THE EFFECTS OF REWARD ON A RACIALLY-BIASED DECISION TO SHOOT

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Abstract

People use shortcuts in cognitive processing by making associations that automatically link constructs together. Associations of a stereotypic nature may become accessible, generating responses which bias the perceiver towards one decision over another. Previous research has shown that people are quicker and more accurate to shoot armed targets that are black than targets that are white (Correll, Park, Judd, & Wittenbrink, 2002). However, previous research has also biased participants toward a more lenient shooting criterion. The current study proposes that when given motivation to not shoot, the stereotypically-dependent bias to shoot will decrease. That is, altering costs and rewards of decisions should influence participants' responses towards responding quickly and accurately, regardless of target ethnicity. Results showed that the reward manipulation was unsuccessful in decreasing Shooter Bias. The manipulation was able to sway participants towards more conservative non-shooting decisions overall but participants remained more accurate and quicker in responses to shoot armed black targets compared to armed white targets.

The Effects of Reward on a Racially-Biased Decision to Shoot

In general, people imagine their actions to be completely controllable. That is, the common perception is that behaviour hinges upon strictly conscious decisions. It would indeed be troubling to think that certain responses may be automatic and occur despite intentions to react otherwise. However, researchers have shown that many behaviours can be “triggered” by unintended sources (Hassin, Bargh, & Uleman, 2002) or that behaviours believed to be under more conscious control are actually better described as containing both controlled and automatic components (Chaiken & Trope, 1999). More specific to the current investigation is the fact that while automatic processes are historically understood as unintentional and nonconscious, previous research has provided evidence that, like controlled processes, automatic processes may also be flexible (Bargh, 1989; Hassin, Bargh, & Zimmerman, 2009) and perceivers may be able to exert some degree of control over such processing (Bargh, 1999). For example, automatic associations are malleable under circumstances where one is pursuing a goal (Devine, 1989; Fiske, 1989). Thus, the central question addressed in the current study is whether racial bias evident in shooting paradigms (Correll, Park, Judd, & Wittenbrink, 2002; Correll, Park, Judd, Wittenbrink, Sadler, & Keese, 2007a; Correll, Park, Judd, & Wittenbrink, 2007b) can be manipulated by the motivation given when responses are made. The racially-biased nature of decisions to shoot and not shoot, though traditionally considered to be automatically activated (Correll et al., 2002), may be modified by altering the cost and reward structure of the task.

In order to navigate the social environment efficiently, previous experiences become associated in memory and specific rules with which to view the surrounding world are created. For example, experience leads one to expect outcome A (e.g. cars moving) when perceiving B (e.g. a green traffic signal). The greater the number of times two occurrences are paired, the stronger the association between the two becomes until the perceiver associates the two automatically (Fazio, Sanbonmatsu, Powell, & Kardes, 1986). Perceivers learn and subsequently expect that outcome A to occur with every occurrence of B. In this way, a person will use this rule of association to determine their response so that they might gain an optimal outcome. For example, with every circumstance that “green” is paired with “go”, the more strongly “green” is associated with a “go” behaviour. The more the association is practiced and reinforced, the more the two stimuli become a harmonious, congruent pairing (Smith & Lerner, 1986). Consequently,

when the stimulus “green” is presented, a representation of “go” (and the behaviours associated with that response) is simultaneously activated. This stimulus-response association makes for efficient processing in that as soon as one observes “green”, the appropriate response is made efficiently and quickly.

Previous studies have investigated the properties of activation without conscious awareness (Banaji, Hardin, & Rothman, 1993; Dijkterhuis, Aarts, Bargh, & Kippenberg, 2000). Dijkterhuis and colleagues (2000) investigated the construct “forgetfulness” as it associates with the elderly population. Their data suggests that greater exposure to elderly individuals encourages increased activation of the construct forgetfulness. This association is strengthened to create mental shortcuts. Previous experience dictates that “elderly” is automatically associated and primes an association to poor memory. Thus, cognitive processing has become efficient, creating a shortcut to automatically associate the two constructs. In this manner, automatic processing works to unconsciously stereotype specific populations.

Sometimes an accepted rule of association must be consciously altered in order to conform to a particular environment. Although these associations are largely functional, being based on the learning of natural co-occurrences, there are many instances in which these same associations can lead to bias or error. That is, the activated associations may need to be controlled in order that one acts in a manner befitting the given situation. Thus, a go response is not the appropriate reaction to a green light if there is a child running into the street. The association between “green” and “go” still exists but now activation is required in order to produce a response conducive to the altered environment.

The classic example of the difficulty in overriding automaticity is the Stroop task (Stroop, 1935) in which people are required to control their attention in order for specific stimuli to be attenuated. In the classic Stroop task, participants are instructed to identify either the word or the colour of the ink the word is written in. When required to report the colour of the word, participants are faster at responding when the word presented is congruent to the written word. For example, if the word is “red”, participants are faster at responding when the word is written in red ink than when the word is written in green ink. However, when instructions dictate that the written word is to be reported, participants are quick to respond, regardless of the congruence of ink colour. Using the example above, participants will quickly respond “red”, whether the ink is

red or green. Thus, while reading of a word interferes with colour naming, colour naming does not interfere with word reading. Posner and Snyder (1975) explained these data in terms of various activation processes. They postulate that word reading is automatic, while colour naming requires controlled processing. Additionally, the task of colour naming (a controlled process) is slowed in the Stroop task because it conflicts with the automatic process of naming the word. As word reading is automatic, and thus faster than controlled processing, one needs merely to adhere to the automatic processing pathway to respond accurately to word stimuli. Thus, incongruent colour-word name pairing will not hinder word naming in the Stroop task.

In activation requiring controlled processing, additional mental resources must be recruited to take into account instructions of the particular task. Responding via controlled processing increases cognitive load and thereby increases time required to evaluate the incongruous colour-word name pairing, make a decision, and subsequently respond. In the Stroop task, responses requiring controlled processing showed longer response latencies compared to responses requiring automatic activations. Less evidence is necessary when making a response based on automatic activation because the association is strong due to previous pairings. Taken together, defying automatic associations in favour of controlled processing increases time required to make a response. Many researchers have investigated the constructs surrounding automatic versus controlled activations (Chaiken & Trope, 1999).

When the appropriate response conflicts with the response automatically associated with the presented stimuli, often one will mistakenly respond based on the prior accepted associations. Responses may vary depending upon the processing mode used. That is, responses based on processing via automatic activation versus controlled processing may result in incorrect responses. Witnessing “green”, a driver may respond with a “go” response because “green” is automatically associated with “go” even if there is a child in the way. Controlled processing occurs consciously and with deliberate thought, reflecting, for example, situational constraints that may require a different response. Using the Stroop task as an example, if a participant is instructed to name the colour of the word, the participant will be required to use controlled processing for some time if they are to respond correctly to the task. However, if a response is made based upon automatic activation, when a word is presented, the participant may automatically but incorrectly read the word as prior association dictates reading of a word

whenever it is presented. Much like the example above, the colour naming will have to be practiced and reinforced many times for controlled processing to become more automatic. The more times the word is paired with instructions to name the colour, people should become quicker and more accurate at the task due to the practice effects (MacLeod & Dunbar, 1988; Cohen, Dunbar, & McClelland, 1990).

Automatic Processing and Stereotyping

Central to the current investigation is how automatic and controlled processing relates to stereotyping. Automatic processing involves constructing associations which organize the environment in an efficient manner. These associations apply to one's social environment as well. When perceiving a group of people, it is cognitively efficient to categorize them. Often, people are categorized according to their social grouping. Stereotypes emerge when people attempt to simplify their environment; increasing motivation and cognitive capacity will decrease the propensity to stereotype (Macrae, Milne, & Bodenhausen, 1994). According to Neuberg and Fiske (1987), if a person interacts with a target individual, that person will go beyond relying upon the category or class of people that the target might belong to. However, if the expectation is that an interaction is unlikely or comparatively trivial, that person might categorize the target and make a judgment about the target based on that classification. Thus, automatic associations between people and their social grouping may induce stereotype activation.

Biases concerning specific ethnic groups can manifest into blatant actions. However, stereotypical behaviour does not always extend to personal beliefs. Specifically, a person may respond in a manner which is biased against a group of people but may not feel as though that group is in any way superior or inferior to any other group of people. For example, Banaji and colleagues (1993) primed participants with the attribute "dependent". In this particular study, participants were primed with a list of characteristics of a "dependent" nature. Primed participants ranked female targets (compared to male targets) as more "dependent", compared to those in the control group. Male targets were not ranked any more dependent than in the control group. To a lesser degree, male targets were rated as more "aggressive" than female targets when primed with a list of adjectives related to the construct "aggressive". In this study, participants have automatically associated gender with the various attributes unconsciously, thus creating a bias in cognitive processing.

