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Abstract

Most of the research on prejudice has focused on majority discrimination of minority group members, but few have investigated minority to minority prejudice. This experiment studied minority group member discrimination against members of other minority groups when asked to perform activities with a group composed of either all racial majority (White) individuals, all racial minority individuals of the participant's own race, or an equal mix of White and racial minority individuals. It was expected that participants would be less likely to evaluate another racial minority group member favorably when in the presence of a White group than in any of the other conditions (mixed group or racial minority group). However, no significant interaction was found between group composition and job applicant race with regards to competence measurements. Instead, there was an interaction between gender and group composition on the competency ratings as well as a correlation between gender and competence evaluation. The findings of this study could help explain the existence and occurrence of minority to minority discrimination; specifically, how the perception of social norms and the environment play a role in discrimination among minorities.

Minority on Minority Discrimination: Impact of Majority Social Norm Perception

Although prejudice and discrimination has been the topics of much research in the past, there is not a great deal of agreement as to the origins of prejudice. Crandall, Eshlemma, and O'Brien (2002) define prejudice as the negative evaluation of a group or individual on the basis of group (i.e. race) membership, while discrimination is described as the act of expressing prejudice towards others. Fein and Spencer (1997) have proposed that prejudice is actually a self-esteem maintaining mechanism, which could be why people lash out at unpopular groups. Others have suggested that the reason for prejudice was to boost one's self-worth as well as to protect the self (Kunda & Sinclair, 1999; Kunda & Spencer, 2003). Having negative views of others or treating other groups in an unfair manner is one method by which individuals can feel better about themselves or their own groups.

Social Norms

One of the oldest definitions of prejudice was provided by Allport. In his book, *The Nature of Prejudice*, Allport (1954) stated that "prejudice is basically a trait of personality" and how, like personality, prejudice is both coherent and consistent. However, Allport's view had not held up to later works on prejudice and its validity has been questioned (e.g., Nelson, 2002; Reynolds, Turner, Haslam, & Ryan, 2001). As early as 1976, the possibility of another predictor of prejudice, environmental factors, has been raised (Foley, 1976).

One aspect of the environment that has been shown to impact the expression of prejudice and discrimination is the social approval of such behavior via the social norms of a group. Shapiro and Neuberg (2008) conducted multiple studies examining how Black college students discriminated against another minority group, Native Americans, in accordance with the perceived social norm. They utilized Native

Americans as the stigmatized group since there was a perceived negative norm of Whites having a low opinion of this race on campus. Their study found that audience composition (or a group one is expected to work with) could alter the pattern of prejudiced behavior. In a public setting, Black males in the majority condition, or a group composed of all Whites, expressed greater discrimination than those placed in the minority condition, a group composed of all Black members. However, when Black males were faced with a Black audience, they rated the Native American job applicant as being more competent than the White applicant. Shapiro and Neuberg (2008) attributed this change to a need to conform to social norms when confronted with the racial majority and suggested that minority discrimination thus stems from environmental factors.

Recent prejudice studies have even taken the environmental explanation further by focusing on a combination of three areas as influential prejudice predictors: personality and attitude systems, cognitive dynamics, and social norms (Pettigrew, 1991).

Minority to Minority Prejudice

Researchers have conducted a great deal of studies on the topics of prejudice and discrimination, especially in terms of race. However, lately there has been more research concerned with the matter of racial prejudice specifically between minority groups and/or racial discrimination within one's own ethnic group or against other minority groups.

In particular, of all the minority groups, Asians are one of the most difficult to categorize into one ethnic group. Despite the fact that the outgroup tends to perceive Asians as one group, there are, in fact, so many different subgroups that a cohesive and general labeling is almost impossible without committing the error of over or under-generalizing (Siu, 1996). Disregarding ethnic group variations between Korean,

Japanese, Chinese, Vietnamese, and etc., there are within group differences as well such as the difference between a wealthy, well-education, English-speaking individual from Hong Kong as compared to a poor, poorly educated, non-English speaking individual from China (Kwong, 1987). Thus, Asian ingroup members tend to differentiate themselves from other Asian subgroups. For example, Korean students have distanced themselves from other Southeast Asian students in order to not be associated or perceived as “welfare sponges” (Lee, 1996).

