Mental and Physical Distraction's Relationship with Judgment Heuristics: Cognitive Taxation's Connection to Stereotyping

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Abstract

The aim of this study was to investigate the impact of distraction on stereotyping behavior to determine whether, as cognitive load is increased, individuals rely on stereotypes to a greater extent. A total of 153 participants (two were excluded from analyses) completed a judgment task where they read a summary of a hypothetical criminal offense and assigned a prison sentence, as well as rated their perception of the severity of the crime and impression of the defendant. A 3 x 2 factorial design was used in which participants were split into three conditions based on distraction; group one received no-distraction, group two was faced with a mental distraction and, group three was physically distracted. Half of each of these groups was exposed to either a White or Black defendant. Next, participants completed an Implicit Association Test (IAT) to evaluate implicit biases. We hypothesized that individuals who were mentally or physically distracted would give longer prison sentences and less favorable impressions of the crime and the defendant when he was Black as opposed to White, than non-distracted participants. The results did not support the hypothesis as no statistically significant interaction was found between distraction and the defendant's race in regards to the dependent measures. The mental and physical distractions may have failed to cognitively tax the participants enough to promote enhanced use of judgment heuristics and stereotyping. Future research directions are discussed that present alternative explorations of this relationship.

Mental and Physical Distraction's Influence on Judgment Heuristics: Cognitive Taxation's Connection to Stereotyping

Increased awareness of multiculturalism and diversity has prompted investigations into what promotes stereotyping (generalizing about members of a group), prejudice (a prejudgment – typically negative – about a group), and discrimination (treating members of a group unfairly) (Plous, 2003). This research has elucidated that such beliefs and behavior are negatively correlated with cognitive processing abilities (Allport, 1954; Fiske & Pavelchak, 1986; Macrae, Milne & Bodenhausen, 1994; Hadjimarcou & Hu, 1999; Fiske, 2004). Through analysis of the impact of distraction on stereotyping, psychologists have been able to demonstrate that decreased cognitive load can lead to increased reliance on judgment heuristics (Bodenhausen, 1990; Gilbert & Hixon, 1991; Miarmi & DeBono, 2007).

Yet, there are other factors, such as priming, that can influence stereotyping. While data illustrates that certain mental primers result in an individual being more likely to stereotype (Bargh, Chen & Burrows, 1996; Ric, 2004), it has also been established that levels of engagement in this mode of thinking can be affected by particular gestures and physical actions (Dutton & Aron, 1974; Förster & Strack, 1996; Soussignan, 2002; Markman & Brendl, 2005; Ito, Chiao, Devine, Lorig & Cacioppo, 2006; Alexopoulos & Ric, 2009; Chandler & Schwarz, 2009; Schubert & Koole, 2009). This latter connection, in which physical positioning or motions unconsciously alter the mind, has been dubbed embodied cognition. While mental processing capabilities and primers can influence stereotyping, psychologists argue

that categorization and the use of mental shortcuts is the mediator, which links the initial manipulations to use of generalizations about a group and its members.

Allport, in his influential book The Nature of Prejudice, first introduced the concept that people use categorization to simplify information processing (1954). He pointed out that in interpersonal interactions and perceptions, people categorize others based on outward characteristics such as age, gender or race. He theorized that new information is then placed into clusters that are generated based on these extrinsic categories. Allport concluded that this act of social categorization of others as members of an outgroup ineluctably leads to stereotyping, prejudice, and discrimination.

While research on stereotyping has progressed, the idea that it is entirely a cognitive phenomenon has expanded to include the role of motivation (Fiske, 2004). Fiske points out that people aren't "cognitive misers but are motivated tacticians" (2004, p. 122). While she acknowledges that stereotyping is a result of a desire to simplify processing, she believes that individual's motivations also play a role. To illustrate this she created a continuum of impression formation. On one end, if the perceiver does not find any compelling information that counters their stereotype, they do not question their generalization. However, if the perceiver is motivated to look further, or information about the individual that contradicts the stereotype emerges, then s/he attempt to reconfirm the initial categorization, subtype, or change the category to fit the individual. Finally, the opposite end of the continuum consists of individuated impression, which occurs when the perceiver is highly motivated to avoid stereotyping (Fiske, 2004). This proposal expands Allport's

theory that stereotyping results from an effort to simplify perception and mental tasks, and builds these author's claims, which have been investigated in numerous studies.

Assessment of distractions as taxing of cognitive abilities corroborates the belief that mental load and stereotyping are correlated. While a distracter requires people to withdraw some of their attention from their undertaking, researchers have found that distractions also cause individuals to process information peripherally, thus inhibiting their dominant response to a situation (Petty, Wells and Brock, 1976). This results in the use of heuristics to expedite the task and can lead to stereotyping as a result of peripheral processing. This concept is explained by the Central Capacity Sharing model, which discusses the impact of dual-task situations on individuals (Tombu & Jolicoeur, 2003). The theory argues that despite humans being able to sort and comprehend multiple stimuli simultaneously, shared processing capacity results in both tasks being completed more inefficiently.

