focus influences both the number of ideas and the type of ideas generated. Sassenrath, Sassenberg, and Scheepers (2016) found that when people encounter a demanding task, they experience challenge rather than threat when they are in a promotion focus as compared to a prevention focus because promotion focus individuals perceive their resources relative to the prevention focus ones. Peng et al. (2019) found that promotion-focused individuals intended to use positive words to describe mysterious decision-making information and created more positive self-frames compared with prevention-focused individuals.

Regulatory focus also affects the behavior of teachers in learning and educational settings. Leung and Lam (2003), for example, pointed out that teachers with promotion focus adopted more approach strategies (e.g., praise) but less avoidance strategies (e.g., punish) than their counterparts with a prevention focus. Concerning the emotions, when their strategies failed, teachers with promotion focus experienced more dejection emotion such as disappointment than agitation emotion such as anger, whereas teachers with prevention focus experienced more agitation emotion than dejection emotion. Liu, Yao, Li, and Zhang (2019) found that promotion focus was a positive predictor of learning behaviors, whereas prevention focus was a negative predictor. They also found that individuals with promotion focus and low prevention focus showed higher academic self-efficacy and lower depression, which in turn showed greater learning behaviors. In the domain of language learning, Chen and Mostafa (2021) examined the relationship between regulatory focus, L2 self-guides, second language (L2) anxiety, and motivated behavior. The results showed that the promotion focus (concerned with accomplishments and achievements) strongly and negatively predicted L2 anxiety, whereas prevention focus (concerned with safety and obligations) was unrelated to L2 anxiety.
Based on the above, there are several reasons to suppose that what people focus on when solving problems might differ as a function of regulatory focus. Hence, the current study predicts that individuals with promotion focus tend to outperform their counterparts with prevention focus in ill-structured problems, and individuals with prevention focus tend to outperform their counterparts with promotion focus in well-structured problems.

**State of Problem**

University students always face problems needed to be solved throughout their academic life. The students may also face the two kinds of problems: ill-structured problems and well-structured problems. The students’ methods of solving these problems may be influenced by their mindset or whether they are promotion or prevention regulatory focused. Accordingly, the current study tried to examine the following hypothesis:

**H1**: Promotion focus students outperform prevention focus students in ill-structured problems and underperform them in well-structured problems.

**H2**: Prevention focus students outperform promotion focus students in well-structured problems and underperform them in ill-structured problems.

**Method**

**Research Methodology**

This study is quantitative in nature and was conducted using descriptive methodology to examine the effect of regulatory focus on the problem-solving.

**Participants**

A total number of 85 undergraduate students enrolled in the department of educational psychology in the second semester of the academic year 2018/2019 in The Hashemite University in Jordan, participated in the study. The study participants were studying in two different classes in social psychology. The sample ranged in age from 18 to 22 years; their academic grade ranged from satisfactory to excellent. They enrolled in the Social Psychology course, and they are distributed randomly according to their results on the regulatory focus questionnaire as the table (1) shows:
Table 1. Participants Distribution on the Four Groups according to their Results on the Regulatory Focus Questionnaire

<table>
<thead>
<tr>
<th>RFT</th>
<th>promotion</th>
<th>prevention</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ill-structured problem</td>
<td>17</td>
<td>21</td>
<td>38</td>
</tr>
<tr>
<td>Well-structured</td>
<td>23</td>
<td>24</td>
<td>47</td>
</tr>
<tr>
<td>total</td>
<td>40</td>
<td>45</td>
<td>85</td>
</tr>
</tbody>
</table>

Measures

The Regulatory Focus Questionnaire (RFQ). It was derived from Lockwood, Jordan, and Kunda (2002) comprises 28 items that measure chronic regulatory focus and has two subscales, promotion focus 14 items and prevention focus 14 items. It was translated to Arabic by an accredited translator and back-translated to English (Brislin, 1970). Participants rated their agreement with each item on a 5-point Likert scale, anchored by Not at all true (one point) and Very true (5 points). The ratings for the 14 items on each scale were summed to create total scores. Cronbach alpha was calculated to assure the internal consistency, and the values were .88 and .89 for promotion focus and prevention focus items, respectively.

List of problems (LP). Two groups of problems were prepared. The first group contained three well-structured problems, such as Z-scores and T. scores, percentiles, and behavioral modification plan, they were chosen from these fields as Snowman and McCown (2012) suggested that well-structured problems could be found in mathematics or engineering, for example. And the second group contained three ill-structured problems, such as Control of unlicensed weapons, high university fee and coverage of expenses, and integrating youth with political action, they were chosen as Simon (1973) suggested that ill-structured problems could be found in social sciences.