However, according to Rudman, Feinberg, and Fairchild (2002), the Asian minority group would most likely express significant ingroup bias, where group members show favoritism toward members of their own group, in regards to both explicit and implicit measures.

Additionally, Asian Americans have been hailed as the so-called model minority (Lee, 1996) which is accompanied by a unique set of stereotypes. Oyserman and Sakamoto (1997) have found that Asian Americans believe that non-Asians perceive them as intelligent and hard-working and that “there are some kernels of truth” in these perceptions.

In this current study, the focus of investigation was placed on social norms or environmental cues as predictors of prejudice. Social norms were social blueprints that dictate who should discriminate against whom and were strong predictors of prejudice expressions (Crandall, Eshleman, & O’Brien, 2002). People internalized social norms for several reasons; one of which was to please the majority. Normally, a person would feel uncomfortable expressing prejudice against protected groups (e.g. disabled, racial minorities, etc.) (Crandall, Eshleman, & O’Brien, 2002); however, a motivation to conform to social norms and please the majority was to decrease discrimination toward oneself (Shapiro and Neuberg, 2008). Moreover, minorities such as Blacks recognize that Whites do discriminate against individuals of minority

groups (Niemann, Jennings, Rozelle, Baxter, & Sullivan, 1994) and anticipated themselves as potential targets for prejudice.

Current Study

In the current study, we hoped to examine the extent to which a racial minority group member would reflect majority social norms in evaluating another minority group individual during a group interaction task. The groups were composed of either the racial majority group, one's own racial minority group, or a mixed group composed of both racial majority and minority members. We hypothesized that minorities were more likely to express prejudice and discrimination towards another racial minority than towards the majority (Whites) when in the all majority group, but were less likely to do so when in the minority racial group. Therefore, competency rating would be highest when rating took place in the minority setting and rating would be lowest when rating took place in the majority setting. No predictions were made for the mixed group setting so this would be an opportunity to observe how social norms would dictate behavior in an ambiguous setting.

Additionally, past research has suggested that men are more likely to express prejudices against other social groups when compared to women (e.g. Altemeyer, 1988; Sidanius, Cling & Pratto, 1991; Whiteley, 1999) and women report having higher levels of empathy than men (Eisenberg & Lennon, 1983; Schieman & Van Gundy, 2000). Since lower levels of prejudice expression have been associated with empathy (Batson, Chang, Orr & Rowland, 2002; Batson et al., 1997), women may be less likely to discriminate against the job applicants than the men. Thus, it is expected that women would be more likely to rate the minority and majority target individual higher than their gender counterparts would.

Methods

Participants

There were a total of 92 participants who volunteered as part of their university Psychology survey course experimental course requirement. Of those who participated, there were 34 Asian (17 female, 17 male), 45 White/Caucasian (24 female, 21 male), 6 South Asian/Indian (2 female, 4 male), 2 Black/African American (1 female, 1 male), 1 Hispanic (1 female), and 3 of unspecified races (1 female, 2 male). The participant's ages ranged between 18 to 23 years. For the purposes of this analysis, the current study focused on the Asian participants.

Materials

In order to select the appropriate stigmatized group to be rated, a survey was given to 47 individuals of a university psychology course to test the social norms on campus. Students were asked to rate twelve different campus groups that represented specific racial groups, gender orientations, religious beliefs, and social circles (i.e. fraternities and sororities) in terms of their attitudes and beliefs about these organizations. Some questions that were asked were "What's your opinion of these groups on campus?", "How likely to choose to become team member?" and etc. The responses were measured on a Likert-like scale of one (lowest opinion/ least likely) to seven (highest opinion/ most likely).

The results of this survey revealed that, on average, the student body on campus had the lowest opinion of international Koreans and the highest opinion of Whites and South Asians (Indians). Thus, the minority and majority job applicant stimuli, or the races that would be representative of a discriminated and non-discriminated group on this college campus, was decided to be Koreans and Whites, respectively.

