The Effect of Cognitive Load and Inhibiting Cues on Triggered Displaced Aggression

Joanna Howard-Field

Student Number: 13901393

Supervisor, Dr Eduardo Vasquez,

Word count: 15, 972

Abstract

Triggered displaced aggression (TDA) is when a provocation, followed by a subsequent provocation, initiates an aggressive response. Research has shown that cognitive load can increase TDA. It has also demonstrated that inhibiting cues can decrease TDA. However, the interaction between cognitive load and inhibiting cues moderating the magnitude of TDA has not yet been studied. Thus, the present experiment investigated the effects of these two variables on TDA. The sample consisted of 80 university students, 59 females and 21 males. The experiment used a 2 (cognitive load high/low) x 2 (inhibiting cues yes/no) factorial design to manipulate cognitive load and inhibiting cues. Following the TDA paradigm procedures, participants were provoked by insulting their performance on a bogus task. They were then exposed to a second annoyance consisting of a slightly negative evaluation from a fictitious partner, who was the target of aggression. The aggression measure required the participant to decide how long their partner (the target of aggression) should immerse their hand in ice-cold water. A 2 (cognitive load high/low) x 2 (inhibiting cues yes/no) ANOVA found main effects of both variables and their expected interaction. The results extend research that cognitive load increases displaced aggression and inhibiting cues decrease it. However, both main effects were qualified by the presence of the other moderator. Cognitive load only had a significant effect on TDA when inhibiting cues were also present. In turn, receiving inhibiting information only significantly reduced displaced aggression under low cognitive load. Therefore, the study demonstrated that under high cognitive load, inhibiting cues are prevented from decreasing TDA. The current research is discussed and interventions to reduce TDA are considered.

As Amy arrives late to work, her boss rebukes her over poor time management and calls her lazy. Although she becomes angry as a result of the negative comments, Amy decides not to react as she wants to keep her job. A few minutes later, her friend Sarah walks past her desk and comments that Amy's new hair cut does not suit her. This angers Amy for a second time that morning. Amy's boss then starts to photocopy some files near to her desk, so Amy is aware her boss can see her behaviour. However, Amy forgets her boss is nearby as she concentrates on some paperwork. When Sarah walks past again a moment later, Amy impulsively pushes her coffee mug off the desk, spilling coffee over Sarah's shoes.

The previous example illustrates a situation when cognitive load and inhibiting cues can interact to impact upon the triggered displaced aggression (TDA) phenomenon. Triggered displaced aggression occurs when a provocation, followed by a second provoking event, produces an aggressive response (Dollard, 1938; Miller, Pedersen, Earleywine, & Pollock, 2003; Vasquez, Denson, Pedersen, Stenstrom & Miller; 2005,). Hence, a time 1 provocation followed by a time 2 provocation (trigger) initiates TDA (Vasquez, 2009). In the context of TDA, retaliation towards the direct source of the time 1 provocation may not be possible, for instance if the provocateur is an employer (Denson, Pedersen & Miller, 2006). The individual that elicits the time 2 provocation or trigger that may be more familiar, or exudes less authority, then becomes the target of the aggression (Marcus-Newhall, Pedersen & Miller, 2000). A colleague or family member may be deemed a more acceptable target of aggression than a boss, as the consequence of this behaviour may be less severe than the risk of being fired (Hoobler & Brass, 2006). Thus, the pent up anger is expected to be 'taken out' on the more familiar second source of provocation (Denson, Pedersen and Miller, 2006; Pedersen, Bushman, Vasquez & Miller, 2008).

From the above research, it seems evident that TDA is a valid phenomenon. However, the evidence demonstrating factors that moderate the level of aggression is lacking. The aim

of the current report is to establish the relevant factors that moderate TDA in response to a second provocation. First, the literature on TDA will be reviewed. The research on moderators of TDA will then be considered. Subsequently, literature on inhibiting cues will be discussed, followed by cognitive load, taking into consideration their interaction on TDA.

Firstly, two models that help to explain the processes leading to TDA will be discussed. The first is the Cognitive Neoassociationistic model of Aggression (CNA; Berkowitz, 1989, 1990, 1993). The CNA proposes that a provocation activates a series of negative thoughts and emotions that are associated with this type of situation. For example, being shouted at by a parent is associated with extreme upset or anger. Berkowitz (1990) stated the negative emotions in response to a provocation are then often expressed through emotional aggression. Westman (2001) supported the model. He explained that the provocation in the context of the TDA paradigm causes great distress which motivates us to react with the same hostile manner, causing another being to feel similar despair.