A certain amount of time and cognitive capacity is needed to control stereotypic attitudes and respond according to personal beliefs (Neely, 1977; Devine, 1989; Gilbert & Hixon, 1991; Dunton & Fazio, 1997). Responses reliant upon a target's category will promote decisions reflective of a stereotype. Inaccuracies will occur if a person merely relies upon categorization of a target, as this overlooks target individuality. A failure of responding to target individuality may result in failure to respond to the critical manipulation. Responding erroneously due to categorization-dependent processing occurs because such an analysis does not take the target's individuality into account. However, activating a stereotype does not necessarily mean that responses will be stereotype-dependent. That is, the stereotype may be overridden. In this circumstance, the perceiver is able to respond in a manner befitting the specificity of the situation, not reflecting automatic processing. This controlled level of processing requires sufficient cognitive effort and time. A lack of either time or cognitive capacity minimizes resources used to promote controlled activation, thereby increasing dependency upon a processing route that uses automatic stereotype activation in order to respond, potentially increasing errors in responding (Gilbert & Hixon, 1991).

Devine (1989) provided evidence that automatic processing and subsequent stereotypical responses occurs regardless of prejudicial attitudes. That is, under conditions in which people are not able to rely upon controlled processing, those who self-report no prejudiced thoughts or feelings will respond in a manner similar those who self-report high prejudicial attitudes. According to Devine (1989), people who have high- and low-prejudiced attitudes are equally as likely to exhibit automatic stereotypical activation. However, when given sufficient resources to promote controlled processing, people are able to hamper automatically activated stereotypical responses to ultimately respond in a manner reflecting less prejudiced attitudes (Devine, 1989).

Recent research shows that automatic stereotype activation may not be as rigid as once believed. Knowing that inaccurate stereotyping may lead to a negative outcome affecting them on a personal level, individuals will tend not to rely upon their prejudices (Brewer, 1988). Sinclair and Kunda (1999) provided evidence that, given proper motivation, people are able to exert greater control over stereotypical responses. In this study, participants automatically activated stereotypically-dependent associations to assess evaluators that provided negative feedback. If evaluated positively, participants' stereotypical activation was reduced. When the participants

were merely observing and not the subject of the evaluators' appraisal, automatic stereotype activation was present but that activation was not linked to the evaluator. Sinclair and Kunda (1999) explain these results in terms of motivation to discredit the evaluator and subsequently the negative feedback that was provided. The fact that participants were able to inhibit automatic activation as it related to the evaluator provides evidence that participants were able to control their stereotyping responses when given the motivation to do so.

Automatic Stereotype Activation and Guns vs. Nonguns

Automatic activation has been increasingly studied as it relates to stereotyping behaviours. One specific event highlighting the automatic nature of biases is illustrated in the much-publicized wrongful death of Amadou Diallo, an African American, at the hands of police officers (Ayoob, 2000). In this tragic circumstance, police officers misidentified the object that Amadou was holding. Instead of the wallet that he truly held, the officers reacted based on the misperception that Amadou was holding a gun. Thus, the question is raised as to whether the offending officers' were automatically predisposed to think Amadou was armed, a possible result of automatically associating black people with guns. Studying cases such as this may possibly explain whether the unfortunate outcome was due to a genuine misidentification of a gun or rather, resulting from a response to Amadou's status as an African American, an error of utilizing automatic processing of a stereotypical nature.

Payne (2001) set out to provide evidence that, regardless of intention, black faces facilitate greater weapon identification than white faces. In this study, participants were shown a computer image of either a white or a black individual. This was followed by an image of either a gun or a nongun (tool). Given an unlimited amount of time and instructions to ignore the facial image, participants were required to indicate whether the subsequent object was a gun or a tool by pressing one of two computer keys. Results indicated that faces presented prior to gun/tool presentation did have an effect on responses. That is, even though accuracy was high, weapons were identified faster when primed by black faces compared to when primed by white faces. Payne (2001) explained the results in terms of congruent and incongruent pairings in order to make a response. In the congruent conditions, viewing a black face followed by a weapon constitutes a congruent pairing. In this condition, participants are able to rely on either automatic or controlled processing to produce a correct response (i.e. the two processes work in tandem).

As there is no competition, the perceiver may use either process to arrive at a correct decision, and thus processing is relatively rapid. However, in an incongruent pairing, participants are forced to rely more upon controlled processing. In this condition, black facial images followed by nonweapons and white facial images followed by weapons represent pairings of an incongruent nature. Responses made using automatic processing while viewing an incongruent pairing may reflect the residual activation of the stereotypic association (i.e. black and gun) caused by the target colouring perception of the object. Responses made using controlled processing, though highly accurate, would take relatively longer compared to the congruent condition.

Payne's (2001) subsequent study limited the amount of time participants were given to respond. Responses were required within 500ms of gun/tool presentation. This had the effect of significantly increasing incorrect responses. Specifically, participants made more stereotype-congruent errors responses when time given to respond was decreased. That is, participants misclassified nonweapons as weapons with greater frequency when primed with black faces, compared to white faces. Thus, Payne's (2001) results suggest that there is a stereotypically-dependent association between images of black individuals and weapons.

Further evidence of this racially-dependent shooting bias is provided by Payne, Shimizu, and Jacoby (2003). Once more, participants were primed with a black or white target image and then a critical image of a gun or a tool. Instructions were given to identify the critical object and subsequently their confidence that they had made the correct choice. Like previous experiments, a response bias was evident. First, participants were biased towards "gun" responses compared to "tool" responses overall. Additionally, participants incorrectly responded "gun" when actually viewing a tool if primed by black targets than when primed by white targets. Participants were more likely to incorrectly respond "tool" when actually viewing a gun if primed by a white target than when primed by a black target. In a second experiment, participants were permitted to alter their responses after the first response had been made. Interestingly, accuracy was significantly higher on the second response compared to the initial response to shoot or not to shoot. Thus, participants were aware that the first response was incorrect, suggesting that failure to respond correctly was not a result of incorrect perception of the gun/nongun. In other words, participants were aware that certain decisions were erroneous. These data suggest the process of activation used to make the response is at fault for incorrect decisions and not error of target perception.

The Shoot/No-Shoot Paradigm

Correll, Park, Judd, and Wittenbrink (2002) developed an experimental paradigm to examine the effects of target ethnicity on the decision to shoot in a simulated police officer game. Full-bodied images of black and white targets were superimposed on various backgrounds holding either guns or nonguns (e.g., wallets, mobile phones, soda cans). Targets were either African-American or Caucasian. Participants were instructed to act as a law enforcement officer would by responding to targets holding guns with “shoot” and targets holding nonguns with “don’t shoot” by pressing one of two buttons. A payoff matrix was utilized to reflect a police officer’s decisions to shoot or not shoot in situations when confronted by a possibly armed suspect. According to the payoff matrix, participants would be rewarded 10 points for correct hits (i.e., shooting an armed target) and 5 points for correct rejections (i.e., not shooting an unarmed target). In addition, points were deducted for misses (40 point deduction for not shooting an armed target) and false alarms (20 point deduction for shooting an unarmed target). Participants were also penalized 10 points if they failed to make a response within the 850ms window following the appearance of the target.

Results of this experiment showed a similar result to that of the Payne (2001) experiment in that speed of responses was racially dependent. Thus, the racially-dependent weapon bias translated to shooting behaviours in which participants “shot” armed targets faster if the target was black versus white. Additionally, results indicated participants took longer to decide not to shoot black targets compared to white targets. Overall, accuracy was high, so Correll et al. (2002) provided a second experiment that was identical to the first, except for the timeout for responses. Instead of 850ms given to respond, subjects were restricted to responses made within 630ms of target presentation. As Correll et al. (2002) expected, response speed decreased as an effect of the shortened timeout, and as a result, error rates increased significantly. Again, the observed effect was racially dependent. Specifically, participants incorrectly responded “shoot” more frequently when the unarmed target was black versus white. Additionally, participants incorrectly responded “don’t shoot” more frequently when the armed target was white versus black. Thus, when participants were permitted time enough to make a controlled decision, accuracy was high. Shortening response time limited ability to process stimuli in a controlled manner and suggests

that participants were restricted towards responding in a more automatic manner and thereby increasing the race-based Shooter Bias.