Investigation of complex situations has also indicated that heuristics are used to ease completion of tasks. Hadjimarcou and Hu (1999) found that endeavors were approached in one of two ways, depending on their complexity. If the task were simple, it would be approached in a piecemeal fashion in which the situation was analyzed based on its current features as opposed to preconceived categories and beliefs. Alternatively, when participants were faced with more complex tasks, they evaluated the stimulus using a category-based approach, and made generalizations based on past knowledge and experience. When coupled with the aforementioned theories, it can be contended that when faced with a task for which one's capabilities

are insufficient (either because it is complex and/or the individual is distracted), individuals choose a heuristic, or category-based approach. Categorization of individuals leads to stereotyping since the perceiver views the target as fitting the traits of their category-members instead of evaluating him or her as an individual. This theory, that decreased ability to process information causes the individual to rely on heuristics to make decisions, has been confirmed in numerous studies.

In support of the aforementioned theories and findings, a study by Andersen, Klatzky and Murray demonstrates that stereotypes are more efficient tools for making social judgments and are also more powerful encoding devices in terms of subjects' recollection of information. In 1990, Andersen, Klatzky and Murray conducted an experiment in which participants were asked to identify whether a target individual would complete a described action or not. Depending on the condition, the target would be defined using stereotypes or personality traits. The authors found that participants were not only significantly quicker at answering the questions when stereotypes were used as opposed to traits, but participants also recalled the stereotypes more accurately. Through emphasizing the evolutionary advantages to stereotyping, this research supports the contention that stereotyping simplifies mental processing (Allport, 1954; Fiske & Pavelchak, 1986; Fiske, 2004).

Further evidence to support the concept that heuristics are used to complete tasks was generated by the research of Macrae, Milne and Bodenhausen (1994). These authors established that a primary task, viz. impression formation of a target, could be simplified by embedding stereotypes, resulting in the participant using fewer cognitive resources and enhancing secondary task performance (reading and

recalling a prose passage). In follow-up studies, the researchers found that stereotyping is unintentional and occurs without the perceiver's awareness. While this adds to the evidence that stereotyping is an adaptive process used to simplify mental processing, other research has investigated the particulars of this relationship.

The findings of Gilbert and Hixon (1991) support the positions of Allport (1954), Fiske (2004), Macrae, Milne and Bodenhausen (1994) and others. Gilbert and Hixon indicated that participants who were busy/distracted showed less stereotype activation but were more likely to apply these stereotypes than non-busy participants. They pointed out that activation occurs in certain instances when an individual is exposed to cues regarding stereotype relevant traits and, that this must occur before an individual applies these stereotypes to their judgments and perceptions. Gilbert and Hixon's findings establish that people are more likely to use activated stereotypes when their cognitive resources are diminished. Conversely, when they have the time and ability to analyze the situation and individual, they are less likely to apply the stereotypes that are activated within their mind, because they have the cognitive resources to regulate their behavior. In corroboration with the contention that cognitive load is positively correlated with stereotyping, Galen Bodenhausen (1990) further investigated this relationship by assessing the effect of circadian rhythms on people's processing abilities.

Bodenhausen conducted two studies to examine the relationship between circadian rhythms and stereotyping. He hypothesized that as people's mental processes were depleted by operating at times of the day that opposed their natural

cycle, they would be more likely to rely on stereotypes to simplify their judgments. In his first study, he tested the participants' likelihood of committing a conjunction fallacy: the incorrect belief that the probability of two events is greater than the probability of either event occurring in isolation. He found that individuals were more likely to make a mistake when they were tested at a time that opposed their circadian rhythms. In his second study, he had participants determine the guilt of another college student. Using a 3 (time of testing) x 2 (personality type: am or pm) x 2 (stereotype activation) factorial design, Bodenhausen found a statistically significant interaction amongst the three factors: morning-type individuals perceived stereotyped targets as more likely to be guilty in the afternoon/evening, while evening-type individuals showed the same tendency in the morning. In support of Allport's theory, Bodenhausen attributed these results to an increased mental load resulting in decreased processing abilities, which then reduced regulation and produced an emphasis on categorization-based decision-making. The possibility that cognitive load is positively correlated with stereotyping invites the question of whether the same results would be observed if mental taxation were induced by a simple distraction.

Miarmi and DeBono's (2007) study substantiated this relationship. The researchers created two conditions for their experiment. Participants assigned to the first condition were shown a summary of a criminal offense, asked to rate their impression of the defendant, and assign the guilty party a prison sentence ranging from zero to 60 years. In the other condition, the participants completed the same tasks but were distracted with pop-up advertisements every 15 seconds. The

researchers maintained that these distractions would not interfere with the individual's processing on a conscious level. In both no-distraction conditions, half of the participants were informed that the defendant was White while the other half was told that he was Black. The average sentence given to Black defendants was significantly higher when the participants were distracted. This supports the idea that stereotyping predominates when mental processing abilities are limited. The connection of stereotyping behavior to the influence of factors (such as cognitive load) is also illustrated in regards to external stimuli and primers.

Exploration of the unconscious mind has substantiated the idea that an individual's physical behavior can be altered by subtly priming the subject with a concept (Bargh, Chen & Burrows, 1996). In 2004, François Ric found that primed thoughts could also affect the stereotyping behavior of a person. He found that activation of information related to sadness increased reliance on stereotypes, while happiness was a deterrent. These results helped to establish the important role that mental primers can have on the subconscious attitudes of an individual.