Measuring Problem Solving Instrument (MPSI). It was designed to judge the performance of the students on the solving the problem process. The list of indicators was designed according to Lynch, Wolcott, and Huber (2000) about their model of solving open-ended problems. The instrument contains four categories of performing the solving problem, which include Identifying the nature of a problem and relevant information, Framing an open-ended problem, Resolving an open-ended problem, and Re-addressing an open-ended problem. This instrument was used because it fits the purposes of the current study in terms of the solving process.

Problem Solving Skills Test (PSST). It was created to examine the students’ prior knowledge of problem-solving skills. It is a 20 items multiple-choice test. Cronbach Alpha for the internal consistency was .899. It is a good indicator and suitable means for research purposes. To determine the levels of the students’ problem-solving skills, the scores of the students were compared with the following criteria: weak 20-35.9, accepted 36-51.9, good 52-67.9, very good 68-83.9, excellent 84-100.
Procedures

The sample was drawn purposively from two classes of social psychology courses students in the second semester of the academic year 2018/2019. The instrument of RFQ was applied to the subjects to specify their mindset. The results of the scale were displayed in table (2):

Table 2. Means and Standard Deviation of the Students on the Mindset Scale

<table>
<thead>
<tr>
<th>mindset</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>promotion</td>
<td>38</td>
<td>51.11</td>
<td>12.092</td>
</tr>
<tr>
<td>prevention</td>
<td>47</td>
<td>48.81</td>
<td>5.174</td>
</tr>
</tbody>
</table>

To make sure that the subjects have a background on problem-solving, the author trained them by a course of three 45-minutes sessions. Then the students were subjected to the PSST to be assured that they acquired the skills of problem-solving after they were allocated randomly to four groups according to their mindset (promotion vs. prevention) and the type of the problems (well-structured vs. ill-structured). The results of that test were shown in table (3):

Table 3. Means and Standard Deviations of the Students’ Scores on the PSST

<table>
<thead>
<tr>
<th>groups</th>
<th>Ill-structured problems</th>
<th>Well-structured problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>promotion</td>
<td>N</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>42.53</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>2.718</td>
</tr>
<tr>
<td></td>
<td>Level</td>
<td>accepted</td>
</tr>
<tr>
<td>prevention</td>
<td>N</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>42.52</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>5.116</td>
</tr>
<tr>
<td></td>
<td>Level</td>
<td>accepted</td>
</tr>
</tbody>
</table>

The table above showed that the participants of the two mindsets had the same level of knowledge in solving the two kinds of problems. Moreover, One-Way ANOVA uncovered that there were no significant differences between the groups ($F (3, 81) = 1.257, p > .295$), which meant that the four groups of the study were equivalent.

After that, they were given the tasks to be solved. The well-structured problems group needed two 45- minutes sessions to finish their tasks, but the ill-structured problems group needed five 45- minutes sessions to finish their tasks. All the tasks were scored according to the MPSI.

Data Analysis

The SPSS statistics 17.0 (Statistical Package for the Social Sciences) statistical package program was used in analyzing data. Means, standard deviations, and One-Way ANOVA were used to test the differences between the groups.
Results

To test the hypotheses of the study “H1: Promotion focus students outperform prevention focus students in ill-structured problems and underperform them in well-structured problems,” and “Prevention focus students outperform promotion focus students in well-structured problems and underperform them in ill-structured problems,” means and standard deviations of the students’ scores on the MPSI was calculated, and they were shown in table (4):

<table>
<thead>
<tr>
<th>groups</th>
<th>Ill-structured problems</th>
<th>Well-structured problems</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>17</td>
</tr>
<tr>
<td>promotion</td>
<td>Mean</td>
<td>70.00</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>2.031</td>
</tr>
<tr>
<td></td>
<td>Level</td>
<td>very good</td>
</tr>
<tr>
<td>prevention</td>
<td>Mean</td>
<td>42.04</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>4.322</td>
</tr>
<tr>
<td></td>
<td>Level</td>
<td>accepted</td>
</tr>
</tbody>
</table>

The table above showed that there were superficial differences between the groups of the study, where promotion students were better than the prevention students on ill-structures problems, the grades were very good and accepted, respectively. On the other hand, the results were opposite for the prevention participants where they were better than their counterparts in well-structured problems, and the grades were excellent and good, respectively.