In addition to this, Berkowitz (1993) also maintains that an aggression-arousing provocation 'primes' someone to respond aggressively to subsequent similar situations. A provocation creates negative emotions such as anger. When the anger is then triggered for a second time, it is likely to be exhibited through aggression. The CNA explains TDA through a stage process. A stimulus (provocation) causes anger. This then activates the associated constructs which in turn triggers a 'fight or flight' response, such as aggression or fear tendencies. The second stage involves processing anger which reduces or intensifies negative affect. A second provocation then acts to intensify or re-activate the original anger, propelling an aggressive response. This clarifies why aggression may be directed towards the time 2 provocation (trigger) rather than the source of the time 1 provocation.

The second model to provide more important justifications for the processes involved in TDA is The General Aggression Model (GAM; Anderson & Bushman, 2002). The GAM establishes that TDA occurs due to an increase in angry or negative affect, which is similar to the CNA. The GAM incorporates the perspective of the individual and their situation, their internal cognitions and the decision-making process (DeWall, Anderson & Bushman, 2011). It also suggests an increase in physiological arousal (Kroas, Ayduk and Mischel, 2005). In terms of TDA, the time 1 provocation promotes negative cognitions. In turn, this primes someone to observe consequent events negatively, even trivial ones. Hence, even a slightly negative triggering event is likely to initiate the decision to respond aggressively (Miller, Pedersen, Earleywine, & Pollock, 2003). Thus, the GAM and the CNA models explain how a time 1 and time 2 provocation are expected to lead towards TDA.

Alternatively to these models, Axelrod (1984) proposed the tit-for-tat matching principle to explain differences in aggression. According to this principle, the arousal and exhibition of aggression is usually elicited in several stages, in which the response matches the magnitude of the provocation (Miller, Pedersen, Earleywine and Pollock, 2003). TDA however, is an exception to the rule. Miller and Marcus-Newhall (1997) argue the provocation and trigger combine to elicit a higher level of aggression rather than the independent effects added together. Therefore, this suggests the outcome of TDA is likely to be of a high magnitude. Hence, the next step is to understand the relevant variables that increase or decrease the magnitude of this behaviour. Some factors that moderate TDA, including cognitive load, have been found to augment aggression (Vasquez, 2009). Thus it should be investigated whether cognitive load and other relevant factors interact to alter this magnitude.

Dollard, Doob, Miller, Mowrer and Sears (1939) suggested a possible reason for increased aggression. They stated that aggression is probable if there is no anticipation of a

successive punishment. Responding aggressively to a provocation from a policeman is unexpected as this can result in the severe punishment of imprisonment. However, aggression towards a friend is permissible as they are likely to forgive the action eventually. So, if a policeman provides the time 1 provocation, this is likely to preclude retaliation due to the presence of authority (Vasquez, Osman & Wood, 2012). When the friend produces the time 2 provocation, they then become the target of aggression as they are more likely to forgive the action. Pedersen, Bushman, Vasquez and Miller (2008) more recently explained this as the 'kicking the barking dog effect'. Familiar beings are observed with less power than an unfamiliar being. For instance, someone may be less motivated to aggress against a tall, muscular stranger as they are able to retaliate with a higher degree of aggression (Vasquez, Lickel & Hennigan, 2010). Consequently, when we are provoked by a powerful being, we refrain from responding aggressively. When a second provocation is delivered from a less powerful or more familiar being, aggression is more likely as there is a lower risk of retaliation or punishment (Mitchell & Ambrose, 2007). Hence, if a provocation is received from a boss, when we arrive home and the dog is barking for attention, the less powerful dog receives the aggression (Olweus, 1995).

As previously stated, Vasquez (2009) demonstrated that a high cognitive load increases the magnitude of aggressive response. However, the current study aims to broaden the research by investigating other factors that may interact with cognitive load to alter its influence on TDA (Denson et al., 2008; Lieberman, Jarcho, and Obayashi, 2005; Vasquez, 2009). Therefore, the purpose of the current study is to test the interaction between cognitive load and the relevant factors on TDA, to understand their influence on aggression.

