The Influence of Exemplars and Role Models on Women's Stereotype Threat

Angela Blay

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Abstract
There has been much interest in understanding and reducing stereotype threat. Stereotype threat affects multiple groups and influences those negatively stereotyped groups to avoid consistent domains. Role models have been found to be effective at alleviating threats from such stereotypes, but little is known if exemplars work, and how individuals view themselves as individuals or as group members as focal targets of such threats. This study manipulated women participants into either a self-focused or group focused mindset. Following the manipulation, women were given a character essay to read that either had a woman exemplar as an intervention or a group of women role models. Participants then took a diagnostic mathematics exam and reported in a closing questionnaire their levels of threat, extra-test thinking, and inspiration. The study reported no significant results for math performance, but did show that the self-focused individuals who read of role models were the least threatened and least affected by extra-test thinking. The research shows how role models may be used to inspire and alleviate stereotype threat, while future research is needed to understand the effects of the mind set focus of self versus group thinking.

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stereotype threat, role models, exemplars, mindset

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The Influence of Exemplars and Role Models on Women's Stereotype Threat

By Angela Blay

A Senior Honor's Thesis Submitted to the

Eastern Michigan University Honors College

in Partial Fulfillment of the Requirements for Graduation

with Honors in Psychology

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Supervising Instructor (Print Name and have signed)
ABSTRACT

There has been much interest in understanding and reducing stereotype threat. Stereotype threat affects multiple groups and influences those negatively stereotyped groups to avoid consistent domains. Role models have been found to be effective at alleviating threats from such stereotypes, but little is known if exemplars work, and how individuals view themselves as individuals or as group members as focal targets of such threats. This study manipulated women participants into either a self-focused or group focused mindset. Following the manipulation, women were given a character essay to read that either had a woman exemplar as an intervention or a group of women role models. Participants then took a diagnostic mathematics exam and reported in a closing questionnaire their levels of threat, extra-test thinking, and inspiration. The study reported no significant results for math performance, but did show that the self-focused individuals who read of role models were the least threatened and least affected by extra-test thinking. The research shows how role models may be used to inspire and alleviate stereotype threat, while future research is needed to understand the effects of the mindset focus of self-versus group thinking.

Key words: stereotype threat, role models, exemplars, mindset
The Influence of Exemplars and

Table of Contents

Introduction........................................................................................................... 1
Literature
Review.................................................................................................................. 3
Present
Study.................................................................................................................... 10
Method.................................................................................................................. 11
Results................................................................................................................... 14
Discussion............................................................................................................. 16
References............................................................................................................. 19
Tables 1-
2....................................................................................................................... 22
Figure
Captions.............................................................................................................. 24
Figure
1......................................................................................................................... 25
Figure
2......................................................................................................................... 26
Appendix............................................................................................................... 27
The Influence of Exemplars and Role Models on Women's Stereotype Threat

“One of the most effective things you will ever do in life, whether you care to or not, is set an example.” – Richelle E. Goodrich

Introduction

Goodrich’s comment on setting an example may not be a revolutionary idea, but it’s an important one. Being an exemplar or role model can leave a legacy behind of accomplishment and inspire others to rise up to or even beyond that standard. Following such an exemplar or role model can lead to one feeling protected from the stereotypes and help ensure success.

Stereotype threat, according to Steele (1997) is “the event of a negative stereotype about a group to which one belongs becoming self-relevant, usually as a plausible interpretation for something one is doing, for an experience one is having, or for a situation one is in that is relevant to one’s self-definition (p. 616).” Stereotype threat is just what it sounds like—a threat to the people that it targets. This is a major issue, as it is pervasive and can lead to underperformance and/or underrepresentation for groups targeted by such stereotypes. For example, Yeung and Von Hippel (2008) found that alerting women with the stereotype that women are bad drivers resulted in an increase in hit pedestrians during a driving simulation task compared to women not alerted to that stereotype. In the study, there were two groups of women, where those in the first group were told that their driving would be compared to their male
The Influence of Exemplars and counterparts, and those in the second group did not receive such information. Both women were examined in their reaction time to a pedestrian walking out into the street while they simulated driving. The women more aware of the stereotype from the first group were two times as likely to hit the pedestrian as women in the other group who were unaware of the stereotype.

Stereotype threat has and continues to affect many domains, specifically in academia. A well-known stereotype is the lack of women in STEM related fields (Science, technology, engineering, and mathematics). The stereotype that women are not good at these subjects leads to stereotype threat for up and coming students. The threat can then lead to the underrepresentation of women contributing to these fields. This can be problematic, as these fields are male dominated, lacking what can be a unique perspective from the women, as well as a lack of women accomplishments within these fields. Moreover, as these are prestigious, well-paying jobs, the lack of women in these fields is thus problematic for women. The stereotype of women not being strong in these fields leads to young girls not doing well and thus not pursuing these subjects or not gaining an interest in these fields in the first place. The present paper was concerned with stereotype threat for women who are focused on their identities as women and as individuals. Additionally, the paper examined if differences in reducing threat across these different identity foci would be affected by whether or not stereotyped individuals read about a group exemplar, or a group of role models.
The Influence of Exemplars and Literature Review