Besides, one-way ANOVA was conducted and revealed that the difference between the four groups was significant \[ F (3,81) = 538.224, p = .000 \], which means that hypotheses were accepted. LSD post hoc showed that promotion participants outperformed prevention participants in ill-structure problems \( p < .000 \), but underperform them in well-structured problems \( p < .000 \).

Discussion

The results of this study confirmed the hypotheses. It was found that the promotion focus students outperformed prevention focus students in ill-structured problems and underperformed them in well-structured problems, on the other hand, prevention focus students outperform promotion focus students in well-structured problems and underperform them in ill-structured problems, hense that what Higgins (1997) and Higgins et al. (2001) pointed at that individuals with a promotion focus tend to utilize approach strategic means for achieving their goals, where the ill-structured problems require setting goals. Studies showed that students performed better on solving problems when they
set goals by themselves than when the goals were stated by externally (Weltman & Wolfson, 1964), because they have a role in forming the goals, so they took ownership and became accountable toward the goals (Smithson, 2012). The promotion focus students might feel that they were restricted by specific time which motivated them to increase their interest in problem description in the term of planning and specifying the procedures of the resolution (Woltin & Jonas, 2012). Another possible reason for the superiority of the promotion focus students was that they were striving for progress and planning for the resolution, and the graduate progress itself was considered a reward for them, Wang et al. (2019) for example found that promotion focus students preferred to receive more immediate rewards. One more possible reason that promotion students outperform prevention students was that they were searching information that suits their regulatory orientation (Wang & Lee, 2006), i.e. the promotion students sought information fits their mindset that they placed more weight on promotion features of the resolution (e.g., organize the laws, redirecting the tendencies of shooting to be practiced in specific clubs). All possible reasons mentioned previously consisted of the nature of the mindset of promotion students in the term of utilizing eager locomotion during goal-striving (“just do it”) (Reeve, 2015).

On the other hand, the results showed that the prevention focus students outperformed the promotion focus students in well-structured problems. This finding seemed logical because the well-structured problems as clearly formulated problems with known solution procedures and specified evaluation standards (Snowman & McCown, 2012), and those features consisted with the natures of those people’s mindset in the term of utilizing avoidance strategic means in order to achieve their goals (Higgins, 1997; Higgins et al., 2001), which direct them to “do the right thing” (Reeve, 2015).

Another way might help prevention focus students to outperform their counterparts in well-structured problems was represented in that the well-structured problems had clear and consisted information which helped in processing and solving that kind of problems, so individuals exhibited greater memory for belief-consistent information when information load was high and greater memory for belief-inconsistent information when information load was low and (Bodenhausen, 1988; Wyer & Srull, 1989).

Furthermore, this finding might be related to the problem closure, where the data available in well-structured problems helped prevention students to achieve unfulfilled goals, which made them feel relief that they could avoid negative consequences, which eventually assisted them to solve the problems, and that what Baas, De Dreu, and Nijstad (2011) found in their research that prevention goals were successfully regulated (relief, fulfilled prevention goals), they led to deactivation, and creativity broke down after producing similar levels of creativity as promotion-focused states.
Conclusion

The finding showed that there were differences in the mindsets of the students, which make a difference in the method of solving problems. So, it can be said that the mindset affects the way the students use in solving the different kinds of problems in the term of using different procedures for that.

Limitations and Recommendations

The current study results do not come without substantial limitations. The sample size may not be sufficient, but that was the maximum size it could be drawn, because of some administrative constraints relating to the university facilities, so the researcher was forced to choose an available sample. The generalizability of the findings also has limitations. Training students on problem-solving by a course of three 45-minutes sessions may not be sufficient too, but that what was possible for the time of the students, they could not leave most of their classes to take the training course, because it was very difficult to find a common time to gather all the 85 students.

Based on the findings of the current study, and despite the limitations above, there are some benefits from the findings. The educators may increase their interests in the students' mindset and specify them before designing curricula or methods of instruction. They may also increase their interests in students with a prevention mindset especially when they are dealing with ill-structured problems because of these kinds of problems that they face in their daily lives. With regard to the researchers, they can conduct more researches on the regulatory focus to study this concept deeply, taking into account other variables such as personality traits, mental abilities, or way of measuring it. Also, more studies needed to be conducted on the subject of the problem-solving, because as mentioned previously, there is paucity in examining the relationship between mindsets and problem-solving.

References