Moderators of TDA

Several factors have been found to increase the likelihood of TDA, such as rumination (Vasquez, Pedersen, Bushman, Kelley, Demeestere & Miller, 2013). For example, Bushman, Bonacci, Pedersen, Vasquez (2005) studied the likelihood of TDA by inducing ruminative thought. They found those who ruminate are more likely to aggress in response to a provocation (Rusting and Nolen-Hoeksema, 1998). However, some people may be more likely to ruminate than others, so this research does not explain extreme TDA universally (Lanciano, Curci & Zatton, 2010). Furthermore, personality types that show a lack of empathy or control towards others are likely to behave more aggressively towards familiar beings (Giancola, 2000; Wastell, Cairns &Haywood, 2009). Yet, this previous research on aggression has targeted specific personalities. It is important to examine other moderators of TDA that may have a larger influence on the magnitude of aggression in universal environments outside of personality traits. A relevant factor that has been found to decrease aggression is inhibition (Giancola, Duke and Ritz, 2011). This is important to consider, as many factors have been found to increase aggression (Vasquez, Pedersen, Bushman, Kelley, Demeestere & Miller, 2013), however little has been found to decrease it. Thus, the next section will discuss the influence of inhibiting cues on the moderation of TDA.

Inhibiting Cues

Inhibiting cues refer to elements of information that attempt to prevent us from behaving impulsively (Poliy, 1998; Fujita, 2011). An example of an inhibiting cue is a policeman, whose presence deters someone from acting aggressively towards the person they are arguing with. Bari and Robbins (2013) stated that inhibition is vital within cognitive processes and the organization of a behavioural response. More specifically, Nigg (2000) explained that ‘executive inhibition’ is the ability to enforce cognitive and behavioural

inhibition of impulsive behaviour. Thus, it is important to focus on inhibiting cues as a moderator of aggression to determine the extent to which they decrease TDA.

Fujita (2011) supported the significance of inhibiting cues. He stated they are vital to regulate behaviour, by increasing the effort to control impulsive reactions. So, when inhibiting information is applied to an aggression-provoking situation we should expect to see less aggression, compared to a situation when inhibiting information is not presented. Inhibition raises awareness that impulsive behaviour such as aggression is socially undesirable (Abderhalden, Needham, Friedli, Poelmans & Dassen, 2002). Moreover, the potential consequences of behaving this way may not be in the aggressor's best interests (Polivy, 1998); in particular, if a more powerful retaliation (Vasquez et al., 2010) or social rejection (Card & Little, 2006) is likely to be a consequence. Hence, we are less likely to exhibit displaced aggression if some form of inhibiting cue is presented in the process of deciding to aggress.

Giancola, Duke and Ritz (2011) studied the moderation of inhibiting cues on aggression. They tested the effect of violence-inhibiting cues when participants were given the opportunity to administer electric shocks to a partner. Those who had received the inhibiting cues administered significantly lower intensity and shorter duration shocks compared to participants who received violence-promoting cues. This research supports that inhibiting cues attempt to restrain the motivation to aggress and can effectively decrease aggression when someone is presented with the opportunity to aggress (Carver & Scheier, 1990). Thus, this indicates that inhibiting cues are a relevant factor when deciding whether or not to aggress.

Previous research conducted by Stucke and Baumeister (2006) investigated this relationship. They explained that the ability to self-regulate is limited. They found when

participants concentrated on an activity involving self-regulation, such as keeping certain muscles still; they were likely to respond aggressively to later events where self-regulation was required. They concluded that a single use of self-regulation was ample to exhaust the self-regulatory system. Thus, this provides a realistic argument as to why aggression may take place after a second provocation.

This was supported by Dewall, Baumeister, Stillman and Galliot (2007. They also found participants who had a depleted level of self-regulation were likely to aggress after a time 2 provocation (trigger), as they had exhausted their regulatory resources during the first provocation. So, inhibition could no longer be utilised and a further provocation led to instinctive behaviour such as aggression. Thus, when we focus on the moderation of inhibiting cues on aggression, it is important to induce realistic cues to activate self-regulation and to assess whether a second provocation triggers TDA. For example, reinforcing the idea that a participant is being monitored on their performance would induce realistic inhibiting cues, as we are used to having our performance monitored during school and work. Bereczkei, Birkas and Kerekes (2010) stated that in a public situation we are aware that our behaviour is observed, so we are more likely to act altruistically as this is a socially desirable behaviour. Thus, if the inhibiting cue is induced following the provocations, stating that the decision to aggress will be observed or studied by someone else, this may promote the necessary self-regulation to prevent aggression (Bereczkei, Birkas & Kerekes, 2010).

In addition, the induced inhibiting cues are similar to our moral and self-regulating behaviour, so we may decide against reacting aggressively as we know it is not socially desirable. When these moral cognitions cannot be processed without great effort, further provoking events may cause an impulsive reaction (Bari & Robbins, 2013). It is important to determine the relevant factors that prevent inhibiting cues from being accessed. When these

are established, methods to increase the influence of inhibiting cues on the decrease of TDA can be investigated.