However, perhaps this stereotypically-dependent effect is population specific. Social outrage has recently demanded attention to incidents of police mistakenly shooting unarmed minority targets. A common assumption would be that law enforcement officers would be the exception to the shooting bias phenomenon. Correll, Park, Judd, Wittenbrink, Sadler, and Keese (2007a) investigated the depth of stereotypically-driven responses within various populations. Participants were collected from the Denver police department, officers from around America attending a training seminar, and civilians. Though both samples of police officers were more accurate in weapon detection than civilians, these groups were more accurate in identifying armed targets when the target was black, compared to armed white targets. As Correll et al. (2002) limited time available to make a response, so too did Correll et al. (2007a) as a second experiment allowed police and civilians alike only 630 ms. to respond to stimuli. As expected, accuracy overall decreased and there was an increase in shooting responses. However, unlike the civilian sample, law enforcement officers did not exhibit the Shooting Bias. That is, while civilians were more accurate to “shoot” when viewing black targets than when viewing white targets, officers’ accuracy to “shoot” were not racially dependent. A third experiment suggested that training could account for the decreased shooting bias. That is, accuracy to shoot increased relative to the amount of practice participants were given in the shooting task. Overall, Correll et al. (2007a) provides evidence that law enforcement officers exhibit significantly less Shooter Bias.

Plant and Peruche (2005) also tested law enforcement officers for Shooter Bias. Officers were given 630 ms to respond and the same instructions to shoot/not shoot when viewing targets with guns/nonguns as in Correll et al. (2002) and Correll et al. (2007a). However, unlike Correll et al. (2007a), police officers showed a significant Shooter Bias. That is, results indicated that officers incorrectly responded to “shoot” unarmed black targets more than unarmed white targets. Additionally, officers incorrectly failed to “shoot” armed white targets more than armed black targets, which duplicated results seen in Correll et al. (2002). Plant and Peruche’s (2005) study corresponded with Correll et al. (2007b) in that there was a strong practice effect. In other words, there was a significant drop in racially-dependent responses in later trials; officers’ accuracy

increased over the course of the trials. Thus, responses which would initially be classified as resulting from associations of an automatic nature shifted towards responses indicative of a more controlled nature, which were reflective of the critical gun stimuli. This practice effect correlates with data collected by MacLeod and Dunbar (1988), and Smith and Lerner (1986) which suggest that, with practice, processing becomes more efficient and response time decreases.

Promoting a stereotype will exacerbate Shooter Bias. Correll, Park, Judd and Wittenbrink (2007b) performed an experiment in which participants completed the same shooting task as used in prior experiments (Correll et al. 2002, Correll et al. 2005, Correll et al. 2007a). Participants were instructed to read stereotypically-congruent or -incongruent articles before completing the computer task. As predicted, reading an article in which the criminal was of black ethnicity had the effect of increasing Shooter Bias. That is, in this stereotypically-congruent condition, participants chose to “shoot” unarmed targets significantly more when the target was black than white, compared to when participants did not read the inflammatory article. In the stereotypically-incongruent condition, participants showed no bias. That is, when reading an article which described a criminal who was white, they responded “shoot” equally to all unarmed targets. These data suggests that greater amounts of prior racial bias increases Shooter Bias. Additionally, the study implies that automatic activation, under certain circumstances, may be malleable.

If a person was to view a target both as “a man with a gun” as well as “a black man”, one category is promoted over the other. According to Devine (1989), a person’s level of prejudice of a social group determines which category is prioritized and subsequently given more attention over other categories (Brewer, 1988; Fiske & Neuberg, 1990). Level of prejudice will bias responding when combined with other factors such as task objectives and the salience of the targets’ social category (Macrae, Bodenhausen & Milne, 1995). Thus, prior prejudices will have an effect on results of the shooting task. If a participant has high levels of prior prejudice, the category “black man” will be promoted over “man with gun” and subsequent responses would reflect prior prejudice instead of presence of a gun.

Stereotypical attitudes will influence racial bias in both weapon claims (Payne, 2001; 2006) and shooting behaviour (Correll et al. 2002). Thus, stereotypical attitudes should be measured separately in order to determine how strictly motivational factors affect stereotypically-

dependent shooting behaviour. For this reason, research has investigated whether Shooter Bias is dependent upon prejudice towards members of various ethnicities. Explicitly, researchers have measured the extent to which prior racial bias relates to the racial bias witnessed in studies of shooting behaviour. Fazio (Fazio, Jackson, Dunton, & Williams, 1995) used the Modern Racism Scale (MRS; McConahay, Hardee, & Batts, 1981) to measure racial bias and the Motivation to Control Prejudiced Reactions Scale (MCP; Dunton & Fazio, 1997). Results suggest that when participants were unmotivated to control their responses, their automatic responses correlated with their personal racial stereotypes. Those who were motivated to behave in an unprejudiced manner had automatic responses that corresponded negatively with their racial stereotyping.

Correll et al. (2002) conducted a third experiment in which participants completed multiple tests before completing the Shooting Task. Tests given included the MRS, Discrimination (DIS) and Diversity (DIV) Scales (Wittenbrink, Judd, & Park, 1997), and the MCP Scale. In this experiment, participants were also asked to estimate the percentage of blacks and white who are dangerous, violent and aggressive based on personal beliefs and subsequently their views of blacks and whites as dangerous, violent, and aggressive on a more global, cultural scale. A 5-item task was also completed which determined participants' personal amount of contact with black individuals. However, the only significant relationship between the various measures of racial bias and the shooting task was that greater amounts of contact with black people were associated with more racially-dependent responses and thus, more Shooter Bias.

Evidence suggests that explicit measurements may not be sufficient to discover a relationship between prior racial bias and Shooter Bias. Previous testing methods may have significantly dissuaded participants to respond truthfully as society strongly objects any sort of racially-biased thought or action. Thus, in the current experiment, an implicit measurement of prior racial bias is utilized in order to determine how it affects Shooter Bias.

The Current Research

Manipulation of costs and rewards. Perhaps automatic activation is not as rigid as it seems. Previous research has consistently employed a common payoff matrix to provide motivation to “shoot” or “not shoot” targets. In the reward structure used previously, participants' decisions mimicked decisions made by police where failing to identify a weapon where one is present (resulting in possible death of the police officer) is worse than mistakenly shooting an

unarmed suspect (Correll et al., 2002). However, this cost and reward structure inevitably biases subjects towards shooting behaviour. That is, using the payoff matrix utilized by Correll and colleagues (Correll, 2007a; Correll et al., 2002; 2005; 2007b), points allocated to subjects for responses may motivate participants to shoot at a greater frequency than not to shoot. For example, if a participant shot every target in an experiment with 50 trials (25 gun and 25 nongun trials), that participant would be penalised 500 points. If another participant never fired a round, that participant would be penalised 1750 points. Understandably, this rewards matrix is designed to reflect the decisions a police officer must make when faced with an armed or unarmed suspect, the greatest point deduction reflects failing to shoot an armed target, resulting in death of the police officer. However, in an attempt to recreate this defensive attitude, a shooting behaviour is subsequently promoted. Additionally, if a participant is unsure of the object being held but aware of the penalty of failing to respond, responding “shoot” would be a savvy decision. Choosing “shoot” would gain them the greatest amount of points if the decision turned out to be correct (e.g. the target was holding a gun) but would also cost them the least amount of points if this response turned out to be incorrect (e.g. the target was holding a nongun). Thus, automatic activation found when participants respond “shoot” toward targets that are black may be further encouraged, and shooting bias phenomena exaggerated, by the reward structure of the situation.

We propose that the race-based Shooter Bias in this paradigm may be related, at least in part, to the learning and application of the costs and benefits of shooting versus not shooting. Thus, by reducing the bias towards shooting, we propose that this may motivate participants to engage in more careful and effortful processing which should reduce reliance on the more automatically accessible associations.

The current research utilised two additional point matrix schemes to examine the effect of reward system on the reduction of stereotypically-dependent Shooter Bias. The intention is to move participants away from “shooting” behaviours toward more conservative responses and “no shoot” decisions. This was achieved by altering the balance of points, which currently biases participants to favour a shooting response.

The Shoot-Bias Matrix. The first condition relied upon the previously-employed payoff matrix (the matrix used by Correll and colleagues). By employing this matrix, the intention was

to replicate previous findings of an overall “shooting” behaviour, as well as duplicate previous results showing racially-biased “shooting” responses.