Research indicates that a person is not solely influenced by his/her mental state but also by physical actions and positioning. Dutton and Aron's (1974) findings provoked a new line of thought within psychology and spurred numerous investigations into embodied cognition. Their research established that the physical state of the body at any given time shapes how one interprets and interacts with the world at that moment. Dutton and Aron found that when an attractive female confederate approached male participants on a rickety, as opposed to a stable, bridge, they were more likely to attempt post-experimental contact and include

sexual content in their questionnaire. The researchers argued that the participants misinterpreted the physical arousal caused by the bridge as sexual arousal, resulting in changed behavior and thought processes. Subsequent studies' results demonstrated that simple actions, such as surreptitiously being made to smile or frown, alters how one interprets and reacts to events (Förster & Strack, 1996; Soussignan, 2002; Chandler & Schwarz, 2009). Research shows each of these actions is linked to a mental construct that is initiated upon activation of the behavior.

The priming of certain concepts by a corporeal behavior have illustrated that an individual's cognitive processing is inextricably linked to their body's individual location at that particular moment. A landmark study by Ito, Chiao, Devine, Lorig & Cacioppo (2006) examined the relationship between forced facial expressions and emotion, as well as how this affects an individual's biases. Findings revealed that participants who were in the smiling condition had less biased results than individuals in the control condition. Studies such as these have applied the concept of embodied cognition to stereotyping and discovered that simple physical actions can alter one's tendency to stereotype (Ito, Chiao, Devine, Lorig & Cacioppo, 2006; Alexopoulos & Ric, 2009). This research has illustrated that both mental and physical priming can influence stereotyping behavior. That this relationship is congruent between both the mind and the body hints that the same dynamic may exist between mental and physical distractions on stereotypic thinking.

Although there is a lack of information focusing on stereotyping, the effect of combined physical and mental tasks (thus a physical distraction) has illustrated

decreased performance in either, or both, areas (Srygley, Mirelman, Herman, Giladi & Hausdorff, 2009; Herman, Mirelman, Giladi, Schweiger & Hausdorff, 2010). Srygley et al. (2009) assessed the effects of a physical behavior (walking or sitting) on the performance of three cognitive tasks (phoneme monitoring, serial three subtraction, and serial seven subtraction). The researchers found that walking had a greater effect on mental performance than sitting, but is dependent on the task and the executive functioning capabilities of the individual. The results indicated that as aging diminished executive function and as task difficulty increased (e.g. serial seven subtractions as opposed to serial three), the participant's performance on the cognitive tasks decreased (Srygley, 1990). Srygley et al. were also able to establish that this effect held true for young adults.

Herman, Mirelman, Giladi, Schweiger and Hausdorff (2010) further supported these findings by illustrating that higher-level mental abilities in the frontal lobes are imperative for processing dual tasks (serial three and serial seven subtractions) while engaging in the physical activity of walking. They also demonstrated that walking requires executive control to prevent falls. This relationship, coupled with the established claim that decreased cognitive functioning is linked to stereotyping, implies that physical distractions will also increase stereotyping behavior. This premise is supported by the findings of Bodenhausen (1990), Gilbert & Hixon (1991), Macrae, Milne & Bodenhausen (1994), Miarmi & DeBono (2007) as well as others, and the theories of Allport (1954), Fiske & Pavelchak (1986), Hadjimarcou & Hu (1999), and Fiske (2004), which indicate that when individuals are not able to give their full attention to their evaluations of a

target, they are more likely to rely on stereotypes and category-based evaluations. Meanwhile, activating the body produces a taxing effect on mental abilities so it can be extrapolated that this cognitive burden will increase use of judgment heuristics (Srygley, Mirelman, Herman, Giladi & Hausdorff, 2009; Herman, Mirelman, Giladi, Schweiger & Hausdorff, 2010).

The intersection of these two concepts – the idea that when mental capacities are diminished stereotyping is more common and that physical actions can prime people to stereotype, has led to the following research question: is it possible that physical and mental distractions could instigate higher levels of stereotyping within an individual than a lack of either? As per the aforementioned research, I hypothesized that mental and physical distractions will elicit greater displays of stereotyping, as opposed to no distractions.

Method

Participants

Participants for this study were recruited through the Tufts University Human Participant pool (SONA). The 153 participants selected the study (named "wombat") from the list of randomly labeled studies posted on SONA. They were compensated for their time with one half-credit hour. Of these participants, there were a total of 87 females (56.9%) and 66 males (43.1%), ranging in age from 18 to 35 years old (M = 19.19, SD = *1.84*). The racial demographics of the study consisted of 112 (73.2%) White, 28 (18.3%) Asian, seven (4.6%) Spanish/Hispanic/Latino and six (3.9%) Black or African American participants. Although, all of the participants were retained for the duration of the study, two (both White males)

were excluded from the analysis as their results failed to save to the computer. This resulted in a subject pool of 151 participants (57.6% female, 72.8% White, 18.5% Asian, 4.6% Hispanic, and 4% Black).

Design

A two (race of the defendant: Black or White) x three (distraction task: no, mental, or physical distraction) between-subjects factorial design was used.