Bari and Robbins (2013) proposed that high levels of awareness are necessary to exercise inhibitory processes which are deemed a form of self-regulation (Vasquez, 2009). However, when the inhibitory processes become dysfunctional due to an extraneous factor, a triggering event is likely to cause impulsive behaviour (Bari and Robbins, 2013). Thus, when there is a depletion of inhibitory processes, we are less likely to be able to moderate our behaviour in response to a provocation (Muraven, Tice & Baumeister, 1998). Anderson and Bushman (2002) stated when anger is experienced; this is likely to reduce inhibitory control. Anger interacts with higher-level cognitive processes, such as moral reasoning, to attempt to justify retaliation. This increases the motivation to act impulsively and this then increases the likelihood of aggression. When applied to TDA, this implies the time 1 provocation produces anger. Inhibitory control effectively prevents aggression but when a second provocation is experienced, there is less inhibitory control to prevent retaliation. Due to this, the attempt to moderate behaviour becomes difficult and aggression is more likely.

Furthermore, Laible, Murphy and Augustine (2014) found a positive relationship between negative affect dysregulation and aggression. In particular, negative affect dysregulation was associated with reactive aggression (Vitaro, Barker, Boivin, Brendgen & Tremblay, 2006). A large amount of negative affect experienced due to a hostile situation was found to reduce the ability to avoid inappropriate behaviour (Pellegrini, Bartini & Brooks, 1999). So, when a time 1 provocation creates negative affect, a second provocation that increases the negative affect makes it extremely difficult to avoid impulsive aggression. This supports the argument that impaired inhibitory cognitions promote the misjudgement of aggression-provoking situations. A higher level of negative affect is more difficult to control (Eisenberg & Fabes, 1992). Thus, a higher motivation to aggress is more difficult to inhibit

compared to similar situations when a higher degree of available mental capacity can process and decrease negative affect.

On another note, Steele and Southwick (1985) and Steele and Josephs (1990) suggested that inhibiting cues can act adversely to highly salient aggression cues. Inhibiting cues can be highly salient, such as a policeman standing nearby to an aggression-provoking situation. Although, they can be often be discrete, for instance deciding to take some sweets from the cupboard when the rest of the family are out but being aware if a parent was there this may not be permitted. These inhibiting cues require cognitive processes to assess appropriate behavioural norms. When self-control cognitions can be accessed and inhibiting cues can be processed, behaviour is likely to be regulated (Denson, Capper, Oaten, Friese & Schofield, 2011; Denson, Dewall & Finkel, 2012). For example, inhibiting cues determine that someone should not retaliate towards a boss in case of being fired or reacting aggressively in a public place where this may be deemed as abnormal behaviour (Muraven, Tice & Baumeister, 1998). However when these regulatory processes cannot be accessed, as in a state of distraction, aggression is likely to occur in response to instigation. Hence, we can assume a variable that inhibits our regulatory system is highly likely to result in more displaced aggression.

Denson, White and Warburton (2009) supported this, stating that being intoxicated is one factor that prevents self-regulation in regards to violence. Giancola and Corman (2007) explained alcohol encourages the brain to focus only on highly salient environmental cues. Denson et al. (2008) studied the interactive effects of alcohol and cue salience on TDA. They tested the hypothesis that intoxicated participants were likely to perceive and act more aggressively toward a higher aggressive-cue salience at the time 2 provocation compared to the non-intoxicated sample. They argued when someone is cognitively impaired, their focus is drawn towards the provocation. Unlike those who are not cognitively impaired, they are

unable to process ‘less important’ variables such as self-regulation. They then respond in accordance to the aggression-cue aggressively. Denson et al. (2008) found a positive correlation between alcohol, triggering cue salience and TDA. Hence, a decrease in cognitive functioning enhances the likelihood that self-regulation is ignored and fails to decrease aggression. Less salient, inhibiting cues are then deemed inferior to negative affect and aggression is likely.

As a result of the current review, there is limited research evidence that demonstrates the effect of cognitive load and inhibiting cues upon the magnitude of TDA. For this reason, it would be appropriate to investigate these variables within the TDA paradigm in order to establish significant relationships. Giancola and Corman (2007) found that alcohol decreased aggression when it was combined with a cognitive activity. However, the methodology could be applied to the TDA paradigm in the context of inhibiting cues and a distraction. If a cognitive task was given to participants when they had received a time 1 and a time 2 provocation, this may distract the participants from attending to inhibiting cues. In turn, we would observe their instinctive aggression responses. This would implicate the extent to which someone is likely to aggress in the presence of inhibiting cues and cognitive load. Hence, this would reflect environments where we are likely to see true aggression exhibited, such as someone aggressing towards a trigger at home after being provoked at work. By investigating this, it can be discovered whether cognitive load is a relevant factor in preventing the role of inhibiting cues in decreasing TDA.