The No-Shoot Bias Matrix. A second condition switched the payoffs for shooting or not shooting so that reliance on the shoot response would result in greater point deductions than would a no shoot response. By changing the payoff matrix, we intended to bias subjects away from a “shoot” response and towards more conservative, “don’t shoot” responses. In this reversed *no-shoot* matrix, 40 points was deducted for incorrectly responding “shoot” towards an unarmed target, and 20 points for incorrectly responding “don’t shoot” towards an armed target. Additionally, 5 points was rewarded for correctly responding “shoot” towards an armed suspect and 10 points for correctly responding “don’t shoot” towards an unarmed target. Thus, participants who fail to shoot across 50 trials (25 armed and 25 unarmed targets) would be penalized a total of 500 points. In this example, participants adopting a “shoot” behaviour across the same 50 trials would be penalized 1750 points (i.e., direct reversal of the point allocation of the *shoot* payoff matrix). Unlike the previous reward structure, if a participant is unsure of the object held by targets, choosing to “not shoot” would be the savvy choice. This fallback decision would have the most gain if the target is holding a nongun, with the least amount of loss if the target, as it turns out, is holding a gun. By employing a matrix with costs and rewards favouring “don’t shoot” responses, subjects should adopt a bias towards “don’t shoot” behaviour.

The No-Bias Matrix. In a third and final condition, a *no-bias* payoff matrix was utilized. In this payoff scheme, points are awarded or deducted based on correct or incorrect responses. That is, participants were rewarded equally (20 points) for shooting armed targets and for not shooting unarmed targets. Additionally, the same amount of points was deducted (20 points) for shooting unarmed targets and for not shooting armed targets. Thus, if participants choose to “shoot” all targets, across 50 trials (25 armed targets, 25 unarmed targets) they would finish the experiment with 0 points. Additionally, participants who choose to not shoot across those same 50 trials would also be rewarded 0 points. Under this condition, if a participant is unsure of the target object held (e.g. gun or nongun), they will be equally motivated to “shoot” and “not shoot”. Adopting decision strategies to “shoot” or “not shoot” was rewarded and penalized equally based on accuracy of the response made.

The underlying assumption is that the reward matrix has the potential to affect race-based Shooter Bias in this paradigm by motivating a more careful processing strategy. Specifically, we hypothesize that the *no shoot* payoff matrix will work in opposition to the Shooter Bias, and the *shoot* payoff matrix will work in tandem with Shooter Bias. That is, given that the accessibility of the black + gun association, a reward structure that rewards shooting behaviour should increase reliance on the association. For a reward structure that provides a more punitive outcome for (incorrect) shooting behaviour, participants should be more motivated to process more carefully, and, to the extent that the association can be overridden, we should see a decrease in race-based shooting bias. By altering the reward matrices, we expect shooting behaviour to be less ethnically-dependent.

Measuring attitude accessibility. Though stereotype activation is dependent upon the particular situation (Gilbert & Hixon, 1991), peoples' attitudes also influence the amount of bias observed in such activations (LaPore & Brown, 1997). Thus, participants' prejudice levels must be measured to determine if the level of Shooter Bias is dependent upon their prejudiced attitudes regarding black people. A person may be low in prejudice level but may still exhibit Shooter Bias through automatic stereotype activation. In fact, when constraints are placed upon individuals cognitive ability, a person with low prejudice levels will often respond in a manner just as stereotypically-dependent as a highly prejudiced person (Devine, 1989).

Monteith (1993) provided evidence that people low in prejudice may still act in a stereotypical manner as those high in prejudice. In this study, participants (of both high- and low-prejudice levels) aware that their responses were evaluated in terms of target sexuality, rated homosexual jokes in terms of humour. Those of high prejudice rated gay jokes more favourably than those of low prejudice. However, low-prejudice participants' favourability of gay jokes depended upon whether prejudice was made salient or not. That is, those with internal motivation to perform in an unprejudiced manner (responding in an unprejudiced manner) were able to self-regulate their responses to reflect their personal attitudes. Thus, self-regulation may prevent stereotypically-dependent responses in those of low prejudice. For this reason, the current study imposes a measure of prior prejudice.

Fazio, et al. (1995) devised a priming-facilitation task (Fazio, et al., 1986) as an implicit measure of the accessibility of racial attitudes. Participants are instructed to respond as quickly

and accurately as possible while responding to stimuli on a computer screen. First, baseline response latencies are recorded to responses to the categorization of positive and negative target adjectives. In a later phase of the task, participants are primed with facial images of people belonging to various ethnicities. After each image, an adjective is presented which the participant is instructed to respond based on the valence of the particular adjective. According to Fazio et al. (1995), if the prime image and the target adjective are congruent, the prime should facilitate activation of the valence of the adjective. In other words, if participants evaluate a facial image as positive, the evaluation of positive should facilitate a subsequently positive adjective. A negative evaluation should be activated if the prime before it is evaluated as negative as well. Thus, responding to the adjective when there is congruency between prime and target should be quicker than if there was an incongruency between prime and target.

Fazio et al. (1995) found that greater facilitation occurred for White participants when positive adjectives followed White primes compared to when they followed Black primes. Additionally, greater facilitation occurred when negative adjectives followed Black primes compared to White primes. In other words, participant responses were relatively faster when responding to a positive adjective after viewing a face that was White versus viewing a face that was Black. However, if a participant was of Black ethnicity, the results were reversed. That is, in this population, greater facilitation occurred when positive adjectives followed Black primes and negative adjectives followed White primes. Compared to other methods of determining racial bias, this method was conducted in a manner which measures racial attitudes implicitly. Thus, if participants are highly motivated to hide or control their true attitudes, the bona fide pipeline (BFP) would detect their true attitudes while other, explicit measures, would not. For this reason, the current study uses the BFP to determine prior racial bias.

Determining prior racial bias may determine the racial dependency of shooting behaviour. That is, a participant with high prior racial bias should respond with shooting behaviour significantly more towards black targets compared to white targets than a participant low in prior racial bias. Participants with high prior racial bias may be less able to inhibit stereotypic responses when encountering inconsistent stimuli (ie. Black target person holding a nongun, White target person holding a gun) compared to a participant with low prior racial bias, who may be able to respond in a more controlled manner (suppressing their automatic stereotype

activation). For this reason, those with greater prior racial bias may be more resistant to the motivating effects that costs and rewards have on shooting behaviour compared to those low in prior racial bias. Thus, we would expect participants high in prior racial bias to sustain high levels of Shooter Bias across all conditions of manipulation.

Method

Participants and Design. Ninety-seven introductory psychology students from Victoria University of Wellington received course credit for participating in the study. The Shoot/No Shoot computer simulation employed a 2 (Target Race: Black vs. White) x 2 (Object Type: Gun vs. Nongun) x 3 (Reward Structure: Shoot, No-Shoot, or No-Bias) mixed factors design with repeated measures on the first two factors. Participants were randomly assigned by the program to one level of the Reward Structure between-subjects factor.

Shoot/No Shoot Task. Using the Eyelink experiment builder computer program, participants were shown 20 various background images on the computer (ie. train station, forest, apartment building, etc.). Critical images were integrated into the backgrounds. Critical images showed a target person of either black ethnicity (60 images made up of 10 different individuals) or a target person of white ethnicity (60 images made up of 10 different individuals) in various stances (ie. crouching, standing, etc.). Half of the target individuals were presented holding a gun (60 images) the other half holding a nongun item (60 images) such as a coke can, wallet, or mobile phone. Images of target individuals were presented six times: three times armed, three times unarmed, and counterbalanced so that each target was shown appearing equally on the left as on the right side of the screen. Refer to Appendix A for examples of the computer images viewed by participants.

A Zalman FPS gun-styled mouse was used by participants to indicate responses. The pistol-grip mouse had two buttons on the grip that were designated “shoot” or “safety” (i.e., no shoot). Whether the top or the bottom button was designated the shoot button was counterbalanced so that for half of the participants, the top button represented “shoot” and the bottom button represented “safety”; for the other half of the participants the button designations were switched.

Participants were introduced to the experiment by reading the computer screen which displayed the following:

During this experiment you will be presented with a number of different scenes. A person may or may not appear during scene presentation. This person may be carrying a gun or they may not be carrying a gun.

Your task is to shoot the people with guns or press the safety when the person is not holding a gun.

Next, participants were instructed how to indicate their decision on the gun-styled mouse:

You will use one of two buttons to either shoot or spare the person

The top trigger is the SHOOT button

By pressing this button, you have decided to shoot the person

This will be accompanied by a gunshot sound

The bottom trigger is the SAFETY button

By pressing this button, you have decided to not shoot the person

This will be accompanied by a click sound

To test participants understanding of button functions, they were instructed:

Press the safety to continue

And on the following screen:

Now press the shoot trigger

Either a gunshot sound or a click sound followed correct trigger presses. Participants were then informed of the reward structure they had been allocated:

Your goal is to earn as many points as possible.