Recent studies on stereotype threat, however, have shown improvement in intervening and reducing the effects that stereotype threat has. Role model interventions were found to be successful in reducing stereotype threat when the group was the target, but less so when the self was the target (Shapiro, Williams, & Hambarchyan, 2013). Moreover, exemplars can prove to be effective, if not for all, at least for some. This was found in the work of Taylor, Lord, McIntyre, and Paulsen (2011), which described the Hillary Clinton effect. Within the study, women in a pilot test had listed Hillary Clinton as high in deserving her success, whereas others did not. As part of the main study, women were given an essay to read about Hillary and then complete the mathematics portion of a GRE test. Those women who listed Hillary as highly deserving of her success scored as well as a test-only control group. The women who listed Hillary as low in deserving her success, however, scored about the same as a threat only group. Essentially, one specific exemplar does indeed reduce the effects of stereotype threat, if the exemplar is liked by that individual. That exemplar may be perceived to have taken on the burden of the stereotype threat and thus, it alleviates the threat from the pressure of the group that an individual would feel. By having an exemplar to look to, an individual may be able to perform better, without the stereotype threat pressure undermining their abilities, as well as encouraging participation in the subject that was previously seen as threatening.
The Influence of Exemplars and

In addition to role models, there is what is called exemplars that may be used to alleviate the stereotype threat in individuals. Role models can either be a group of women or one woman, but exemplars are individuals that are more seen as outliers, as someone that breaks from the norm. A role model is a person that others would look to as someone to imitate, while an exemplar is a person that is an example of an excellent model. Though the two sound the same, the difference lies in the level of standard being followed. For example, the first woman to win the Field Medal in mathematics, akin to the Math Nobel Prize, in 2013, would be considered an exemplar. By her example, it’s possible that many more girls will be interested in STEM related fields. As defined by White (2005) an exemplary person would be one that acts as an influence for moral life and thought, which based on this definition goes beyond a role model, whom is defined more as a person who others admire for a specific role. Marx has had two studies conducted in which he found that group members who are threatened and saw a member perform well within their group, tend to perform better themselves (Marx & Roman, 2002, Marx, Friedman, and Ko, 2009). Through their research, they found what they called the “Obama Effect.” By highlighting Barack Obama’s accomplishments, African American students performed significantly better on exams. Obama was an excellent exemplar in this case, in which the effects of stereotype threat were reduced significantly.

It appears that certain conditions, however, need to be considered when providing a role model or exemplar for stereotype threat to be alleviated. In the Aronson, Lustina, Good, and Keough 2009 study, they attempted to follow up on the Marx idea of the Obama Effect. His
The Influence of Exemplars and research, however, concluded with no significant results, suggesting that while some exemplars are effective at reducing stereotype threat, they may not be universally effective. In a 2005 study, McIntyre, Lord, Gresky, Ten Eyck, Frye, and Bond Jr. found that the number of role models used in reducing stereotype threat may matter in order to receive significant results. Women in this study were asked to read biographies about one, two or three women and then complete a math test. The women who read no biography at all scored the worst, whereas the women who read about one role model did better. Those two groups, however, were still scoring lower than men. The women that read about two or three role models did better yet, with the group that read about three role models doing the best and scoring as well as the men. The study also showed that reading about four or more role models would no longer have a significant effect and would not contribute to more success for the women taking these math tests. There seems to be a limit, still, on the reduction of stereotype threat in certain conditions.

Beginning with the work completed by Steel and Aronson (1995), studies have shown that stereotype threat can undermine the intellectual performance of an individual. When given a portion of a standardized test, blacks were outperformed by whites when the test given to them was threatened as being diagnostic of intellectual ability, as opposed to the groups that were told the test was non-diagnostic of intellectual ability or simply a challenging test. Following that study, Aronson (1999) expanded on his previous work suggesting that merely by changing the social circumstances of a task can effectively reduce some stereotype threat. His study also found that some groups may not be as affected by stereotype threats as others, but it is not exclusive
The Influence of Exemplars and just to highly stigmatized groups, as they were able to successfully threaten white males through intellectual test performance. There are many groups vulnerable to stereotype threat, however, it is common in the literature to find effects on minority groups, for example, women.

Both Steele, Spencer and Aronson’s (2002) as well as Yeung and Von Hippel’s (2008) studies highlight the importance of a stereotype threat being identifiable to an individual in order for it to have a significant effect on them. The most important component of stereotype threat is that an individual identify with the stereotype and care enough about their performance in relation to their identifying group. Steele talks about how there are underlying psychological processes that affect an individual and make them vulnerable to stereotype and social identity threat, which leads to an underperformance. Steele argues that it’s not a lack of preparation or skills that undermines their abilities. There is something else coming into play. These studies found that the more aware the individual is of the stereotype for their identifying group, the more it affects their performance. It seems to be related to pressure of proving success of one’s social group that causes an adverse effect.