Cognitive Load

Cognitive load has been found to moderate TDA (Vasquez, 2009). Cognitive load represents the degree of effort that performing a task places on the cognitive processing system (Paas & van Merriënboer, 1994). An increase in cognitive processes causes an

increase in cognitive load. This then decreases the cognitive processing capacity that can be utilised to process and manage new situations appropriately (Crick & Dodge, 1994; Paas, Tuovinen, Tabbers & Gerven, 2003). So, in a new situation the presence of a high cognitive load leads to dependence upon cognitions that require less processing (Vasquez, 2009). When faced with a potential conflict, thoughtless behaviour is more likely compared to someone with a higher degree of available cognitive processing capacity (Kuo & Sullivan, 2001).

Vasquez (2009) demonstrated that inducing cognitive load in the context of TDA can impact the processing of the provocation. Vasquez (2009) tested the effect of cognitive load on TDA in the context of provocation salience. The time 1 provocation involved insulting the participant on their performance on a task. They then completed another task which was marked by a fictitious partner. The time 2 provocation salience was then induced according to the partner's evaluation of the participants work. Marking in black ink implied low salience and marking in red ink implied high salience. The cognitive load was also induced during the trigger (time 2 provocation) while the participant read their partner's marking. The results showed that inducing cognitive load increased aggression when the trigger was highly salient. However, cognitive load failed to increase aggression when the trigger was low in salience. So, when a high cognitive load was induced, this interfered with the processing of less salient information, such as a less salient trigger (time 2 provocation). The participant then focused on the highly salient time 1 provocation, leading to aggressive retaliation. Under low cognitive load, less salient factors are likely to be processed and contributed towards the decision to aggress. Thus, less aggression can be expected under low cognitive load.

Meiring and Subramoney (2014) supported the relationship between mental capacity and aggression. They found a decrease in mental capacity was associated with a decrease in empathy and altruism. When it comes to the TDA paradigm, a reduction in mental capacity is likely to lead to a reduction in empathy towards the source of the trigger. Hence a higher

magnitude of aggression is likely to be directed towards the trigger, in comparison to a full mental-capacity where the perspective of the trigger can be taken and empathy can be involved in the decision to aggress or not.

Pedersen, Vasquez, Bartholow, Grosvenor and Truong (2014) stated in the context of social-cognitive theory, we interpret uncertain social stimuli based on the current cognitions that can be accessed in memory. Anderson, Krull and Weiner (1996) stated when someone is provoked and the intentions of the provocateur are ambiguous, this reflects realistic provoking situations and this is likely to produce an aggressive response. In addition, relevant knowledge acquired from similar situations is applied (Schwarz, 2010; Yeh & Barsalou, 2006). Once load is induced in the TDA paradigm and mental capacity has decreased, the participant is likely to interpret the time 2 provocation extremely negatively, as their current memory stores are negative due to the time 1 provocation.

Fonseca, Brauer, Moisuc and Nugier (2013) tested the effect of cognitive load on reactions to social situations, such as someone cutting in the queue at a supermarket. They argued cognitive load causes less tolerance of anti-social behaviour. So a provocation may be deemed less acceptable under load which creates a higher degree of negative affect. Furthermore, an added cognitive load weakens the effect of control within uncivil situations. Fonseca et al. (2013) predicted that participants in the induced cognitive load group would be less effective at social control in an uncivilized situation compared to those under no load. Participants in the cognitive load condition experienced more intense, negative emotions. They also found those under cognitive load were more likely to engage in ineffective social control when faced with an uncivilized situation. Thus, this demonstrates that when cognitive load is presented within a provoking situation, this serves to augment anti-social behaviour by increasing negative emotions in response to a provocation and decreasing the effect of self-regulation. Hence, if cognitive load is induced following inhibiting cues, this might interfere

with the processing and utilisation of the cue to effectively control aggression. Furthermore, the increased negative emotions due to the high load may increase the motivation to aggress, overriding the subtlety of the cue.

In contrast, Giancola, Josephs, Parrot and Duke (2010) argue that a distraction following a provocation, such as inducing a high cognitive load should in fact decrease an aggressive response. A distraction diverts concentration away from the negative effect that is produced after a provocation, towards the distracting variable. When this is applied to the CNA, (Berkowitz, 1989,1990, 1993) a distraction may interfere with the triggering of associated negative constructs in response to the first provocation. So, this may prevent the associated negative constructs from being activated and this may weaken the desire to retaliate aggressively.