Job-Applicant Task. This evaluative measures test was meant to engage the

participants to evaluate either the White or Asian-Korean job applicant and determine the potential of the applicant in becoming a finance company employee. A resume and description of the job was provided along with a set of 11 questions (Cronbach's $\alpha = 0.94$) that evaluated the hypothetical applicant in three areas: organizational fit, general application, and general recommendation (see Appendix A). For example, a question was "How likely is it that this person will be a productive contributor as an employee?" or "How competent is this candidate?" These questions are rated on a Likert-type scale of 1 (not at all) to 9 (extremely). The job description and the resume for both the White and Asian-Korean applicant were the same except for the applicant's names, race, and picture.

Photographs. The photographs used to manipulate group composition were taken via online sources e.g. Facebook and the other descriptors (name, age, and race) were fabricated. The pictures consisted of four males and four females for each of the following races: White/Caucasian, Asian, African American, Hispanic/Latino, South Asian/Indian; the pictures were cropped as headshots or like photographs used for identification cards. The pictures of the male job applicants (White/Caucasian and Asian-Korean) were also obtained from online sources.

Proof-reading Task. A paragraph was taken from Herbert Simon's *The Sciences of the Artificial* (1996) and was altered such that there would be multiple grammatical mistakes and typos (see Appendix B). The participants were then asked to find as many errors as possible and rewrite a correct version.

Problem-solving Task. Various cognitive tasks were presented where the participant was first asked to solve and then evaluate their own problem-solving process (see Appendix C). For the first problem, the participant needed to determine whether the two figures were the same or different (Delvenne et al., 2004). The second task asked people to decide whether the prism figure was possible, meaning

having no structural violations, or impossible, meaning having structural violations (Williams & Tarr, 1997). The last problem was a famous cryptarithmic puzzle (DONALD + GERALD = ROBERT) that required each letter to be replaced uniquely with a number from 0-9. After each problem, the participant were asked questions such as “Rate the difficulty of this activity” and “To what extent was completing this activity on a computer beneficial to coming up with a solution?”

Design

For the purposes of analysis, only Asian participants were selected as the focal minority group. The design employed was a 2 (job-applicant race: White/Caucasian vs. Korean) x 3 (group composition: all majority vs. all minority vs. mix of both). Participants were randomly assigned to one of the experimental conditions and their evaluations of the job applicants were compared.

This experiment was designed on a website using an online survey tool, SurveyMonkey.com, in order to increase the number of participants as well as emphasize the cover story for this study. Because this study depended heavily on having the participant believe that he or she was part of a group composed of other participants, several techniques were employed in order to ensure that the imaginary group was as realistic as possible.

One strategy was for the stimulus group participants to be represented by pictures and basic information (e.g. name, age, gender) presented on the top or side of the webpage. This detail was meant to enforce a public condition where the participant realized that his or her evaluations would be known to the other participants as well. Another strategy was asking participants to submit some available times for a fabricated second part of the experiment for which they may or may not be chosen to attend at a later time. The participants were told that if selected he or she would subsequently meet with their other group members to discuss their

responses, evaluate each other, and engage in a few problem-solving activities as a group. However, ultimately, the intention was to simply give the impression of having to work with other participants so no second part of the study did actually occur.

Since participant suspicion was often an issue in prejudice studies, a cover story was used. Participants were told that the experiment examined decision-making online compared to decision-making interactions when in person and in a group. In actuality, the participant would perform tasks in one of three group compositions: the presence of a group composed of the racial majority, a group composed of one's own race members, or a “mixed” group composed of racial majority and one's own racial minority individuals.