Additionally, Stone, Lynch, Sjomeling, and Darley (1999) found similar results in their study. There were two experiments in which participants were told that the task, which was a test of golf skills, either involved natural sports ability or athletic intelligence. Black and white participants showed results of opposite patterns, where the Black individuals did better when the task was described as needing natural sports ability, whereas the White individuals did better
The Influence of Exemplars and

when the task was described as requiring athletic intelligence, consistent with stereotypes for each group. These results only occurred for individuals who indicated that their performance related to their self-worth. This work shows that when performance is indicative of a specific social identity’s success, the threat of the stereotype posed upon the group can negatively affect the individual’s performance. For a highly stereotyped group, such as women, this knowledge can help explain and lead to a better understanding of how the stereotype affects certain groups as well as how to alleviate those threats.

There are two major theories related to stereotype threat. The first comes from the work of Steele, Aronson, and Spencer (2002). Their view of stereotype threat is that the threat comes from a group level, coinciding with the individual’s social identity. In order for the threat to really affect the individual, they must be group focused in their identity, as opposed to self-focused. Additionally, the stereotype threat comes from doubt and aversion, meaning the individual’s identity within the group is dependent upon the success of their performance, which creates self-doubt. In their study, for example, these doubts and aversions to the stereotype threat lead to women committing errors on the math assessments that their tested skills had predicted they would perform well on otherwise. This is what they call the “underperformance phenomenon.” The women were underperforming due to the inhibition of their learned skills. Therefore, stereotype threats extend to learning as well as the actual performance of the individual. This means that stereotype threat is not a function of effort, but rather an effect of
The Influence of Exemplars and becoming aware of certain stereotypes that the individual can identify with and the resulting underperformance from the anxiety related to the stereotype.

The other theory related to stereotype threat comes from Schmader, Johns, and Forbes (2008). They view stereotype threat as coming from either the group level or the self-level, as opposed to just the group level from the previous theory. At the self-level, an individual is capable of holding strong enough doubts in which their performance would be affected. There are certain key mechanisms that stereotype threat may affect in an individual, which can extend to either the group or self-level. The individual may be primed to think in terms of the group, and thus will feel pressure to do well, so as not to prove the stereotype. The individual may feel a personal investment in their own performance and place pressure upon themselves in that way. Through either focus, the stereotype threat causes deficits for the individual. First, the person is subject to physiological responses in relation to their anxiety. Second, attempts to monitor their own performance may result in further anxiety or pressure that can hinder their performance. Lastly, the individual will try to suppress any negative thoughts or emotions as they try to self-regulate. As a result, these mechanisms take away the attention that the individual would need to otherwise succeed at the task at hand, causing the direction of this focus to shift from the actual task itself to their executive responses and their attempts on resolving them. This can be problematic, as the deficits are significant enough to allow the stereotype threat to hinder their performance.

Following these theories, there are two ways in which to alleviate the stereotype threat:
The Influence of Exemplars and using outside influences such as role models or exemplars: on an individual level and on a group level.

Alleviating stereotype at a group level involves a role model that the individual can identify with, a role model that displays competence in that particular area, and the individual displaying a desire to succeed, or in other words, care about their own performance (Marx & Roman, 2002). First, the role models must possess some traits that the individual can relate to, either physically, through gender for example, or psychological similarities, such as taking the same math courses. Also, the perceived competence of the role model matters to the individual and can possibly even inspire the individual to perform better. A study conducted by McIntyre, Paulson and Lord (2003) showed that women can perform significantly better when given role models as examples of success in a particular area. Women that face stereotype threat are able to perform better once they are reminded of other women’s achievements. Following that study, McIntyre et. al (2011) explored the impact of the role models, showing that some role models are actually more effective than others. This study showed that the role model that was perceived to have deserved her achievements were much more effective in alleviating stereotype threat than the role model perceived as not deserving of her achievements. These main focal points of role models, including their perceived competence, similarities to the individuals and their perceived deservingness of their achievements may be what makes an effective role model successful in inspiring individuals and alleviating stereotype threat enough to perform better.
The Influence of Exemplars and

On the other hand, the opposing theory of alleviating stereotype threat on the individual level takes on a different approach. When individuals facing stereotype threat are self-focused, role models may not be as effective in alleviating that threat. The Taylor et. al. (2011) study showed that for a role model to be effective for an individual, they must be perceived by the individual as deserving of their achievements and perceived as having taken the burden off their identifying group, thereby allowing for the role model to be inspirational in difficult situations. This, however, does not work when the role model is perceived as undeserving of their achievements. The most effective approach would then be self-affirmations. This approach is only effective when the individual is focused on their own performance and what it shows about their own abilities (Shapiro et. al, 2013). Furthermore, Beilock, Jellison, Rydell, McConnel, and Carr (2006) showed through a series of experiments that performance affected by stereotype threat is related to a disruption in information processing within the individual. Once the individual is sufficiently distracted away from the stereotype threat, the individual is able to focus their attention away from the pressure that accompanies that stereotype threat, onto the task at hand and perform better overall.

Present Study

This study investigated the effectiveness of role models versus an exemplar as an intervention in alleviating stereotype threat, on a group level and on the individual level. It was
The Influence of Exemplars and hypotheses that women in the self-focused mindset with an exemplar intervention would perform better on the math test than women in the self-focused mindset with the role model interventions. Additionally, the women in the group focused mindset with the role models intervention would perform better on the math test than women not in the group mindset. This is due to the fact that the interventions success depends on the mindset of the participant, whether it is group or self-focused. It was hypothesized that the role models would help to reduce the stereotype threat, reduce extra test thinking, such as worry, and inspire participants to perform better.