Materials

This study was conducted in the Tufts University Social Cognition Lab and administered via computer. The first part of the experiment evaluated explicit bias, while the second part consisted of a standard race (White vs. Black) and positive/negative word IAT (Implicit Association Test) used to measure implicit bias. The IAT was programmed using DirectRT and both sections were completed on MediaLab. Part one was adapted from Miarmi and DeBono's 2007 study. Additional questions, photos and instructions were included to adapt the scenario to the new manipulations and provide other data for analysis. A simple musical beat that was created on GarageBand was played through the computer's speakers in four of the six conditions (not the two control groups). Hard-copy consent, debriefing and demographic forms were administered. The answers from the demographic forms were then entered into a computer for analysis by the experimenter.

Procedure

Participants entered the lab and shared their SONA number with the experimenter (in order to ensure that credit was awarded) before being led to a

cubicle with a computer that had been preloaded with the experiment. Each participant was assigned to a condition based on his/her order of arrival. The experimenter then informed the participant of the length and general format of the study. After having any questions answered about the informed consent waiver, the participant then signed the document. The experimenter then gave directions for the first task and began the computer program.

Exercise One. The first exercise was a measure of explicit bias and consisted of a story and follow-up questions. Similar to Miarmi & DeBono's (2007) experiment, participants read background information about a hypothetical drunk driving incident that occurred on Christmas Eve, resulting in the death of a pedestrian.

Race and Distraction manipulations. Depending on the condition, the defendant was identified in a mug shot shown at the top of the scenario description page as being White or Black (See Figure 1 and Figure 2). If the participant was in the mental or physical distraction conditions, a simple beat (beep beep beep bing) was automatically played by MediaLab for the duration of the reading of the no-distraction summary by the participant. These participants then completed two of three tasks depending on their condition. If the effects of mental distraction were being tested, the participant was asked to remember the number of times that they heard a "bing". This involved (1) monitoring and distinguishing between the "beeps" and "bings" and (2) remembering the number of "bings". In the physical distraction condition, the participant was told to tap the table for each "beep" while completing the exercise. This also involved two tasks: (1) monitoring and

distinguishing between the "beeps" and "bings" and (2) physically tapping the table. In the control condition participants were not asked to do either task and the beat was not played. Once the participant had completed reading the summary of the case and began to answer questions, the beat stopped playing and they were able to complete the rest of the tasks in silence.

Dependent measures. After reading the description of the scenario, the participant was asked to assign the defendant a prison sentence (ranging from zero-60 years) and answer two questions on a one- to nine-point Likert-scale; the first asked participants to record their impression of the defendant (from extremely unfavorable to extremely favorable), while in the second they assessed the severity of the offense (from extremely severe to extremely minor). Participants were also asked to rate their perceived multi-tasking ability on another one- to nine- point Likert-scale (not good at all to very good), answer a manipulation check (if in the mental or physical distraction conditions), and were given an opportunity to write any comments about the experiment. To score the responses, participants' impressions of the defendant and their judgments of the severity of the crime were reverse coded. This ensured that higher responses for impression, severity, and sentence all corresponded to harsher interpretations of the crime.

Exercise Two. Upon finishing the first task, participants completed the Race IAT.

Dependent measures. The dependent measure for exercise two was the participant's difference in response times in regards to stereotype congruent, and non-congruent, pairs on the IAT.

After a demographic information sheet was completed, the experimenter answered any questions and provided the participants with a debriefing form, which included an explanation of the experiment as well as contact information for future inquiries or a copy of the finished study.

Results

Overview. The findings of this experiment failed to support the hypothesis. A one-way between-subjects ANOVA was used to compare the effects of distraction and the defendant's race on impression formation of the severity of the crime, likeability of the individual, and sentencing length. No statistically significant mean differences were found for the interaction of the distraction manipulation with the race of the defendant manipulation with respect to the three dependent variables: impression of the target, severity of the crime, and length of the prison sentence. Further analyses reinforced these results by ruling out multitasking ability and implicit bias levels as confounding variables. However, follow-up analyses investigating the impact of implicit bias levels on the measures illustrated a marginal interaction as well as other compelling results.

Manipulation Checks. The answers for the manipulation check questions were not included in the analyses as they failed to indicate how distracted the individuals were in each condition. After preliminary analysis, it was concluded that the answers did not provide usable information since there was no way to determine the actual number of beeps the individuals in the mental distraction condition were exposed to. Similarly, the question's self-report nature resulted in the answers being unreliable because, for example, an individual could claim to have

heard four bings (an extremely low number) and this would not elucidate whether the test subject simply made up an answer, was a rapid reader, or simply skimmed the no-distraction summary, resulting in them hearing fewer bings. The physical distraction question also lacked reliability since the accuracy of the participant's answer to how often they tapped in time with the beat could not be confirmed as their behavior was not recorded or observed. There was not a manipulation check for the no-distraction group.