The following actions will score you points:

XX pts – shooting people that are holding a gun

XX pts – pressing the safety when the person is not holding a gun

The following actions will cost you points:

XX pts – shooting people that are not holding a gun

XX pts – pressing the safety when the person is holding a gun

XX pts – not pressing either button (timeout)

Next, each participant was informed that they would complete a block of practice trials to familiarize them with the experiment. Participants were again shown the trigger-indication screen as well as the reward structure screen before completing the 10 practice trials. A “READY”

	Armed	Unarmed
Shoot Bias Matrix		
Shoot	10	-20
No Shoot	-40	5
No-Shoot Bias Matrix		
Shoot	5	-40
No Shoot	-20	10
No Bias Matrix		
Shoot	20	-20
No Shoot	-20	20

Figure 1. Reward Structure Manipulations. Participants were randomly assigned one of the three structures.

screen was presented before each trial, cueing the beginning of the trial. Each trial consisted of 3-5 randomly determined successive background images and lasting for durations between 300-850ms. The last background image in each trial contained the image of either an armed or unarmed target individual.

Following each trigger press, a screen was presented which indicated one of five outcomes:

You did not shoot an innocent person!!

You shot an armed criminal!!

You did not shoot an armed criminal!!

You shot an innocent person!!

You waited too long!!

After feedback message, participants were shown their points gained or lost for that particular trial (points deducted due to an incorrect response was shown in red-coloured font, points gained due to a correct response was shown in green-coloured font). Following the block of practice trials, participants completed 40 critical trials which were presented in 3 separate

blocks (total of 120 trials). Critical trials followed the same structure as practice trials, with the additional feature of presentation of the cumulative score after the individual trial score.

For each critical image, participants were allowed 850 ms. of response time. If a participant failed to respond within the allocated response time, 10 points were deducted from their overall score. Both accuracy and response latency were recorded for each trial. At the end of each trial, participants were informed of the accuracy of the decision, the points allocated or deducted for that trial, as well as the cumulative score.

Reward Structure Manipulation

Three combinations of costs and rewards were utilized in order to manipulate shooting behaviour (see Figure 1). In every condition, 10 points were deducted for failing to respond within the 850 ms. timeout window.

Shoot Bias Matrix. The first combination of costs and rewards is a replica of the reward matrix used by Correll et al. (2002). This reward matrix was designed for the purpose of reflecting the repercussions experienced by police officers regarding their decisions to shoot. Correll et al. (2002) determined that more points should be deducted for not shooting an armed target compared to shooting an unarmed target, as failing to shoot a suspect with a weapon may lead to serious injury, or even the death of the police officer. Thus, in this matrix, 40 points were deducted for failing to shoot an armed target. Comparatively, only 20 points were deducted for shooting an unarmed target. Additionally, participants gained 10 points for correctly shooting an armed target and 5 points for correctly failing to shoot an unarmed target.

No-Shoot Bias Matrix. The second combination of costs and rewards was designed to switch the participants' bias from shooting behaviour towards a more conservative non-shooting behaviour. The point matrixes costs and rewards were altered from Correll et al. (2002) system of bias so that more points are deducted for shooting unarmed targets compared to failing to shoot armed targets. That is, in this condition, 20 points were deducted for failing to shoot an armed target while 40 points were deducted for shooting an unarmed target. Correctly responding "shoot" when viewing armed targets was rewarded with 5 points and responding "don't shoot" when viewing unarmed targets was rewarded with 10 points.

No-Bias Matrix. In the third and final payoff matrix condition, costs and rewards were balanced. That is, the same number of points was deducted for all incorrect responses, while all

correct responses were rewarded equally. Specifically, 20 points were deducted for either shooting an unarmed or failing to shoot an armed target. In this condition, all correct responses (i.e. shooting an armed or not shooting an unarmed target) resulted in a gain of 20 points.

Attitude accessibility measure

The Fazio priming-facilitation task was included to measure the accessibility of negative attitudes towards blacks. This task was counterbalanced between-subjects to occur equally as often before or after the shoot task.

Materials. Participants viewed the 48 various photographs of White, Black, and other (Asian and Hispanic) males and females used in previous studies (Fazio et al., 1995). Refer to Appendix B for examples of the images used. These photographs were used to prime the 16 various target adjectives. Target adjectives consisted of 8 positive valence adjectives and 8 negative valence adjectives (see Appendix B for a full list of the positive and negative adjectives used).

Procedure. Participants viewed a single adjective on the computer screen and were instructed to indicate whether that adjective was positive or negative. Participants were shown computer images of 16 adjectives and instructed to decide, as quickly as possible, whether each adjective was positive or negative in valence. Participants were instructed to press the “Z” key on the provided keyboard if they determined that the adjective represented a “positive” adjective. If the participant determined the adjective to be “negative”, instructions dictated the participant to press the “/” key. The order of adjective presentation was randomized. Participants were encouraged to respond as quickly and accurately as possible. However, adjectives remained on the screen until a response was made.

The first block of trials collected baseline latency data. This data consisted of the response latency between target adjective presentation and subsequent key press (bRT). After baseline data were collected, participants were primed with either a black or a white or “other” facial image before target adjective presentation. Again, responses were recorded and analysed in terms of response latency (pRT). Response accuracy was also collected. Participants completed 9 blocks of trials (including Block 1 in which baseline data was collected).

Adjectives that were judged incorrectly (e.g. participants responded “positive” when target adjective was negative) were excluded from analysis. Additionally, all trials in which

responses were made before 300ms or after 2000ms from target presentation were excluded. Adjectives were excluded from individual participant data which received response latency of over 2000ms in Block 1.

Results and Discussion

The primary aim of this experiment was to determine whether costs and rewards affect the racially-biased decisions during a shooting task.

As in previous experiments (Correll et al., 2002), participants who timed out in over one eighth of all trials were excluded from the study resulting in the exclusion of 10 participants (5 participants in the *shoot* condition, 2 participants in the *no shoot* condition, and 3 participants in the *no bias* condition). Additionally, 1 subject was excluded based on an extremely high percentage (over 90%; after testing, this subject explained that throughout the experiment, she had forgotten which trigger indicated which behavior) of incorrect adjective valence categorizations in the priming facilitation task. In this circumstance, prior levels of prejudice were impossible to determine. Thus, data from a total of 86 participants were analyzed.

First, results are examined from the shoot task. Accuracy was first analyzed in terms of the errors made. Specifically, incorrect responses were evaluated and reported in terms of target ethnicity, whether a gun or nongun is present, and the reward manipulation employed. Second, participant response time was examined. Response times were measured and reported as the time between target onset and participants' subsequent response. All responses made before 300ms or after 850ms of target presentation were excluded from the analysis. Additionally, as in Correll et al.'s (2005) study, only correct responses were analyzed in terms of their response times. Third, we will examine the results as they relate to Fazio et al.'s priming-facilitation measure, which determines levels of prior racial bias.

Shooting Task

Error Rates. Participants' error rates (number of errors divided by the number of critical trials) were subjected to a 2 (Target Race: Black versus White) x 2 (Object: gun versus nongun) x 3 (Reward Structure: shoot, no-shoot, or no-bias matrix) mixed-measures ANOVA with repeated measures on the first two factors. Results are reported in terms of number of incorrect responses.

This analysis yielded three significant findings. First, comparing the bars in Figure 2 shows that participants made fewer errors when responding to armed targets ($M = 3.88$, $SD =$

.22) compared to unarmed ($M = 4.60$, $SD = .31$) targets. In other words, we found a significant effect for Object type, $F(1,85) = 7.06$, $p < .01$, $\eta_p^2 = .078$. Second, comparing the bars shows that the target's race affected people's accuracy for armed and unarmed targets differently. That is, participants were more accurate to shoot armed targets if the target was black ($M = 3.174$ errors, $SD = .28$) than white ($M = 4.58$ errors, $SD = .26$). Additionally, participants were more accurate to not shoot unarmed targets if the target was white ($M = 4.00$, $SD = .31$) than black ($M = 5.19$, $SD = .37$). In other words, there was a significant two way interaction between target ethnicity and object type, $F(1,85) = 36.18$, $p < .01$, $\eta_p^2 = .304$. Finally, Figure 2 shows that the given costs and rewards affected people's accuracy for armed and unarmed targets differently. Specifically, in the condition that biased shooting responses, participants less accurate when targets held nonguns ($M = 5.33$, $SD = .56$) than when targets held guns ($M = 3.87$, $SD = .397$). In other words, participants were more accurate in situations that required “shoot” responses compared to “don’t shoot” responses. The same effect was observed in the no-bias condition. That is, participants made more errors when responding to targets holding nonguns ($M = 5.02$, $SD = .54$) than targets holding guns ($M = 3.879$, $SD = .38$), thus more accurate to shoot than not shoot. However, in the no-shoot bias condition, participants were as accurate in responding to armed targets ($M = 3.88$, $SD = .377$) as they were in responding to unarmed targets ($M = 3.43$, $SD = .53$). That is, we

Figure 2. Mean incorrect responses as a function of reward structure and target armedness.

found a significant two-way interaction between Reward Structure and Object type, $F(2,85)=4.87, p=.01, \eta_p^2=.105$. Contrary to the hypothesis, there was no 3-way interaction. In other words, altering the costs and rewards of responses failed to affect Shooter Bias. Taken together, people were more accurate when a shooting response was required. Also, participants more accurately shot armed black targets compared to white armed targets and more accurately failed to shoot unarmed white targets compared to unarmed black targets. While similar results have been found in previous studies (Correll et al, 2002; Correll et al. 2007a; Correll et al. 2007b), the finding that altering reward structure may affect participant response is a finding novel to this experiment.