Method

Participants

There were a total of 36 participants, participating for course credit at Eastern Michigan University. Of the 36 participants, 27 were women and 9 were men. For the purpose of this study, only the data from women were used.

Procedure

Participants were tested in a lab. Participants were explained that the study had three parts: one to examine how participants view themselves and others, another part to examine student performance on a diagnostic math test, and a final part including a closing questionnaire. Participants were first manipulated to think more about themselves as individuals or as a member
The Influence of Exemplars and

of various groups, such as women as a group. As such participants were asked to list traits that
primed either group or self-focus (e.g., think of your unique traits, think of the traits your groups
possess). This had the participant thinking about themselves, on an isolated level, or as part of a
group, as they took these traits they listed and described how they affected how they saw
themselves individually or as part of the group. For example, participants reported traits such as
loyalty, kindness, or detail-oriented, and then went on to explain how those traits make up their
identity and how that trait can be useful for them. Following the manipulation of mindset, they
then filled out demographics that identified characteristics of their groups and self, including
number of classes they completed, ACT or SAT score, gender, age, and ethnicity.

Next, the participants read character essays that were about either an exemplar or a group
of role models (e.g. an award winning woman mathematician, or three women with a successful
statistical business). The essays described the achievements of these women and how their traits
led to that success and are used as strengths. For example, the women at the statistical company
were able to use their emotions to connect with clientele and form better relationships with them.
Likewise, the exemplary woman math professor won the Math Nobel prize due to her own
intelligence and was the first woman to be awarded this prize. To be sure the participants read
the essays, there were questions they were asked to answer about what they read, including how
they would describe the performance of those women.
The Influence of Exemplars and

Following that, participants took a diagnostic mathematical exam comprised of 26 GRE items, given only 15 minutes to complete it to the best of their ability. The participants were told that the exam would be used by the math department to identify student’s quantitative abilities as strong or weak and by the university to allocate scholarships, which would be compared to other students’ scores. Furthermore, the math exam instructions included a comment on interest in differences among groups in their performance, naming women and minorities in particular. This intensified the threat for the participants. Due to an error on the answer sheet, the second GRE question was thrown out and not calculated into their scores. The score was based on the number of items they completed and how many of those completed they got correct.

The final task was to assess the participants levels of inspiration (e.g., reading the essay inspired me to do well) and threat in relation to their focal mindset and their performance. The questionnaire was set on a scale of 0 (not at all) to 9 (extremely) and was 18 questions long. The questions were arranged in sections that measured how threatening or difficult the test felt, whether the stereotype affected them, how they felt they performed, how concerned they felt about their performance in relation to the threat, and the amount the character essays inspired them. The participants were able to report their levels of threat, concern, extra task thinking and inspiration. This information was used to describe how the mindset and role model or exemplar intervention can affect the stereotype threat felt by individuals. The participants were then debriefed on the true nature of the study. All materials used in this study are available in the appendix.
Results

The primary hypothesis for the study was that women who read about role models and were group focused would perform better on a math test than would women who were not group focused or who read about an exemplar. To observe this, the percentage of attempted items that women answered correctly was examined in a 2(essay read: role model, exemplar) X 2(focus: self, group) analysis of variance (ANOVA). That test, however, found no significant main effects, $F(1, 23) < 1, ns., and only a marginal interaction, (F1, 23) = .064, p = .803. (create a table in paper) The means for the percent scores are presented in Table 1. The effects of role models and focus did not affect performance, as opposed to what was originally hypothesized.

It was also hypothesized that women who read of role models would be more inspired than would women who read of exemplars. In order to assess inspiration, the items on the closing survey that asked about inspiration (reading about the people inspired confidence in math, confidence in general) were averaged together to create a composite measure of inspiration (see McIntyre et al., 2010). That composite measure was also compared in a 2 X 2 ANOVA, that revealed no significant differences in role models or exemplars, $F(1, 22) < 1, ns., or of focus, $F(1, 22) = .976, ns, or no significant interaction, $F(1, 22) < 1, ns. Thus the effect of role models and exemplars on inspiration produced no systematic differences.
Additional hypotheses were also made concerning the psychological threat that may have been experienced by women. Past research indicates that feelings of threat and extra-task worry are contributors to the experience of stereotype threat and can lead to harm and/or performance differences. To test for threat, a composite average for the items dealing with test threat was computed (how you feel you did on the test; how difficult the test was to complete; how anxious the test made you feel, and how threatened you were about the test). That composite average was also examined with a 2 X 2 ANOVA. For the amount of threat reported there were no observed main effects (Fs < 1), but there was a significant focus by target interaction, $F(1, 22) = 5.67, p = .027$. As shown in Figure 1, that interaction occurred because women who were self-focused and read of role models were the least threatened.