Procedures

The experiment was conducted online through SurveyMonkey.com and the participants accessed the study via a URL link sent through email by the experimenter. The participant was asked to electronically sign the informed consent and to fill in his or her general information (e.g. race, gender, age, etc). There were in total three tasks that the participant was asked to complete: a proof-reading task, an applicant evaluation task, and a problem-solving task. After the first task was completed, the participant was randomly assigned to evaluate either a minority (i.e. Korean) or majority (i.e. White/Caucasian) applicant who was applying for a position at a finance firm. With each applicant, a copy of their resume, picture, and the job description was provided as well. Afterwards, a problem-solving task was presented with various cognitive questions; participants were asked to solve and then evaluate their own problem solving processes. Lastly, the participant was probed for suspicions and debriefed according to the guidelines for ethical treatment of research participants provided by the American Psychological Association (APA).

Results

It was hypothesized that ratings of the minority applicants would be higher in the minority group composition condition than in the majority group composition. Unlike what was predicted, no significant interaction was found between Group Composition x Job Applicant Race ANOVA and the competence measures, $F(1, 24) = 0.796$, $\rho = .463$, partial $\eta^2 = 0.004$. However, for the question (“How competent is this candidate?”) a significant main effect for Job Applicant Race was observed, $F(1, 24) = 4.50$, $\rho = .044$. In this case, the Asian participants had overall evaluated the Asian applicant as being more competent ($M = 7.63$, $SD = 0.484$) than the White applicant ($M = 6.78$, $SD = 0.244$).

Table 1. Means of Competence Ratings for White and Asian Job Applicants (Stimuli)

TargetRace	Mean	Std. Error
White applicant	6.783	.244
Asian applicant	7.625	.484

It was also predicted that males would provide lower ratings of competency towards minority targets than females. Unexpectedly, for the same competence evaluation question, Group Composition x Gender ANOVA yielded a significant interaction, $F(2, 24) = 3.57$, $\rho = .044$, partial $\eta^2 = 0.01$, such that male participants in the majority group gave higher ratings ($M=7.00$, $SD = 0.55$) than in the minority condition ($M=6.33$, $SD = 0.56$), while females in the minority group rated higher ($M=7.90$, $SD = 0.67$) than when in the majority group ($M=6.95$, $SD = 0.51$). Both females ($M=7.50$, $SD = 0.56$) and males ($M=6.83$, $SD = 0.50$) in the mixed condition displayed behavior that was between the majority and minority settings.

Table 2. Means of Sex and Group Composition Interaction on Competence Measures

Sex	Group Composition	Mean	Std. Error
male	majority	7.000	.548
	mix	6.833	.500
	minority	6.333	.559
female	majority	6.950	.512
	mix	7.500	.559
	minority	7.900	.671

A significant correlation between gender and the competence evaluations (“To what extent would you recommend hiring his candidate” and “How qualified is this candidate for this job”) were seen, $r = .394$, $p = 0.21$ (two-tailed) and $r = .369$, $p = 0.32$ (two-tailed), respectively. This indicated that the females rated the job applicants higher than the male participants did and vice versa.

Discussion

Do minorities discriminate against other minorities? In order to answer this question, the following study investigated whether group conditions (i.e. all racial majority, all racial minority, and mixed majority and minority) and social norms would influence Asians to discriminate against another minority.

Even though it was expected that the all majority group condition would elicit a social-norm conscious response - where the target minority would be rated lower than the majority applicant – and an all minority condition would result in the minority applicant being rated higher than the majority applicant, this anticipated behavior was not observed. There was no significant interaction found between group composition, job applicant race, and the competence measurements, which also implies that the mixed group condition would have no noticeable effect on the minority or majority competency evaluations either.

Despite the fact that the current study was modeled after Shapiro and

Neuberg's (2008) study, the results obtained were not the same. Perhaps this difference in results obtained was due to several differences between their study and ours. First, rather than Blacks, we observed Asians who may not perceive themselves as one cohesive group but as part of smaller subgroups. Also, even though we chose the most discriminated group on campus, there may have still been some type of ingroup bias leading to higher than expected ratings.

Our results indicated that Asian participants rated the Asian job applicant as being more competent than the White applicant. One reason could be because of ingroup bias where group members showed favoritism toward members of their own group. Because the focal minority group of study was Asians and the target minority applicant was also Asian, the participants may very well have identified with the job applicant and viewed him in more positive terms than the outgroup White applicant (Tajfel, 1969; Tajfel et al., 1971). Similarly, the categorization-competition hypothesis states that because there was only one out-group (Whites), the feelings of competition that arose from the salient categorization of races result in strong intergroup biases. By utilizing the ingroup favoritism effect, the interests of the Asian group member (i.e. getting a job) are protected in the competition with the outgroup (Tajfel & Turner, 1986).