Impression Rating. Using a Univariate ANOVA, it was determined that there was a main effect for distraction in regards to participants' impressions of the target, $F(2, 145) = 3.826$, $p = 0.024$. A post-hoc comparison using the Tukey HSD test indicated that the mean score for the no-distraction participants ($M = 7.572$, $SD = 0.201$, 95% CI [7.132, 7.929]) was significantly different than the mental distraction condition ($M = 6.790$, $SD = 0.200$, 95% CI [6.352, 7.141]). However, the physical distraction condition ($M = 7.167$, $SD = 0.198$, 95% CI [6.710, 7.506]) did not statistically significantly differ from either of the other two categories. According to the between-subjects ANOVA, there was no main effect for the race of the defendant manipulation [$F(1, 145) = 0.184$, $p = 0.669$], nor was their a statistically significant interaction between race and distraction [$F(2, 145) = .638$, $p = 0.530$].

Severity Rating. A Univariate ANOVA indicated that there was no main effect for distraction [$F(1, 145) = 1.820$, $p = 0.166$] or race [$F(1, 145) = 0.552$, $p = 0.459$] in regards to ratings of the severity of the crime. Analysis also failed to show a statistically significant interaction between the two variables, $F(2, 145) = 1.461$, $p = 0.236$.

Sentence Length. The results of the one-way ANOVA also illustrated that there were no significant effects for the sentence length assigned to the defendant. Distraction was not statistically significant [$F(2, 145) = 1.726$, $p = 0.182$], nor was race [$F(1, 145) = 0.016$, $p = 0.901$] and there was no interaction between distraction and race [$F(2, 145) = 0.508$, $p = 0.603$].

Low- vs. High-Bias Analyses. ：Additional statistical tests were also conducted by dividing participants into low- or high-bias groups. As contended by Miarmi and DeBono (2007) in their explanation of their results, participants were not able to regulate, and hide, their implicit biases when cognitively taxed by a distraction. Since the manipulations in this study were implemented to determine whether this effect existed in regards to physical distractions as well, by looking at high-bias versus low-bias individuals these findings were more apparent. By dividing the participants into two groups, it was possible to examine the isolated responses of high-bias individuals to determine whether they were able to self-regulate and conceal their biases when they were distracted. To accomplish this, participants were split based on IAT scores. All individuals who scored higher than the median IAT score ($Mdn = 0.6129$) were considered to be members of the high-bias group ($n = 74$) and all participants with an IAT score below the median were placed into the low-bias group ($n = 77$).

Low- vs. High-Bias Impression Rating. A Univariate ANOVA test was conducted to assess the difference between low- and high-bias participants' impressions of the defendant. Results indicated that there was not a main effect for distraction [$F(2, 145) = 1.713$, $p = 0.184$] nor race [$F(1, 145) = 0.726$, $p = 0.396$]

when low-bias participants' ratings were compared to their high-bias counterparts. There was also no effect found for an interaction between distraction, race, and implicit bias levels [$F(2, 145) = 2.083$, $p = 0.129$].

Low- vs. High-Bias Severity Rating. A one-way ANOVA test indicated that there was no main effect for distraction between the low-bias and high-bias groups, $F(2, 145) = 0.258$, $p = 0.773$. Lack of statistical significance was also found for an interaction between distraction, race and implicit bias scores [$F(2, 145) = 0.398$, $p = 0.672$]. Yet, there was a main effect for the race of the defendant and implicit biases [$F(1, 145) = 4.819$, $p = 0.030$], which illustrates that the race of the defendant, coupled with the implicit bias score of the participant, affected the severity rating of the crime (see Figure 3). An Independent Samples T-Test illustrated that there was no statistically significant difference between low- and high-bias individual's ratings of the severity of the crime when participants believed it was committed by a Black defendant [$t(74) = -1.063$, $p = 0.291$]. However, when the defendant was White, responses varied based on implicit bias levels [$t(74) = 2.380$, $p = 0.020$]; low-bias participants rated the severity of the White defendant's crime as more severe ($M = 3.00$, $SD = 1.621$) while high-bias individuals rated the crimes as less severe ($M = 2.26$, $SD = 1.044$). Further, there was a statistically significant difference between how low-bias and high-bias individuals separately evaluated White or Black defendants. Low-bias participants did not show a difference in their ratings of the crimes severity [$t(75) = -1.379$, $p = 0.172$], while those in the high-bias group did [$t(72) = 2.139$, $p = 0.036$]. This illustrated that higher bias individuals gave significantly harsher ratings to the Black defendant ($M = 2.863$, $SD = 0.220$, 95% CI

[2.429, 3.297]).

Low- vs. High-Bias Sentence Length. Implicit bias levels did not interact with the distraction condition [$F(2, 145) = 1.476$, $p = 0.232$] or race condition [$F(1, 145) = 0.039$, $p = 0.844$] in isolation in respect to the prison sentences given by the participants. However, a Univariate ANOVA illustrated that there was a marginal statistically significant interaction of implicit biases, the distraction condition, and the race condition [$F(2, 145) = 2.671$, $p = 0.073$]. Further analysis was conducted with Independent Samples T-Tests. In the no-distraction condition, high-bias and low-bias participants gave the White and Black defendant statistically similar prison sentences (high bias: t (20) = -1.222, $p = 0.236$, low bias: t (24) = 0.857, $p = 0.400$) illustrating statistically egalitarian sentencing. Alternately, high-bias participants who had been subject to the mental distraction gave the White defendant statistically significantly shorter sentences than they gave the Black defendant t (25) = -2.420, $p = 0.023$ (See Figure 4). This suggests that the mental distraction may have prevented these individuals from regulating their implicit bias. Finally, both the low-bias [t (17) = 0.242, $p = 0.812$] and high-bias [t (28) = 0.806, $p = 0.427$] participants who experienced the physical distraction gave the Black defendant a longer sentence but with no statistical difference. Low-bias individuals gave the Black defendant a sentence length of $M = 19.20$, $SD = 6.162$, but the White defendant received a lower sentence of $M = 17.11$, $SD = 6.008$ while high-bias participants assigned a longer prison term to the Black defendant [$M = 23.680$, $SD = 3.877$] than to the White one [$M = 19.44$, $SD = 3.564$].