The same procedure was also conducted for the extra-test thinking that women reported. For the amount of extra test thinking reported (mean on items thought I did poorly, thought that women did poorly, thought about stereotype during test) there were no observed main effects (Fs < 1), but there was a significant focus by target interaction, $F(1, 22) = 4.85, p = .040$. As shown in Figure 2, that interaction occurred because women who were self-focused and read of role models engaged in less extra test thinking than did women who were self-focused and read of role models or compared to women who were group focused.
The Influence of Exemplars and

Discussion

The results of the study showed mixed results in relation to the four main hypotheses. The first hypothesis was that women who read about role models and were group focused would perform better than women who read about an exemplar and were self-focused. The second hypothesis was the women who read of role models would be more inspired than women who read of an exemplar. The remaining two hypotheses were about role models alleviating the stereotype threat and extra-task worry that participants may feel.

The first hypothesis was not supported. The mathematics test may not have been gauged correctly, as participants were not screened previously for mathematical ability nor were they aware they would be completing a mathematical exam until they arrived at the lab. It is also possible that the test was not threatening enough, however, the results from the self-reported data in the questionnaire states otherwise. For future research, a pilot test with math items could be useful in producing better results. Additionally, using a different ability test altogether may yield different results. Using more motivational items, such as items that participants would elect to continue on to, on the math exam itself may also result in more significant findings in future studies.

The second hypothesis was also not supported. It is possible that participants were not able to identify or were inspired by the chose role models and exemplar. Again, results from the self-reported data in the threat reports and extra-test thinking show that this was not the case. It is
possible that both role models and exemplars equally inspire individuals, therefore, there are no differences can be observed. A future study might use a non-exemplar or role model condition to test this. Another reason the hypothesis was not supported may be that participants only read of one exemplar or role model story. McIntyre et. al (2005) showed that three stories of role models is optimal for an effect on participants. Future work might compare multiple exemplars and role models in the same study.

The hypothesis that the role models would help reduce stereotype threat was supported. This was shown through the questionnaire findings. Participants reported feeling less stereotype threat under the role model condition, which may be due to the fact that role models are able to take on the burden of pressure performance and reassure individuals of success. The women that were self-focused with the role model interventions were the least threatened, which can mean that those reading about role models were inspired to perform better and not focus on the stereotype threat as much.

Additionally, the hypothesis that role models would alleviate extra-test thinking was supported. This was also shown through the questionnaire findings, and similar to the previous hypothesis, role models allowed the participants to focus on the task at hand as opposed to worrying about their performance. The significant interaction occurred in the self-focused mindset with the role model intervention as well, suggesting that this combination yields a strong way to alleviate stereotype threat in women and possibly inspire them.
The Influence of Exemplars and

These findings are related to the findings of Shapiro et. al (2013). Her findings suggest that multiple types of interventions for stereotype threat are necessary to explore in order to reduce it across multiple negatively stereotyped groups. This study has shown an interaction between the self-focused mindset of the participants and the intervention of role models for women as a means in alleviating stereotype threat and extra-test thinking as another possible way to approach stereotype threat. As Shapiro et. al has shown, stereotype threat is not a singular construct, but does indeed reach across several forms.

For future studies, more needs to be done in order to understand and reduce stereotype threat in the best way possible for multiple groups. In the case of women and STEM related stereotype threat, future research should include men as part of the studies as well as different types of role models or exemplars to better reduce it. In doing so, women will be better able to integrate into the STEM related fields, contributing more and performing better at these subjects than ever before. It could help generate interest for girls to participate in these fields, starting at a younger age and result in women entering more prestigious job positions and earning more. Reducing stereotype threat for women in regards to STEM subjects may actually produce more women role models, which will pave the way for more girls and women to break ground in STEM fields. As Goodrich said, one of the best things to do is set an example.
The Influence of Exemplars and References


Goodrich, R. (2014). *Mile Anyway: Quotes, Verse, & Grumblings for Every Day of the Year.* Purple Papaya, LLC.


The Influence of Exemplars and


The Influence of Exemplars and


The Influence of Exemplars and

Tables

Table 1. Mean percent correct scores for women who read about role models or exemplars under self or group focused thinking.

<table>
<thead>
<tr>
<th></th>
<th>Read about Role Models</th>
<th>Read about an Exemplar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Focused</td>
<td>22.41</td>
<td>35.04</td>
</tr>
<tr>
<td></td>
<td>(14.28)</td>
<td>(11.98)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Group Focused</td>
<td>36.67</td>
<td>45.30</td>
</tr>
<tr>
<td></td>
<td>(15.88)</td>
<td>(29.61)</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 2. Mean inspiration ratings for women who read about role models or exemplars under self or group focused thinking.

<table>
<thead>
<tr>
<th></th>
<th>Read about Role Models</th>
<th>Read about an Exemplar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Focused</td>
<td>3.33</td>
<td>3.00</td>
</tr>
<tr>
<td></td>
<td>(2.89)</td>
<td>(1.80)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>9</td>
</tr>
</tbody>
</table>
The Influence of Exemplars and

<table>
<thead>
<tr>
<th>Group Focused</th>
<th>3.67</th>
<th>2.60</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2.92)</td>
<td></td>
<td>(2.79)</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>
The Influence of Exemplars and

Figure Captions

Figure 1. Reported stereotype threat of participants in self or group focus who read of an exemplar or role models.