Nevertheless, this fails to explain the effect of a distraction within the context of TDA. A distraction may prevent aggression in response to a provocation, however it may not have the same result with a subsequent trigger when self-regulation is exhausted (Stucke & Baumeister; 2006). A trigger will re-activate negative constructs created by the provocation (Berkowitz, 1989, 1990, 1993) even if these are reduced due to a distraction. The reactivated negative emotions then outweigh the salience of self-regulation and this is still likely to produce an aggressive response. Thus, research is required to test if cognitive load distracts the participant away from their anger, causing decreased aggression, or whether it serves to increase the likelihood of an impulsive response.

Alternatively, Hoaken, Shaughnessy and Pihl, (2003) argued inducing a distraction contributes to an increase in aggression. Lieberman, Jarcho, and Obayashi, (2005) supported the notion that cognitive load is a suitable distraction that contributes to a higher magnitude of TDA. They stated that a high load decreases cognitive processing, which results in the

misconception of the trigger (Forgas, 1995). We are unable to process mitigating circumstances that may explain why someone elicited a trigger (Wegener, Clark, & Petty, 2006). We are then likely to respond aggressively, rather than trying to understand the reason for their behaviour. Furthermore, Vasquez (2009) explains when there is a depletion in cognitive processing capacity; highly salient information is most likely to be focussed upon. As a result, we are more likely to remember the highly salient provocation, so this is likely to steer an extreme aggressive response.

Watson and Fisher (2004) compared aggression to a set of jugglers. They can cope with handling several objects at the same time. In the same way, the general public learns to complete minor activities simultaneously. As various objects are introduced, it becomes harder to concentrate, which results in one if not all of the objects being dropped. In the same way, when we experience a provocation, we use self-regulation to control our aggressive actions. However, when cognitive load is then increased, this causes someone to react impulsively with anger as they can no longer attend to self-regulation, or process inhibiting cues that have previously been induced. Thus, by inducing inhibiting cues followed by cognitive load, this will demonstrate whether the load interferes with the appropriate recall of the cues and their aim to decrease aggressive responding.

In addition, Anderson and Bushman (2002) argued that anger focuses attention towards provoking events. Anger also increases attention towards subsequent related stimuli (Cohen, Eckhardt & Schagat, 1998). Hence, when cognitive load is high, the anger in response to the time 1 and 2 provocation is more likely to be processed than the inhibition to refrain from aggression. Therefore, this suggests when inhibiting cues have been presented, a subsequent increase in cognitive load is likely to direct attention towards anger and the motivation to aggress, and away from the cues to process restraining an impulsive response.

If this is demonstrated in the current study, it can extend research that aims to decrease TDA, such as methods to increase the salience of inhibiting cues.

Furthermore, Denson et al. (2008) suggests that a high cognitive load is capable of increasing TDA at any point within the paradigm. However, there is a lack of empirical support for this, as the research by Denson et al. (2008) and Vasquez (2009) have been the sole findings for the relationship between induced cognitive load and TDA. This presents a gap between our knowledge of TDA and the relevant causes that influence the behaviour. Cognitive load has been found to be an effective factor in its exhibition (Vasquez, 2009). However, the presence of alternative, relevant factors need to be included within research to determine how the magnitude of aggression is influenced. When this is achieved, programmes may be designed to successfully manage and decrease the consequences of TDA.

In addition, Denson et al. (2008) argued that increasing cognitive load while aggressing, decreases the capacity to inhibit aggressive reactions. If cognitive load is induced after inhibiting cues are produced, we expect them to prevent the inhibiting cues from being processed to decrease aggression. Vasquez (2009) concurred, stating that if cognitive load is increased during the aggression stage of the paradigm, this is likely to increase the extent of aggression. Cognitive load prevents the availability of inhibitory cognitions whilst the magnitude of aggression is decided. Hence, we expect to observe instinctive aggressive tendencies if cognitive load is induced within this part of the paradigm. This suggests future research should concentrate on investigating the effect of induced inhibiting cues followed by cognitive load during the aggression condition. Doing so will demonstrate the realistic extremes of TDA under the influence of an occupied mental capacity. In turn the results will aid our understanding of the extent to which cognitive load increases TDA and prevents inhibiting cues from decreasing TDA.

Seguin, Boulerice, Harden, Tremblay and Pihl (1999) tested instinctive aggressive behaviour and proposed an association between working memory and aggression. More specifically, working memory involves executive cognitive functioning (ECF) which permits attentional regulation (Giancola & Tarter, 1999) and more complex cognitions such as self-control (MacTavish, 2011). Therefore, a deficit in ECF means a reduced attentional capacity and the ability to recall and utilise earlier inhibiting information. This leads to behavioural dysregulation due to maladaptive judgements of other's behaviour and how to respond to it (Giancola & Tarter, 1999; MacTavish, 2011).