Potential Confounding Variables

Multitask. A one-way ANOVA determined that the participant's multitasking ability did not statistically significantly vary between groups [$F(2, 145) = 1.501$, $p = 0.227$]. Since this is not a statistically significant covariate, people's self-perceived multitasking capabilities, and thus their ability to handle distractions, did not account for the differences, or lack thereof, among groups.

IAT. A Univariate ANOVA of the IAT scores established that implicit bias levels did not vary between conditions [$F(3, 145) = 0.898$, $p = 0.444$]. This indicates that differing levels of prejudice did not explain the findings of this study.

Discussion

This study explored the relationship between decreased cognitive resources and reliance on category-based evaluations by examining the impact of mental and physical distractions on impression formation of a Black or White target. Previous research established that mental distractions result in increased use of stereotyping behavior and empirical research has also illustrated that physical actions can increase mental load (Allport, 1954, Fiske & Pavelchak, 1986; Bodenhausen, 1990; Gilbert & Hixon, 1991; Macrae, Milne & Bodenhausen, 1994; Fiske, 2004; Miarmi & DeBono, 2007; Srygley, Mirelman, Herman, Giladi & Hausdorff, 2009; Herman, Mirelman, Giladi, Schweiger & Hausdorff, 2010). This psychological investigation incorporated these concepts into one hypothesis: as a result of the increased cognitive burden of mental and physical distractions, it was anticipated that participants would be more likely to rely on judgment heuristics such as stereotyping, when distracted by either method, than when processing capabilities were not compromised.

The findings of this study failed to support this study's hypothesis. The data did not provide evidence of an interaction between distraction and race of the defendant. There was no statistically significant interaction in regards to the participants' ratings of the target, his crime, or the sentence given. However, there was a statistically significant main effect for ratings of the impression of the defendant depending on the participant's distraction condition. This means that the individuals had different impressions of the defendant depending on the cognitive taxation created by the distraction. This did not provide support for the hypothesis as these ratings did not vary based on the defendant's race. However, exploratory analyses of IAT scores as a predictor of dependent variable responses resulted in some interesting patterns.

When participants were divided into low- and high-bias groups based on IAT scores, it was evident that people with contrasting implicit bias levels responded differently to the manipulations of distraction and race of the defendant, particularly when assigning a prison sentence to defendants. While in the no-distraction condition, high-bias participants gave the Black defendant shorter sentences than the White defendant; the opposite was true for low-bias individuals. This suggests that when cognitive load was low, the participants were able to restrain their biases and appear egalitarian. Conversely, when they were mentally distracted, the high-bias participants gave the Black defendant a statistically significantly longer prison sentence than the White defendant, while the low-bias participants were less favorable towards the White defendant (p=0.023). This indicates that when distracted, individuals were more likely to exhibit their implicit

biases. This may be due to their cognitive load increasing and preventing them from monitoring their own behavior, which may have led to an augmented reliance on categorization and stereotyping.

However, these findings were not maintained in the physically distracted group, as the prison sentences they assigned did not differ for the White and Black defendants (low-bias $p = 0.812$ and high-bias $p = 0.427$). That the physical distraction was not cognitively taxing enough to elicit explicit biases, raises the concept that it may not have been as large a load as the mental distraction. This could be a result of the task of counting the "bings" being a forced activity that requires one's concentration, while participants were able to tap to the regular beat of the "beeps" using automatic behavior. Since tapping in a rhythmic pattern to a musical beat is a more natural process, thus needing less mental control and regulation, the manipulation may have been less distracting.

While these findings highlight the possibility that there might be more to the results than merely a non-significant interaction, the majority of this study's findings counter the established outcomes of previous literature. Contrary to our results, Miarmi and DeBono (2007) found a positive correlation between mental distraction and stereotyping. Other research completed by Bodenhausen (1990) and Macrae, Milne, and Bodenhausen (1994) also found that as cognitive abilities were decreased, judgment heuristics increased. While this conclusion contradicts previous literature, this may be due to several limitations in this study.

Since, as would be expected, higher-bias individuals gave harsher responses for the Black defendant with regard to severity of the crime, the findings are not the

result of an abnormal or unbiased sample. As high-bias participants gave significantly harsher ratings to the Black defendant (M = 2.863, SD = 0.220, 95% CI [2.429, 3.297]), it is evident that the Tufts University participants that were determined to have higher levels of implicit bias also had higher levels of explicit bias. This implies that the failure of the distractions to impact stereotyping behavior, which has been evidenced in previous research, is not because of the participant pool but instead may be a result of the manipulations failing to sufficiently cognitively tax the participants (Miarmi & DeBono, 2007).