Figure 2. Extra test thinking of participants in self or group focus who read of an exemplar or role models.
The Influence of Exemplars and Figure 1.
The Influence of Exemplars and Role Models

Figure 2.
Appendix

OVERVIEW OF STUDY PROCEDURES

Please read over the study procedures carefully as they explain the process and the nature of the research you will perform today.

In this study you will complete the following activities.

1. First tell us about yourself.
2. Help us develop some materials for future research in our lab (you will read an essay for its clarity, memorability, and flow).
3. Complete a measure of quantitative reasoning (please see attached explanation of the page that follows).
4. Complete a closing questionnaire.
Group Focus

As part of this study, we will need to know a little bit about the groups that belong to (e.g., gender, ethnicity, sports, interests, social). In it, you will be asked to provide a little bit of demographic detail. First, we would like you to write a brief paragraph that describes the five most defining personality traits that you see in the groups to which you identify (e.g., gender, SES, race/ethnicity, academics, etc.).

Please give a brief description of those traits here (e.g., outgoing, optimistic, dark, etc.).

1. 
2. 
3. 
4. 
5. 

In the space below, please describe these traits and how they affect how you see your groups.

________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________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Please answer the demographics on the next page.
The Influence of Exemplars and Self-Focus

As part of this study, we will need to know a little bit about you. In it, you will be asked to provide a little bit of demographic detail. First, we would like you to write a brief paragraph that describes the five most defining personality traits that you see in yourself.

Please give a brief description of those traits here (e.g., outgoing, optimistic, dark, etc.).

1. __________________________
2. __________________________
3. __________________________
4. __________________________
5. __________________________

In the space below, please describe these traits and how they affect how you see yourself.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Please answer the demographics on the next page.
The Influence of Exemplars and

Demographic Information

How many math courses in college have you had, including those you are currently enrolled in? _____

If you can recall, what was your score for S.A.T. or A.C.T. math section? _____.

Gender: M  F

Age: _____

Ethnicity: European or European American
(please circle) African or African American
Arab or Arab American
Asian or Asian American
Native American
Latin or Latin American
Other
The Influence of Exemplars and

Exemplar Intervention

We are in the developing stages of research on how people can recall and perceive information about others. For the essay below, please read over the essay carefully and attempt to commit details of the people and events included. Additionally we'd like you to also be sure the essay flows well, makes sense, and seems like it would be relatively easy to recall.

Maryam Mirzakhani, a professor at Stanford University, has become the first woman to be awarded the Field’s Medal, which is the world’s top prize in mathematics, also known as the “Nobel Prize of math.” She received her award at the International Congress of Mathematics in Seoul. Mirzakhani is being honored for her contributions to geometry and dynamical systems, particularly in understanding the symmetry of curved surfaces. “This is a great honor. I will be happy if it encourages young female scientists and mathematicians,” said Mirzakhani, who was born and raised in Tehran, Iran. Mirzakhani distinguished herself as a math whiz as a teenager, winning gold medals in the International Math Olympiads. She is now the second Stanford scholar to win the award, officially known as the International Medal for Outstanding Discoveries in Mathematics, which was established in 1936. She will receive $13,700 cash for her achievement.

1. Who or what person was this story about?

2. What was the occupation/field of industry of this person?

3. How would you describe the person’s performance in their field?

How easy was this essay to read?

0 1 2 3 4 5 6 7 8 9

not at all very easy

Do you think you could recall facts and information regarding this essay at a later time?
The Influence of Exemplars and

How long do you think you could remember the information (in total # of days)? ______

Role Models Intervention

We are in the developing stages of research on how people can recall and perceive information about others. For the essay below, please read over the essay carefully and attempt to commit details of the people and events included. Additionally we'd like you to also be sure the essay flows well, makes sense, and seems like it would be relatively easy to recall.

Elite Statistical Consulting is an organization that conducts data analysis for research. It was created by three women (René Paulson, Beth Sadler, LaSonnie Dore), all of whom remain heavily involved in the company. What makes this company unique is their approach to connect with their clientele and use their relationships to further conduct leading research. These women use their insight into emotions to understand their clients’ needs and provide for them the best service specific to the research. The company is centered on establishing a strong relationship with their clients, in order to provide the best possible service and lead to growth in the field of research. In fact, because these women can create such strong relationships and trust with their clients, many other groups have begun to emulate this practice in their consulting efforts. The Elite group has expanded since it first began and now has several branches all over the country. Customer satisfaction remains high within this company, as the client’s needs always come first.

1. Who or what group was this story about?

2. What was the occupation/field of industry of this group?

3. How would you describe the group’s performance in their field?

How easy was this essay to read?

0 1 2 3 4 5 6 7 8 9

not at all absolutely

very easy

32
The Influence of Exemplars and

Do you think you could recall facts and information regarding this essay at a later time?

0 1 2 3 4 5 6 7 8 9
not at all absolutely

How long do you think you could remember the information (in total # of days)? _______

Quantitative Exam
Quantitative Ability Exam Overview

As part of our research, we are collaborating with the Mathematics Department to standardize The Eastern Diagnostic Exam of Quantitative Ability, which will be used to diagnose students’ quantitative skills as strong or weak. Your results will be compared to other students’ scores in order to make assessments about your ability, the quantitative ability of student groups at EMU, and to inform how to fund various scholarship programs.