However, ingroup favoritism doesn't necessary mean rejection of the outgroup. Both applicants were rated high with the only difference being that Asian applicant was given a more positive evaluation. A key factor affecting decisions such as the one presented in the evaluation task could be the concern for fairness. In a similar study, Dovidio and Gaertner (2000) showed that even though White college students showed a preference to hire a fellow ingroup member over an outgroup (Black) student, they had still recommended hiring the Black candidate 45 percent of the time.

Because Asians believe that they are held at a more socially-desirable status, it

may be that they feel less pressure to conform to majority (White) social norms as other minorities do. Especially in higher education settings (e.g. universities) where academics tend to be the focus, an Asian individual could feel comfortable enough so as to not conform and discriminate against another minority member.

Another difference between the Shapiro and Neuberg (2008) study was that the experiment was computer-based rather than conducted in person. With the increasing use of the internet in establishing social networks, there has been an abundance of studies that describe a behavior known as the online disinhibition effect (Suler, 2004). The online disinhibition effect explains how people are more likely to self-disclose or act more frequently or intensely than they would in person. For the very same reason, a participant taking a study online may not display the same behavior that would be observed in a lab setting, which could potentially explain the difference between our results and Shapiro and Neuberg's (2008) findings. People care about what other people think and it is possible that the group member pictures are not sufficient enough stimuli to invoke a desire in participants to strategically conform to social norms (Cialdini & Goldstein, 2004; Cialdini & Trost, 1998; Jones & Wortman, 1973; Klimoski & Inks, 1990; Pennington & Schlenker, 1999; Tetlock, 1983).

It is also possible that in the current study there was not enough of an incentive for the participants to conform to the majority social norm. In Shapiro and Neuberg's (2008) study, a monetary incentive was offered as a means of inciting the need to conform based on what the Black participants perceived to be majority group attitudes toward another minority group. The story was that participants would come together to discuss their results and vote on one individual of the group to be entered into a raffle to receive the reward. Because the minority participants felt a greater need to be favored by the White majority, they were, thus, more likely to employ the

strategy of publicly discriminating against a perceived stigmatized minority group. However, a monetary incentive wasn't offered in this study so it is likely that there wasn't enough reason for the Asian participants to discriminate against another minority (or in this case, their own ingroup) and favor the majority.

Gender and Group Composition and Competency

A main effect of job applicant race as well as an unexpected interaction between group composition and gender was found to be significant for the ratings. We hypothesized that women would rate both job applicants higher than men and the men indeed did rate the job applicants lower than the women did.

Results have indicated that there is a relationship between gender and competency ratings. Female participants had evaluated both job candidates, on average, higher than the male participants had. One possibility could be that minority women reported and expected to experience less prejudice than minority men do (Broman et al., 2000; Crocker et al., 1999; Sellers & Shelton, 2003). Since there was lower sensitivity and expectations to being personally discriminated against, it was possible that women empathized with the job candidates and scored them higher. Minority men, on the other hand, were more likely to publicly discriminate since they believed that they experience higher levels of prejudice from the majority (e.g. Broman, Mavaddat, & Hsu, 2000; Crocker et al., 1999; Sellers & Shelton, 2003). One's expectation of other's behaviors or social norms would influence one's perception of discrimination, which in turns would affect our own behavior towards others.