Response Time. Participant response was subjected to a 2 (Target Race: Black versus White) x 2 (Object: gun versus nongun) x 3 (Reward Structure: shoot, no-shoot, or no-bias matrix) mixed measures ANOVA with Target Race and Object Type as within-subject variables and Reward Structure as the between-subject variable. This analysis revealed three significant findings. First, comparing between bars in Figure 3 shows that participants were quicker to respond when viewing black targets ($M = 650.47, SD = 3.42$) compared to white targets ($M = 654.55, SD = 3.53$). That is, there was a main effect for Target Race, $F(1,85)= 6.23, p=.015, \eta_p^2=.07$. Second, participants were quicker to respond when viewing a gun ($M = 618.60, SD = 3.70$) than a nongun ($M = 686.42, SD = 3.69$). That is, there was a main effect for Object Type,

Figure 3. Mean response time as a function of reward structure and target armedness.

$F(1, 85) = 516.7, p < .01, \eta_p^2 = .862$. Finally, the analysis revealed that target's race affected participant response time for armed and unarmed targets differently. Specifically, participants were quicker to respond to armed targets when the target was black ($M = 610.45, SD = 3.79$) than when the target was white ($M = 626.75, SD = 4.07$). In addition, participants were faster at responding to unarmed targets when the target was white ($M = 682.34, SD = 3.76$) than when the target was black ($M = 690.49, SD = 3.96$). In other words, there was a significant two way interaction between Target Race and Object Type such that, $F(2, 85) = .235, p < .01, \eta_p^2 = .336$. Taken together, people were quicker to respond when viewing guns compared to nonguns and were faster responding to black targets compared to white targets. Additionally, participants were quicker at responding to armed black targets than armed white targets. Simultaneously, responses were made quicker when unarmed targets were white than when they were black. The analysis revealed no other statistically significant findings. Contrary to our hypothesis, the reward structure manipulation failed to effect participant's responses.

Racial Attitude Accessibility

Priming Facilitation. In each trial, the time between target adjective and subsequent key press represented the response latency for that trial. Initially, measurements were taken for target adjectives without primes. These latencies represented the adjectives' baseline response latencies (bRT). Later, when testing for prior prejudice levels, the adjectives were preceded by facial primes. Adjectives which were first primed by facial images (pRT) were compared to bRTs in order to determine the effect that the ethnicity-valence relationship had on participants' response time. Subtracting pRT from bRT represented the facilitation score for each trial. In order to determine RT as a factor of primed ethnicity, facilitation scores were averaged for ethnicity (black versus white) by valence (positive versus negative) to produce 4 data points: White prime with Positive valence (WPV), White prime with negative valence (WNV), Black prime with positive valence (BPV), and Black negative valence (BNV). For both black and white primes, negative valence response times were subtracted from positive valence response times in order to get each participant's Attitude Estimate. The equation used is as follows:

$$(WPV - WNV) - (BPV - BNV) = \text{Attitude Estimate (AE)}$$

If this number turned out to be a negative value, we took the participant to have prior racial bias. If one has prior racial bias, the black/positive valence association will seem incongruent and the white/negative valence association will seem incongruent. This will result in high response time values for BPV and WNV compared to BNV and WPV. For example, if Person A took longer to respond to positive target adjectives when preceded by black primes and also took longer to respond to negative target adjectives when preceded by white primes, his Attitude Estimate Equation might look something like this:

$$(200\text{ms} - 800\text{ms}) - (1,000\text{ms} - 500\text{ms}) = -1,100 \text{ (AE)}$$

If a participant took equally long periods of time to respond to all positive valence adjectives compared to negative valence adjectives, regardless of the prime preceded it, such as Person B, her Attitude Estimate Equation might look something like this:

$$(1,000\text{ms} - 400\text{ms}) - (1,000\text{ms} - 500\text{ms}) = 100 \text{ (AE)}$$

Thus, Person B would be an example of a person with low prior prejudice because the Attitude Estimate is positive.

Combining Shoot/No-Shoot Task and Attitude accessibility measure. Taking into account each participant's Attitude Estimate, we determined that there would be a prior racial bias if both the Attitude Estimate and the Bias Number were both negative. The Bias Index was calculated as a function of response time of the shooting task, and in much the same fashion as the Attitude Estimate was calculated. That is, the average time that participants took to respond to armed targets was subtracted from the average time it took for them to respond to unarmed targets, respective of target ethnicity. This is reflected in the equation:

$$(\text{unarmed white} - \text{armed white}) - (\text{unarmed black} - \text{armed black}) = \text{Bias Index}$$

For there to be a level of prior racial bias, the black/nongun association would be perceived as incongruent and the white/gun association would seem incongruent. This will result

in high response time values for unarmed/black and armed/white values compared to the armed/black and unarmed/white values. In this circumstance, the Bias Index would emerge as a negative value. For example, if Person A took longer to respond to unarmed black targets and also took longer to respond to armed white targets, his Bias Index Equation might look something like this:

$$(400\text{ms} - 700\text{ms}) - (800\text{ms} - 400\text{ms}) = -700 \text{ (Bias Index)}$$

If a participant took equally long periods of time to respond to all unarmed targets compared to armed targets, regardless of the ethnicity of the target, such as Person B, her Bias Index Equation might look something like this:

$$(700\text{ms} - 400\text{ms}) - (700\text{ms} - 500\text{ms}) = 100 \text{ (Bias Index)}$$

Thus, the positive value of the Bias Index is indicative of low prior prejudice. Combined with the positive value of Attitude Estimate, Person B would be classified as someone with little prior prejudice. This score was correlated with accuracy of the shooting task.

A regression analysis was conducted to determine whether the Attitude Estimate was a predictor of the Race Bias Index. Overall, the regression analysis was not statistically significant, $R^2 = .007$, $F(1, 84) = .628$, $p = .43$. Additionally, regression analyses were conducted to determine whether the Attitude Estimate a predictor of Race Bias Index as regards to the Reward Structure Manipulation. However, the analyses were not statistically significant, $R^2 = .012$, $F(1, 25) = .3$, $p = .59$ (shoot bias reward structure), $R^2 = .066$, $F(1, 28) = 1.974$, $p = .17$ (no-shoot bias reward structure), and $R^2 = .001$, $F(1, 27) = .02$, $p = .89$ (no-bias reward structure). That is, regardless of the reward structure employed, level of prejudice did not determine the amount of Shooter Bias.

General Discussion

Previous studies have suggested that there is an automatic stereotypically-dependent association between black people and weapons (Payne, 2001; 2006). Further work has revealed that people are biased to shoot black targets compared to white targets. In a shooting paradigm, people have been observed to be faster (Correll et al., 2007b) and more accurate in their

decisions to “shoot” armed targets if the target is black compared to white (Correll et al., 2002; Correll et al., 2007a). Additionally, people have been observed to be faster at “not shooting” unarmed white targets faster than unarmed black targets (Correll et al., 2002). In the current study, we attempted to manipulate the racially-dependent shooting bias and underlying automatic stereotype activation frequently observed in previous studies. In order to encourage participants towards decisions which favoured more conservative, non-shooting responses, we altered the rewards and penalties given for responding correctly and incorrectly.

The current study replicated results observed in previous studies. That is, ethnicity of the target did affect participants’ decisions to shoot and not shoot. Specifically, participants were quicker and more accurate to shoot armed targets when the target was black versus white. In addition, participants were quicker and more accurate to decide to not shoot when viewing an unarmed white target than when viewing an unarmed black target.