As you may know, math skills are crucial to performance in many important subjects in college. Mathematics performance has also been shown to highly predict graduation rates from college and career success. Yet surprisingly little is known about the mental processes underlying math ability. There is some controversy concerning group differences in quantitative ability. Sometimes the tests show no differences, but most of time differences are found indicating that some groups (i.e., women, minorities, etc.) perform poorly in mathematics. This research is aimed to diagnose how each participant and particular groups of students perform in mathematics. The results of the research will be used to guide decisions regarding funding of programs for students strong in mathematics.
The Influence of Exemplars and

**Instructions.** Please read the following instructions.

- Do not begin until instructed to start exam.
- When you are told to begin the exam, turn to the page labeled “Diagnostic Exam” and begin.
- All calculations should be done on the exam booklet. Calculators are not allowed.
- Do your best to answer the items critically and please do not guess! If you cannot answer an item skip it and return to it later.
- Record your answers on the answer sheet provided.
- You have 15 minutes to complete the exam.
- Once you finish the exam, turn your test and answer sheet over and wait for further instructions.
- You may write on the booklet.

*You may use scratch paper which the test administrator will provide you if needed. Try to do your best on each item without guessing. Please complete the items in order and DO NOT skip around. If you cannot confidently identify the correct answer then you may guess if needed.*

You will have 15 minutes. Good luck.
The Influence of Exemplars and

1. If $3^n < 500$, which of the following is the greatest possible value of $n$?
   
   A. 2  
   B. 4  
   C. 5  
   D. 6  
   E. 7

2. \[
\frac{m + m}{m} - n =
\]
   
   A. $mn$  
   B. $m - n$  
   C. $m - n$  
   D. 1  
   E. -1

3. In deciding the asking price for a piece of property, a real estate broker determines that the market value of the lot is \( \frac{1}{7} \) the market value of the building on it. If the total value of the property is set at $140,000, then what is the total value of the lot?
   
   A. $10,000  
   B. $17,500  
   C. $20,000  
   D. $120,000  
   E. $122,500
4. Company A manufactures paper plates at a rate of 1,000K per hour, while company B manufactures plates at a rate of 1,000L per hour. If both companies work simultaneously, how many hours will it take them to manufacture 100,000 plates?

A. \( \frac{100}{K+L} \)
B. \( \frac{100}{KL} \)
C. \( \frac{K+L}{100} \)
D. 100 (K+L)
E. 1000 (K+L)

5. John has 4 ties, 12 shirts, and 3 belts. If each day he wears exactly one tie, one shirt and one belt, what is the maximum number of days he can go without repeating a particular combination?

A. 12
B. 21
C. 84
D. 108
E. 144
6. If \( y = 2x - 1 \), what is the value of \( x \) in terms of \( y \)?

A. \( \frac{y+1}{2} \)
B. \( \frac{y-1}{2} \)
C. \( \frac{y+1}{2} \)
D. \( \frac{y+1}{2} \)
E. \( y + \frac{1}{2} \)

7. If \( a = 2 \), \( b = 4 \), and \( c = 5 \), then

\[
\frac{a+b}{c} = \frac{a-b}{c} =
\]

A. 1
B. \( \frac{11}{30} \)
C. \( \frac{37}{10} \)
D. \( -\frac{11}{30} \)
E. -1

8. If \( \frac{p-q}{p} = \frac{2}{7} \), then \( \frac{q}{p} = \)

A. \( \frac{2}{5} \)
B. \( \frac{5}{7} \)
C. 1
D. \( \frac{7}{5} \)
E. \( \frac{7}{2} \)

9. If integer \( x \) were divided by 7, the quotient would be 12 with a remainder of 1. Therefore, \( x \) equals
10. If \( y \neq 0 \) and \( 2x + y = 12 \), then which of the following is NOT a possible value of \( x \)?

- A. 12
- B. 10
- C. 8
- D. 6
- E. 4

11. If \( 4x + 3y = 8 \) and \( x/2 = 1/4 \), what is the value of \( y \)?

- A. \( 4/3 \)
- B. 2
- C. \( 7/3 \)
- D. 3
- E. \( 10/3 \)

12. Two people were hired to mow a lawn for a total of $45. They completed the job with one person working for 1 hour and 20 minutes and the other working 40 minutes. If they split the $45 in proportion to the amount of time each spent working on the job, how much did the person who worked longer receive?

- A. $33.75
- B. $30.00
- C. $27.50
- D. $25.00
- E. $22.50
13. A rectangular window with dimensions 2 meters by 3 meters is to be enlarged by cutting out a semicircular region in the wall as shown above. What is the area, in square meters, of this semicircular region?