Furthermore, depending on what group the individual was assigned to and the participant gender, an effect was observed on the competency ratings of the job applicants. The male and female participants displayed a reversal of behavior in the sense that males rated the applicants higher when accountable to White men and

lower when accountable to Asian men; however, the women when grouped with Asian women overall evaluated the candidates as more competent than when in a group with White women. This observation was consistent with the findings of Shapiro and Neuberg (2008) where Black men displayed greater expressions of prejudice than Black women in a public setting. The authors cited perceived social norm conformity as the source of such behavior; moreover, Black men especially, anticipated the need to conform and discriminate more strongly against the minority applicant as a strategy to ensure favor from the White group members. Since Black men expected to be discriminated against more so than women do, their behavior would display this anticipated pattern. Similarly, the Asian males also felt the pressure to express stronger discriminatory behavior when accountable to Whites than when accountable to their own race.

The women results were also consistent with past studies. Both Black men and women recognized and were concerned with being negatively discriminated against by White individuals of their own respective genders (Mendoza-Denton et al., 2002; Pinel, 1999; Shelton & Richeson, 2005; Walton & Cohen, 2007), and, thus, Asian women may have felt less comfortable when with White females than with Asian females. Another possibility was that there was a social norm present that may be different from what the study intended. Since Asians were expected to act as the “model minority,” the Asian females may have been under the impression that White group members expected intelligent and carefully thought-out responses from them. Also, because females, in general, experience higher anxiety and greater self-consciousness compared to men (Striegel-Moore, Silberstein, & Rodin, 1993), the competence measure could have implicitly represented a social measure of how “model minority-like” an Asian individual was. Thus, the Asian females were likely to respond more conservatively and evaluated both candidates as less competent when in

the presence of the majority than with their own race.

The mixed group compositions were found to be in between the majority and minority group influenced competence measures. An explanation for this observation could be how, because the mixed groups were composed of equal numbers of Asian and White individuals, the participants felt less pressure to conform when compared to those in the all majority condition but still enough to discriminate against the Asian candidate more than those in the all minority group. In this case, the need to conform to social norms was balanced with the participant's true feelings and could be seen as somewhat similar to what would be anticipated in a real-world situation. The group conditions of all majority and all minority are not typical of what would be usually seen in situations where minority to minority discriminations occur. Often there is a mix of many different races and, depending on the exact composition of that group, minority individuals would act accordingly.

Strengths and Limitations

The following study had several strengths. We focused on the less researched topic of minority on minority discrimination and, since minorities currently represent the majority of America's workforce, it was important to attenuate to their needs as well as those of the majority (McGrane & White, 2007). Moreover, often in the world, the race compositions are not all White or all Asian as assumed in previous studies; rather, crowds are composed of people of different races in different proportions. The mixed group condition offered some insight as to what external motivation was required in order for minority-minority discrimination to occur as well as how such behavior would take place in a real world-like scenario.

One limitation of the study is that when probed for suspicion, some of the participants said that the group composition was not believable; they stated that it would be highly unlikely to get all participants of one minority race (especially one's

own) and didn't believe that one could not know any of the other group members. The reason for this is most likely because, having a small undergraduate population of about 5,000 students, Carnegie Mellon University (CMU) offered a particular environment that doesn't necessarily reflect what would be seen at a larger university or in the United States. On campus, people were a lot less likely to be "lost in the greater student body," so to speak, and so students were more likely to know and recognize each other. Minority groups such as Asians are often quite tight knit due to their small numbers and are more likely to break off into even more specific groups (e.g. Japanese, Korean, Chinese, Malaysian, etc.). Thus, because there was such a small population of minorities on campus, it was also difficult to get the proper number of Asians necessary to get generalizable experimental results, which may have also contributed to the lack of significant interaction.

Implications and Future Directions

Social norms were a method of adaptation that allowed people to predict expressions of prejudice, reactions toward discrimination, and reactions to hostile expressions (Crandall, Eshleman, & O'Brien, 2002). However, at the same time, social norms could also be employed to incite prejudice attitudes and discriminatory behavior. The findings of this study have not only investigated the extent to which social norms influenced prejudiced behavior but also how these applied to minority against minority discrimination.