However, the novel manipulation failed to produce the desired effect of decreasing Shooter Bias. In other words, participants “shot” armed black targets quicker and more accurately than armed white targets. Changing the costs and rewards towards a point distribution which favoured non-shooting decisions compared to shooting decisions did not influence this bias. The manipulation did, however, affect overall shooting accuracy. Participants responded more accurately to all armed targets, in general, when assigned to the *shoot bias* reward matrix than when assigned to the *no shoot bias* reward matrix. In other words, when motivated towards “shooting”, participants were more accurate than when they were motivated towards “not shooting”. Participants who were assigned the *no-shoot bias* points matrix were more accurate in responding to unarmed targets than armed targets. The reward structure manipulation was able to drive participants away from shooting behaviour but responses remained stereotypically-dependent throughout.

Previous studies have commonly observed stereotypically-dependent shooting behaviour to be fairly stable (Correll et al., 2002; 2007a; 2007b). In the current study, Shooter Bias remained stable across prejudice levels. That is, the level of Shooter Bias did not depend upon whether a participant was of high or low prejudice. This finding can be explained by the rationale that participants may be affected by the automatic association between black targets and “threat”. The awareness of the association, alone, may be sufficient to shape responses in a stereotypical

manner. People may activate this connection (subsequently affecting responses in the shooting task) without consciously equating any negative stereotype to the black social group (Devine, 1989; LaPore & Brown, 1997; Gaertner & McLaughlin 1983; Fazio et al., 1995). Thus, high prejudice or low prejudice, participants may be affected by an association of “threat”, sufficient to promote high levels of Shooter Bias.

As we have discussed, grouping people into categories is an efficient manner of processing, requiring little time and cognitive capacity (Brewer, 1988; Fiske & Neuberg, 1990). Consequently, it is not surprising that participants automatically categorize targets in terms of the ethnic groups they are associated with. However, the result of this “quick and dirty” form of activation is a potentially erroneous decision, as participants will respond to target ethnicity, while failing to focus on the target gun or nongun. One would assume that given the situational demands of the shooting task, participants would ignore ethnicity of the target and promote a controlled level of processing, contingent upon armedness of the target and reward structure given (Gilbert & Hixon, 1991; Chaiken & Trope, 1997). Thus, there must be some underpinning phenomena holding Shooter Bias resistant to such manipulations. Any one of several explanations can account for the stability of stereotypically-dependent responses.

Appropriate Motivation. The motivation employed may not have been sufficient to combat participants’ dependence upon target ethnicity when responding. People low in prejudice will struggle internally with the knowledge that their responses, regardless of the type of processing that was relied upon to make their decisions, were stereotypically dependent (Monteith, 1993). Thus, simply informing participants that their behaviour will be analyzed to determine prejudice may be sufficient to cause guilt for responding stereotypically (at least in those who have low levels of prejudice). Feedback could increase salience of target ethnicity following incorrect responses (e.g. “you did not shoot an armed white criminal!!” or “you just shot an innocent black person!!”) which would, in turn, increase awareness of stereotypical responses. Participants may then have greater cognitive ability and sufficient motivation to control stereotypic responses. However, as previous research has indicated (Payne, Lambert & Jacoby, 2002; Olson & Fazio, 2003) drawing attention towards race of the target may maintain or increase responses reflecting automatic stereotype activation. According to Payne et al. (2002)

this is due to the increase in racial salience. That is, instructing participants to “ignore” target ethnicity makes participants attend to that specific attribute of the target.

The initial reward structure was based on replicating police officers decisions to shoot or not shoot. When police officers make decisions, the lives and wellbeing of themselves and others are contingent upon responding quickly and accurately. Compared to police officer response incentives, the reward structure of the current study cannot measure up. If a police officer responds according to automatic stereotype activation, the result could be the death of an innocent African American or being fatally shot as a result of not shooting an armed Caucasian. Thus, police officers are faced with the ultimate form of motivation. Unfortunately, responses based on points cannot compare to the costs and rewards of decisions facing police officers everyday (Correll et al., 2002).

The perceived reward differential is relative to each participant. We cannot determine how much each response is worth or the point differential between correct or incorrect decisions should be. For example, correct decisions could be worth 1,000 points and all incorrect decisions -1,000 to Person A, while shooting unarmed suspects could be worth -5,000 points and not shooting armed suspects -10,000 points to Person B. While one no-shoot reward matrix would provide sufficient motivation to bias participants to “not shoot”, another would fail to do so. What motivates one person to respond using a controlled level of processing may not be nearly enough incentive for someone else.

We propose a task in order to predetermine individual incentive. In order to provide the necessary motivation required in order to put themselves in police officers shoes, we must first determine the value of costs and rewards required to sway participants towards responses favouring one decision over another. First, this proposed task will determine participants personal reward hierarchy. In order to determine the value each person should be awarded and deducted, the task would describe and illustrate a scenario in which participants have shot an unarmed person and thus, taken an innocent life (in the case of false alarms). The value chosen by each individual would represent their points deducted for every false alarm. Next, participants would be instructed to imagine a scenario of being confronted by an armed suspect and because they fail to shoot, they are dead. After allowing the participant time to imagine the gravity of such an outcome, they would then be asked to rate the response (in the form of points) of failing to

respond to the armed suspect. Thus, we are able to determine the point value that a participant intrinsically assigns to a “miss”. The same form of scenarios and subsequently determining point values would also determine values placed upon correctly shooting and not shooting targets. After we have discovered individual costs and rewards, each participant’s set of points would be used in reward structures (e.g. shoot bias, no-shoot bias, and no-bias) fit specifically for them. Designing the reward matrices separately will enable us to manipulate the costs and rewards appropriate for each participant. Determining the value each participant fundamentally assigns to shooting and not shooting will allow us to more closely replicate police decisions.

The Introduction Manipulation. The current study, as well as previous experiments (Correll, Urland, & Ito, 2005; Correll et al. 2002; 2007a; 2007b) have utilized a structure designed to replicate police officers decision to shoot. In order to be assured that automatic stereotype activation relates to real world responses to shoot and not shoot, we must also replicate the setting where shooting and non-shooting decisions are made. However, the stimuli used in the current study may not be the perfect example of a real-world shooting scenario. That is, the presentation of consecutive, dissimilar backgrounds may prove to be a confounding variable. Police officers do not perceive drastically dissimilar settings every 300-850ms. Participants in the current study are expected to attend to multiple settings, scan, and separate critical stimuli from irrelevant stimuli. The sudden novelty of the critical background and all of the elements within it may influence participants’ behaviour. Though the purpose of multiple setting changes is designed to mimic the act of “scanning” the environment, a setting doesn’t change drastically from one second to another from forest to train station to an office room. In the current study, automatic stereotype activation may be influenced by the novelty of backgrounds, target persons, and target objects alike. For this reason, we propose that participants are introduced to a certain amount of information before viewing essential images. To determine if the suddenness of the setting presentation has an effect upon Shooter Bias, we propose to include trials in which only the setting is mentioned before the critical trial. This information would be presented as scenarios such as:

“You are alone in your office building”

“You are about to board your train when....”

As police officers are aware of their surroundings, and often the suspect, before observing a potential weapon or nonweapon, using this method, participants would be informed of the setting they are to observe before witnessing the gun or nongun.

When police officers experience a suspect and weapon or nonweapon, they do not often experience an entirely novel environment, or even a novel suspect. That is, before they are forced to respond with a shooting or non-shooting response, police officers may be aware of suspect ethnicity. For this reason, trials may be included which mention the targets ethnicity before responses are required. This information would be presented as scenarios such as:

“You are walking down the road and you see a black man who reaches in his pocket.”

“You are about to board your train when you see a white man who reaches in his coat”

Introduction as a Means of a Prime. On one hand, knowing the ethnicity of the target before viewing may serve to increase Shooter Bias. That is, a participant’s stereotype may be triggered when they become aware of the ethnicity of the target about to be shown. This stereotype activation may serve to facilitate stereotypical responses when a congruent pairing is given (Neuberg, 1989; Blair & Banaji, 1996) while having the opposite effect given an incongruent pairing. For example, Participant A may be primed to see a nongun if she is aware that she is about to view a white target. Likewise, being aware that he is about to view a black target might prime Participant B to see a gun.