In addition, MacTavish (2011) explained that ECF has a 'hot' component that is involved in emotional responses and decision-making processes. When our cognitive functions are depleted, we expect to see an increase in aggression in response to a provocation (Easton, Sacco, Neavins, Wupperman & George, 2008; Godlaski, & Giancola, 2009). This is because there is a lack of available self-regulation to promote the reasoning and motivation against acting impulsively (Friese, Hofmann & Wänke, 2008). They also have less attention to process the magnitude of the provocation. Therefore participants are likely to utilise 'hot' executive functioning and due to negative affect, they are likely to make extreme decisions. Hence, when someone is motivated to aggress following a provocation but inhibiting cues are induced before the decision to aggress, we expect these to be processed appropriately and utilised to decrease aggression. However, if the cues are followed by an increase in cognitive load, we expect the load to decrease the ability of the cues to be recalled and processed. The load will make it harder to think about the less subtle cues while deciding to aggress, meaning the motivation to aggress overrides the cues and permits the impulsive response to take exhibited.

Furthermore, Brower and Price (2001) reported a negative correlation between executive functioning and aggressive behaviour. They found those with frontal lobe

dysfunction were more likely to exhibit aggressive behaviour. This corresponds with the research suggesting ECF takes place in the frontal lobe where this controls self-regulation, inhibition of behaviour and emotion (Cummings, 1995; Giancola & Tarter, 1999; MacTavish, 2011). Hence this supports when cognitive functioning is impaired, this prevents the processing of inhibiting information and aggressive behaviour is likely to be the outcome. For instance if a participant is induced with inhibiting cues after receiving a provocation and a trigger, an increase in cognitive load will then deplete the ECF, preventing the ability of the cues to decrease an impulsive response towards the trigger. Hence we can expect to see a high magnitude of triggered displaced aggression. In particular, it was explained that a decrease in cognitive functioning leads to an increase in impulsive behaviour, especially aggression (Gannon, Ward & Beech, 2009). Denson, Aviles, Pollock, Earleywine, Vasquez and Miller (2008) researched the importance of self-regulation in the TDA paradigm by investigating it within the intoxicated population. They demonstrated that being intoxicated reduces cognitive functioning and in-turn, this decreases self-regulation. As a result, this population had the strongest TDA responses. This proposes the impairment of cognitive functioning is related to a larger magnitude of TDA. Thus, we can argue that inducing an activity that significantly decreases mental capacity will slow the rate of cognitive functioning, such as judging appropriately the realistic magnitude of a trigger, following a provocation.

Lane and Cherek (2000) also supported that the lack of cognitive processing capacity is likely to lead to aggression, even on the scale of crime and violence. When applied to the context of the TDA paradigm, we expect that following inhibiting information, cognitive processing interferes with the awareness of the cues that prevent aggression. Our impulsive aggression is then focussed towards the triggering individual who has provided a motivation for retaliation. So, if cognitive load is induced after the inhibiting cues have been

administered, this is likely to push out the inhibiting information and permit the aggressive impulse to be performed.

Denson et al. (2008) suggested that a low mental capacity is capable of increasing TDA at any point within the paradigm. Trope and Gaunt (2000) explained that under high load, only highly salient cues influence behaviour in response to the provocation and trigger. Therefore, this suggests inhibiting cues fail to be used when a high cognitive load is being processed as the cues are too subtle. Vasquez (2009) also found inducing cognitive load successfully led to the onset of TDA. This was only the case when cognitive load was applied in combination with the trigger, suggesting the induced high cognitive load influenced maladaptive judgements of the subsequent trigger. Dollard (1938) stated that receiving a trigger provides the excuse to respond aggressively

Research suggests cognitive load acts to increase TDA by enabling us to express socially undesirable behaviours. On the other hand, inhibiting cues act to restrict us from expressing those behaviours. To attend to the required self-regulation before responding to a trigger, there needs to be sufficient cognitive capacity to enable understanding of the trigger. Therefore, we can assume a higher cognitive load utilises a larger mental capacity, hence weakening the awareness of self-regulation (Bari & Robbins, 2013). Following inhibitory cues, someone who then processes a high load of information has less mental capacity to recall these cues that manage self-regulation. As a result, a highly salient variable, like anger or motivation to respond aggressively, occupies the available mental capacity, preventing inhibitory cues from attempting to lower aggression.