Since the mental distraction condition was intended to replicate Miarmi and DeBono's results using a different manipulation, the lack of support for the hypothesis is likely due to the manipulations that were used. This suspicion is further reinforced by numerous comments from the participants noting that the regular pattern of the distractors (three "beeps" and then one "bing" continuously repeated) was not cognitively taxing enough. This argument corresponds to the Yerkes-Dodson law (1908), which states that only optimal levels of arousal can produce optimal levels of performance. In relation to this investigation, optimal levels of distraction were needed to elicit optimal levels of cognitive taxation in order to prevent individuals from being able to regulate their stereotyping behavior. It is possible that the distracters did not produce a heavy enough mental load to cause increased use of judgment heuristics. Pre-trial testing of the distracter to assess the effectiveness of the chosen manipulations would have ensured sufficient mental taxation and thus, greatly improved the design of the study.

While it is likely that inadequate manipulations accounted for the

inconsistency in these experimental findings compared to previous research, future studies may help clarify the relationship between distraction and stereotyping. For example, it is possible that visual distracters may result in a heavier cognitive load than auditory stimuli, as hearing does not play a direct role in the processing of the original task. It is also conceivable that counting the number of "bings" and tapping on each "beep" was not as mentally taxing as Miarmi and DeBono's advertisement pop-ups, which prevented the participant from continuing their original task every 15 seconds, as opposed to occurring in conjunction with the task.

One future design change that is critical to reconciling the results of this study with previous literature would be to alter the manipulations to an unpredictable and random pattern that would require more concentration. Ideally, pre-testing would be performed to guarantee the effectiveness of this task as a distracter. Further, it may be informative to involve distracters of other senses, such as tactile or olfactory, to determine whether the task being aural as opposed to visual rendered it an ineffective distracter.

Finally, the results of Srygley et al. (2009) and Herman et al. (2010) indicated that age also predicts the impact that a secondary task has on mental load. This prompts the need for future research to explore the impact of distracter tasks on numerous demographics, as opposed to studying solely college-age individuals. Further support for expansion to other groups is found in research that indicates that certain manipulations affect only specific groups. For example, only men view themselves as more powerful when they make a fist while no change is exhibited in females (Schubert & Koole, 1990). It may be possible that an auditory-based

distraction does not affect college-age individuals who are constantly exposed to various sounds as they live, work and study in communal settings. In addition, many students will listen to music, TV or the radio while studying, indicating that they are capable of the handling these dual tasks without diminishing their cognitive processing abilities.

While the results of this investigation do not definitively answer the questions surrounding stereotyping and distraction, continued efforts are important. Research in this area allows for a better understanding of what factors affect and motivate people's judgments and perceptions as well as the impact of cognitive taxation on behavior. The potential to better understand unconscious motivations and influences of people's stereotyping behavior, raises individuals abilities to avoid making unfair judgments, perceptions and actions. By increasing our knowledge of these factors, it is possible to prevent them, as one can make the conscious decision to preemptively prevent generalizations. Through a better understanding of the role of these variables, it might be possible to mitigate stereotyping, prejudice and discrimination, resulting in a more just and equal world.

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Figure 1. Black mug shot of the defendant (John Sanders)

Figure 2. White mug shot of the defendant (John Sanders)