A. \( \pi/4 \)
B. \( \pi/2 \)
C. \( \pi \)
D. \( 2\pi \)
E. \( 4\pi \)

14. \( 10^2 \left( 10^8 + 10^8 \right) = \frac{2(10^{16})}{10^4} \)

A. \( 2(10^4) \)
B. \( 2(10^6) \)
C. \( 10^8 \)
D. \( 2(10^8) \)
E. \( 10^{10} \)

15. If \( n = 15 \times 28 \times 26 \), which of the following is NOT an integer?

A. \( n/15 \)
B. \( n/21 \)
C. \( n/32 \)
D. \( n/35 \)
E. \( n/39 \)
16. In square PQRS above, T is the midpoint of side RS. If PT = 8√5, what is the length of a side of the square?

A. 16  
B. 6√5  
C. 4√5  
D. 8  
E. 2√6

17. If q ≠ 0 and k = qr/2 − s, then what is r in terms of k, q, and s?

A. 2k + s  
B. 2sk  
C. 2(k − s)  
D. 2k + sq  
E. 2(k + s)
The Influence of Exemplars and

18. \(|3| + |-4| + |3-4|

A. 14
B. 8
C. 7
D. 2
E. 0

19. A computer can perform 30 identical tasks in 6 hours. At that rate, what is the minimum number of computers that should be assigned to complete 80 of the tasks within 3 hours?

A. 6
B. 7
C. 8
D. 12
E. 16

20. Which of the following is 850 percent greater than \(8 \times 10^3\)?

A. \(8.5 \times 10^3\)
B. \(6.4 \times 10^4\)
C. \(6.8 \times 10^4\)
D. \(7.6 \times 10^4\)
E. \(1.6 \times 10^5\)

21. \(\frac{9^2 - 6^2}{3}\)

A. 1
B. 15/9
C. 5
D. 8
The Influence of Exemplars and

E. 15

22. What is 0.423658 rounded to the nearest thousandth?

A. 0.42
B. 0.423
C. 0.424
D. 0.4236
E. 0.4237

23. If $3(x + 2) = x - 4$, then $x =$

A. -5
B. -3
C. 1
D. 3
E. 5

24. If $x^2 + 2xy + y^2 = 9$, then $(x + y)^4 =$

A. 3
B. 18
C. 27
D. 36
E. 81

25. If the sum of two numbers is 14 and their difference is 2, what is the product of the two numbers?

A. 24
B. 28
C. 40
D. 45
E. 48
26. A secretary typed 6 letters, each of which had either 1 or 2 pages. If the secretary typed 10 pages in all, how many of the letters had 2 pages?

A. 1  
B. 2  
C. 3  
D. 4  
E. 5  

The Influence of Exemplars and
The Influence of Exemplars and

Closing Questionnaire

Please circle the choice that best fits your feelings to the following questions.

How well do you feel you did on the math test?

0 1 2 3 4 5 6 7 8 9
not at all extremely

How difficult did you find the math test to be (including the format of the test and the individual items)?

0 1 2 3 4 5 6 7 8 9
not at all extremely

How anxious did the math test make you?

0 1 2 3 4 5 6 7 8 9
not at all extremely

How threatening did you find the math test to be?

0 1 2 3 4 5 6 7 8 9
not at all extremely

After hearing about the stereotype that women do poorly in math, how pressured did you feel to perform well on the math test?

0 1 2 3 4 5 6 7 8 9

44
The Influence of Exemplars and

none at all                                very much

To what extent did reading about the people at the start of the study lead you to conclude that you might be able to score well on math tests?

0   1   2   3   4   5   6   7   8   9
not at all                                very much

To what extent did reading the people at the start of the study lead you to conclude that you might be able to score better than you previously believed on math tests?

0   1   2   3   4   5   6   7   8   9
not at all                                very much

To what extent did reading the people at the start of the study lead you to conclude that women in general might be able to score well on math tests?

0   1   2   3   4   5   6   7   8   9
not at all                                very much

To what extent did reading the people at the start of the study lead you to conclude that women in general might be able to score better than you previously believed on math tests?

0   1   2   3   4   5   6   7   8   9
not at all                                very much

How often did you think about performing poorly while you completed the math test?

0   1   2   3   4   5   6   7   8   9
not at all                                very much

45
The Influence of Exemplars and

How often did you think about how other members of your gender fared at math while you took the math test?

0 1 2 3 4 5 6 7 8 9
not at all very much

How often did you think about the stereotype that women are worse at math compared to men?

0 1 2 3 4 5 6 7 8 9
not at all very much

How much did you think that the stereotype that women are worse at math compared to men influenced your performance on the math test?

0 1 2 3 4 5 6 7 8 9
not at all very much

I am concerned that the researcher will judge women, as a whole, based on my performance on the test?

0 1 2 3 4 5 6 7 8 9
not at all very much

The researcher will think that women, as a whole, have less math ability because of how I did on the test?

0 1 2 3 4 5 6 7 8 9
not at all very much

How much did reading these people at the start of the study inspire you to feel confident?

0 1 2 3 4 5 6 7 8 9
not at all very much

46
The Influence of Exemplars and

How much did reading these people at the start of the study inspire you to feel confident about yourself in general?

0 1 2 3 4 5 6 7 8 9

not at all very much

How much did reading these people at the start of the study inspire you to feel confident about yourself in mathematics?

0 1 2 3 4 5 6 7 8 9

not at all very much

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1 Quantitative exam format appeared different in study.