In terms of future directions, it would be valuable to consider investigating more situations where the environmental cues to conform to social norms are somewhat vague, as is the case with the mixed group condition. In such instances, would the individual conform and favor the majority or favor a minority group member like him or herself and ignore the social norm? As the findings of this study suggested, the individual would weigh out social norms (which may differ depending

on gender) with his or her true attitudes and find a balance between the two. However, more work needs to be done on internal motivation and the act of internalizing social norms. When would individuals truly become advocates of a social norm? Also, what were the prejudice suppressions that occur with the adopting of majority attitudes? The individual must have had some original views that might have been displaced or integrated when new social norms were presented. These are all interesting questions that have yet to be thoroughly explored and should be the direction for future works in this area.

Conclusions

The current study wanted to dispel the myth that racial minorities do not discriminate against other racial minorities by hypothesizing that the internalization of majority social norms would influence minorities to discriminate against other minorities when in the presence of certain groups (i.e. racial majority group members). However, this discriminatory behavior was not observed but rather a link between gender and group composition was seen. This finding indicated that male and female minorities have different social norm perceptions and concerns that also contribute to expressions of prejudice. Prejudice is no longer, as Allport (1954) described, simply “a trait of personality” but rather a dynamic, multi-factored phenomenon that embodies both internal and external predictors. Thus, in order to understand prejudice, especially minority-minority prejudice, it would be beneficial to investigate prejudice with the view that this behavior exists in a dynamic system of social interactions and other factors (Shapiro & Neuberg, 2008).

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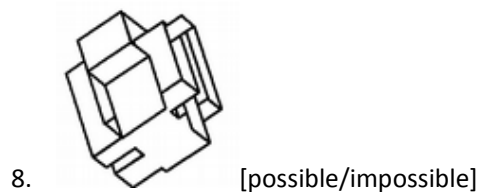
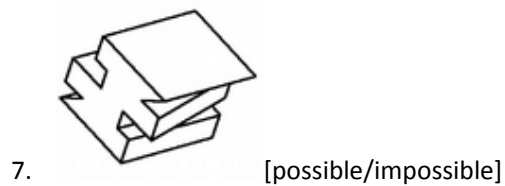
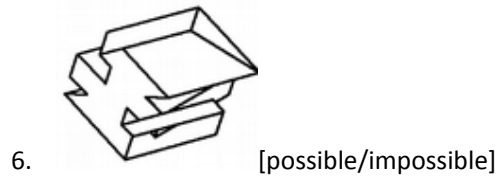
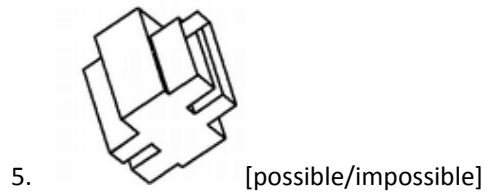
Appendix B

Example of Proof-Reading Task

Instructions: Please find as many grammatical errors as possible in the following paragraph and retype the corrected version in the text box below.

“An thinking human beening is a adaptive system; men’s goals defyne the interface between they’re inner and outr environments. Including in the latter their memory stores. To the extent that they are effectived adaptive, they’re behavior Will reflect characteristics largely of the outeR environment (in the light of their goals) and will reveal? Only a few leemiting property of the inner environment – of the fysiological machinerry which enabling a person to think.”

*Reference: Simon, H.A. (1996). The sciences of the artificial (3rd ed.). Cambridge, MA: The MIT Press.



*Reference: Williams, P. & Tarr, M.J. (1997). Structural processing and implicit memory for possible and impossible figures. *Journal of Experimental Psychology*, 23(6), 1344-1361.

Questions:

1. Rate the difficulty of entire activity.

1	2	3	4	5	6	7	8	9
Not at all								Extremely

2. How much time(t) did it take you to complete each problem?

1	2	3	4	5	6	7	8	9
t < 30 seconds	30 secs ≥ t > 1 minute	1 min ≥ t > 5 mins	5 mins ≥ t > 10 mins	10 mins ≥ t > 15 mins	15 mins ≥ t > 20 mins	20 mins ≥ t > 25 mins	25 mins ≥ t > 30 mins	t > 30 mins

3. Please describe as detailed a record as possible of your thinking and decisions as you completed this activity.

4. To what extent was completing this activity on a computer beneficial to coming up with a solution?