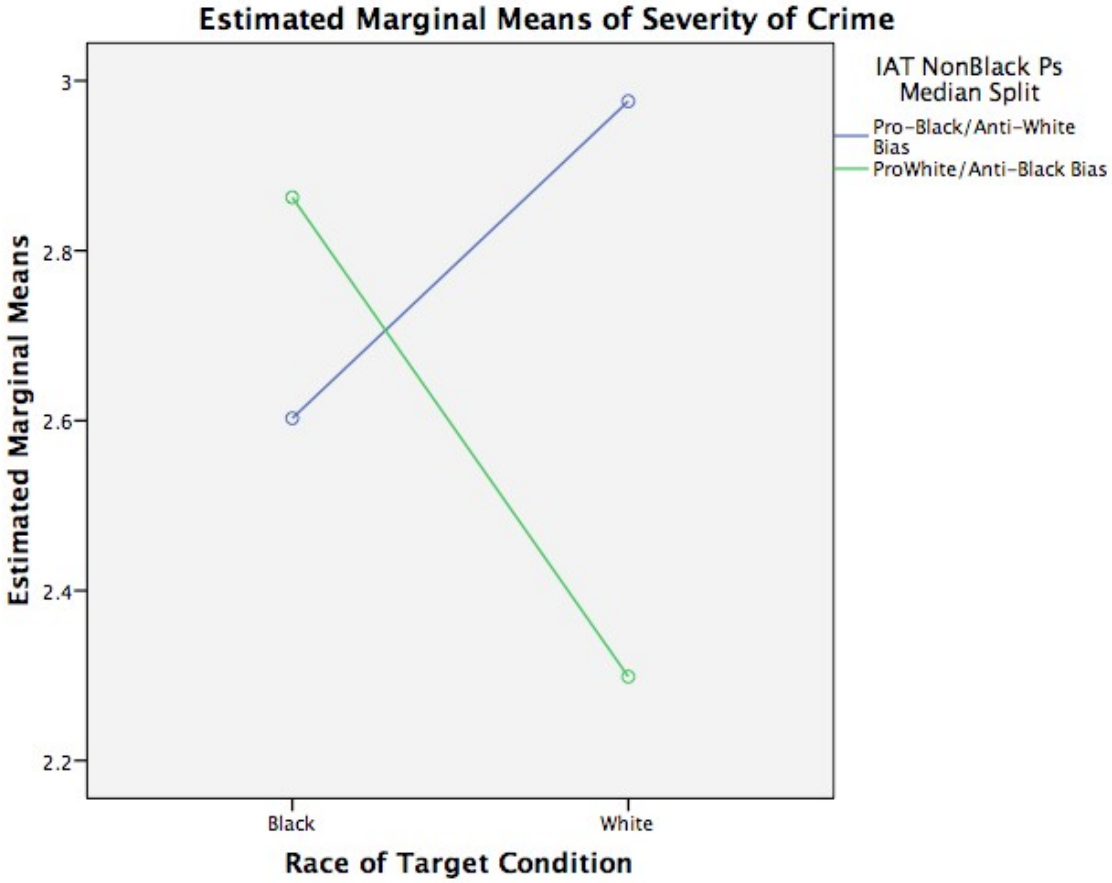

Figure 3. Results indicated that there was a main effect for the race of the defendant and implicit biases in terms of ratings of the crime's severity. Pro-Black (low-bias) individuals rated the Black defendant's crime as less severe than the White's, while the opposite was found for pro-White (high-bias) participants.

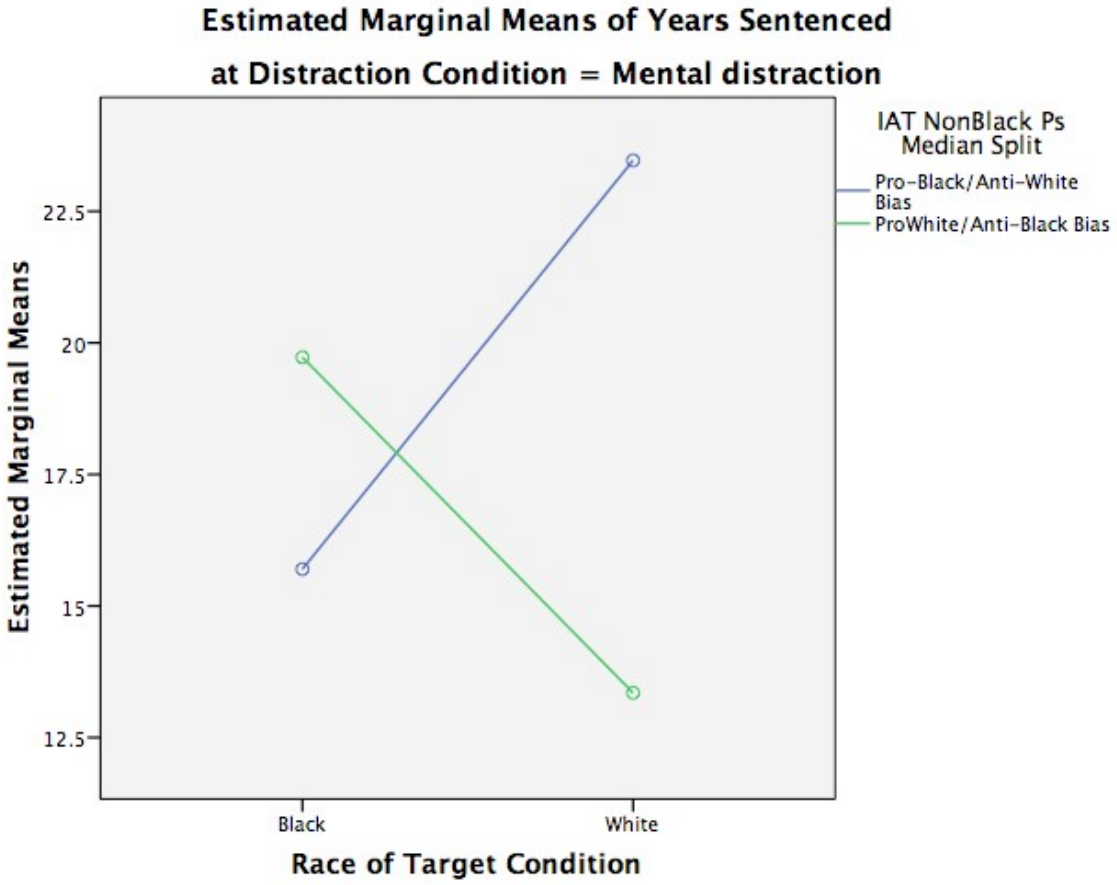

Figure 4. There was an interaction between the defendants' race and the participants' bias levels within the mental distraction condition. Low-bias (pro-Black) participants gave less severe punishments to the Black defendant while high-bias (pro-White) individuals favored the White defendant.