In an incongruent condition, however, Participant A, who is primed to view a white target, expecting to see a congruent nongun, may take significantly longer to shoot when it turns out that the white target is armed with a gun. Because there is time for the association to form, the white-nongun association may be difficult to overcome. Thus, a white-gun pairing may elicit longer response time or less accuracy, compared to a white-nongun pairing. By the same logic, if Participant B is primed to view a black man, he may activate a stereotypical association with “gun”. Subsequently, his expectancy is that he will view gun and respond accordingly. Thus, viewing a nongun may consequently result in a longer response time and less accuracy than if the target is shown holding the expected gun. Using this manipulation, Shooter Bias may be exaggerated in circumstances which are incongruent because ethnicity of the target would be primed. According to this rationale, any Shooter Bias would be due to the automatic application

of the association between ethnicity and armedness and not merely because of stereotype activation.

Introduction as a Means of Control. On the other hand, Shooter Bias may be significantly decreased given the proposed line of research. Controlled processing could exert significant influence over activation to decrease any stereotypically-dependent responses. Results of the current study suggest that the biased manipulations employed were sufficient to affect accuracy. Thus, because participants will be aware of the specific target about to be viewed, and given time to control responses, accuracy should reflect motivation given, regardless of target ethnicity. The novel stimuli being only the gun or nongun should prompt responses biasing participants towards the manipulation condition (e.g. shoot bias, no-shoot bias, no bias). For example, if Participant A is given a *no-shoot bias* manipulation and a scenario that:

“You are walking down a street and see a black man. The man reaches in his pocket,”

Participant A will prepared to see a black man. As per results of the current study, the no-shoot bias manipulation will sway him towards responding “don’t shoot” and thus, accuracy will be greater for nonguns compared to guns, regardless of the ethnicity of the target. If this rationale is valid, participants should be able to control for stereotype activation because sufficient cognitive resources are allotted to process information about target ethnicity and hamper any stereotypical ideals (Devine, 1989; Gilbert & Hixon, 1991) and thus, respond strictly based on motivation (Neuberg, 1989; Plant & Devine, 1998).

According to this logic, Shooter Bias would still exist if a participant is low in motivation to control their stereotypic attitudes. To account for this, the Motivation to Control Prejudiced Reactions Scale (MCP; Dunton & Fazio, 1997) may be employed to measure participants’ motivation to control their prejudiced attitudes. If, for example, a participant is low in motivation to control his prejudicial reactions, knowing that the target to be viewed is black and given a no-shoot biased reward matrix, he would maintain his prejudiced attitude towards the association between black and gun (Payne, 2001; Correll et al. 2002).

And so the question is raised, is the underlying unconscious association between blacks and guns to blame for the Shooter Bias behaviour or is Shooter Bias due to a general stereotypical attitude? If the former is true, then priming ethnicity of the target before viewing target person holding the target object may serve to increase Shooter Bias. Thus, priming may set

up an expectation of a congruent nature while any incongruent pairing would violate expectancies (Neuberg, 1989; Blair & Banaji, 1996) and exaggerate the Shooter Bias observed in previous studies. If the latter rationale is accurate, and the underlying stereotyping behaviour is responsible, the manipulation should serve to eliminate Shooter Bias observed in previous studies. By this rationale, providing that participants are given sufficient time and cognitive ability to process constructs of target ethnicity, any ethnicity-dependent biases in shooting behaviour would be a result of prejudicial attitudes. Participants who do not maintain prejudicial attitudes should be driven away from shooting responses when given a reward structure that is biased towards non-shooting decisions.

In addition to determining the factor that affects Shooter Bias, the suggested study is more closely mimics police decisions without rapidly introducing novel settings.

Mechanisms Underlying Stereotype Activation

Black Targets and an Association to Threat. In the current study, manipulating the costs and rewards of participants' decisions was not sufficient to change the stereotypically-driven Shooter Bias. It seems as though the possible automatic association between blacks and threat is more enduring than can be controlled by costs and rewards of points. In another study, task goals ("avoid race bias" versus "use race bias") affected participant self-reported intentions, but did not improve performance (Payne et al., 2002). It follows that if participants were able to exert greater control over their responses, automatic stereotype activation would decrease, as participants would be able to respond to the situation and gun/nongun target. This would have the effect of improving performance and reducing stereotypically-dependent Shooter Bias. However, the hypothesized association between black targets and threat seems unwavering. The ability to preserve a biased shooting behaviour in spite of goals to the contrary suggests that the association linking the constructs "black" and "threat" may occur early in cognitive processing.

Some underlying mechanism might connect African Americans to a feeling of danger causing a failure to respond to goals. The points manipulation utilized in the current study may not have been enough to sway participants away from responses reflecting this association. Correll and colleagues hypothesized that people associate African Americans with violence and threat (Correll, et al. 2005). Additionally, police officers (Correll et al., 2007b) and non-police officers, who had more personal contact with African Americans had significantly greater levels

of Shooter Bias (Correll et al., 2002). With greater reinforcement, the initial association between African Americans and fear will become stronger and more automatically linked. Multiple pairings between black people and danger would subsequently promote automatic stereotype activation. It follows that with greater exposure (Correll et al., 2002) the fear underlying this stereotypical association would be sufficient to cause activation between black targets and shooting behaviours observed in the current research.

Activation of a fear construct may induce an automatic association of a biased nature. Such an association would occur early in cognitive processing. One way to examine the fear association is by measuring event-related brain potentials (or ERP) components. Correll, et al. (2005) measured ERPs to determine how Shooter Bias relates to the P200 and N200. Participants were given the exact shooting task and payoff matrix as presented in previous experiments. Once again, participants were biased towards behaviours which favoured shooting responses. Additionally, a shooting bias was again found that participants respond “shoot” quicker if armed targets are black and respond “don’t shoot” quicker if unarmed targets are white. Novel to this line of research was the finding that participants with larger P200 ERP activation (showing greater threat) and smaller N200 activation (low response inhibition) when responding to black targets versus white targets, showed greater Shooter Bias. This supports the theory that stereotypes are activated early in the detection process to bias how a participant ultimately responds.

Subsequent studies may be able to identify the strength of any “threat” or “fear” construct as it relates to black people. Changing the point value of their decisions was not sufficient to alter the automatic association between blacks and threat. It stands to reason that we must determine an appropriate method of manipulation in order to control responses to a greater degree. By determining the source of any fear association, society might be able to limit the number of wrongful deaths caused by automatic stereotypically-dependent activation.

Additionally, social norms may play a part to motivate people away from automatic associations reliant upon stereotypes. Knowing that they will be looked upon unfavourably because social norms tell us that prejudice is unacceptable, low- and high- prejudice people alike will be motivated to act in a way that corresponds to social norms. In this case, participants would be motivated to exert greater control over responses to shoot (Plant & Devine, 1998).

However, even this form of motivation may not eradicate Shooter Bias altogether. The answer may lay in the population we look to while attempting to replicate our reward structure.

As previous studies have suggested, when a population is perceived, it is perceived as a structure of various attributes (Brewer, 1988). If a perceiver is confronted with a member of that population, the attributes are activated, potentially stereotyping that member (Posner & Snyder, 1975; Shiffrin & Schnieder, 1977; Bargh, 1984). Though relationships of an automatic nature may form quickly (Smith & Lerner, 1986), the greater the amount of contact with the population in question, the more that an attribute, or construct, is activated in association with that group member (Correll et al., 2002; Dijkterhuis et al., 2000). It follows that in a population composed few black individuals, participants would have very limited exposure to people of black ethnicity. Thus, the current study executed in New Zealand may showcase a weaker shooting bias compared to another country where exposure to black individuals is higher. In a culture like that of New York, where exposure to the black community is greater, Shooter Bias may be even more unyielding and resolute.

This study has replicated the Shooter Bias phenomenon as it relates to the automatic stereotypic association between black targets and weapons (Payne, 2001; 2005; 2006; Correll et al., 2002; 2005; 2007; 2007b). Like previous research, results of the current study have highlighted the importance of using controlled processes when confronted by potentially threatening targets. Instead of relying upon categorizing people based on their ethnicity, and subsequently using set stereotypes to make responses, decisions must be based upon more individualized, unbiased sets of criteria, like what a suspect is actually holding in their hand.

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Appendix A

Four examples of computer images used in the shooting task. Presentation of an armed or unarmed target superimposed on a background indicate that a response should be made. These particular images both depict congruent targets (white target holding a nongun and black target holding a gun) on the left and incongruent targets (white target holding a gun and a black target holding a nongun) on the right.

Appendix B

Face stimuli used to measure the accessibility of negative attitudes towards blacks.

Positive and negative valence adjectives used to measure the accessibility of negative attitudes towards blacks.

Positive	Negative
Charming	Awful
Delightful	Disgusting
Excellent	Disturbing
Fabulous	Horrible
Likeable	Irritating
Nice	Repulsive
Outstanding	Rotten
Wonderful	Sickening