Furthermore, Vigil-Colet and Codorniu-Raga (2004) stated that those who have a decreased inhibition, or they cannot access inhibiting information, are correlated with higher levels of impulsivity. In turn, this is related to higher aggression. They found participants

who were classed as ‘impulsive’ had shorter reaction times in response to a stop/go task. They also took less time to complete their assigned questionnaires, indicating that ‘impulsive participants chose speed over accuracy. As a result, we can assume that when a trigger is released, if inhibiting information is hindered by a subsequent cognitive load, this permits impulsive behaviour. If participants are conditioned to act on their impulse by being unable to access inhibiting cues, we expect to observe impulsive aggression. Impulsivity is also associated with parietal lobe dysfunction, as mentioned earlier. Dewall, Baumeister, Stillman and Gailliott (2007) supported this. They stated the impulse to aggress is prevented by the social norm of self-regulation. When we fail to inhibit this impulse, this is likely to cause aggression. Consequently, cognitive impairment is likely to lead to impulsive behaviour as the firstly induced inhibiting cues are not appropriately processed to lower aggression.

In summary, inhibiting cues can decrease TDA. However, this may only be the case when there is no alternative, highly salient information within the paradigm to motivate aggression. Therefore, if inhibiting cues are induced following the trigger and before the aggression, we expect a low magnitude of TDA. In turn, cognitive load can increase aggression when it is induced prior to, and during the decision to aggress. Investigation of these variables is appropriate as further research is needed to establish whether cognitive load increases aggression, while inhibiting cues decrease it. We also want to test whether these two variables interact to alter the magnitude of TDA by inducing inhibiting information followed by cognitive load. Hence, the aim of the current study is to expand the existing research regarding the effect of inhibiting cues and cognitive load upon the magnitude of triggered displaced aggression. It will also be the first study to test the interaction between cognitive load and inhibiting cues on the magnitude of TDA.

It is expected that participants under high cognitive load will act more aggressively than participants under low load that can judge the magnitude of the time 2 provocation and

standards of behaviour more appropriately. When inhibiting cues are induced, it is expected that lower aggression levels will be exhibited, compared to those who do not receive inhibiting cues as they have an increased awareness of the consequences of their aggressive intentions. When inhibiting cues are induced followed by a high load, it is hypothesised that the cues will not decrease aggression compared to low load and inhibiting cues. Hence, it is expected that the degree of available mental capacity to be correlated with the magnitude of TDA. Thus, the current study aims to test the following hypotheses. Firstly, it is predicted that cognitive load will independently increase TDA. Secondly, it is hypothesised that inducing inhibiting cues will independently decrease TDA. Finally, cognitive load will interact with the previously induced inhibiting cues to prevent them from decreasing aggression.

Method

Participants

The sample had 80 participants (N = 80). This included 59 females and 21 males aged between 18 and 24 (M = 19.8, SD = 1.46) from the University of Kent. The participants were randomly assigned to one of the four conditions, so there were 20 cases per condition. Each participant was awarded 3 course credits for volunteering to participate in the study. The students were recruited via the 'Research Participant Scheme' (RPS) at the University of Kent which allocated them to a certain timeslot. As they were recruited from within the university environment, this created an opportunity sample as the population was readily obtained.

Design

The experiment employed a 2 (no inhibiting cues/inhibiting cue) x 2 (low cognitive load/high cognitive load) between-subjects factorial design. The design involved a constant time 1 provocation and a subsequent mild provocation or trigger. The first component of the study was the provocation induction. This occurred after a bogus cognitive task (i.e., the anagram exercise; Appendix A). Secondly, the trigger condition consisted of the slightly negative feedback of the NASA task (Appendix B). These were both kept constant throughout the experiment. This was followed by the opportunity to aggress, which involved the participant deciding how long to distract their partner with ice-cold water.

Furthermore, there was a manipulation check to measure the effects of the cognitive load. The independent variables (IV's) in the experiment were cognitive load (high/low) and inhibiting cues (yes/no). The dependent variable (DV) was the level of aggression, which was measured by the number of seconds the participant decided for their partner to immerse their

hand in cold water. The inhibiting cues were induced prior to the cognitive load, to asses if a reduced mental capacity was associated with high levels of TDA.

Materials

The first element of the experiment involved an anagram exercise which consisted of 15 anagrams (Appendix A). For example ‘srlueeap’ was solved to become pleasure. This exercise was given 4 minutes to be completed and was timed using a stopwatch. Following this, the participant was given a creativity task, called the ‘NASA task’ (Bettencourt, Brewer, Croak, & Miller, 1992; Appendix B). The participant was asked to list suitable characteristics for an astronaut. The exercise was then swapped with the (fictitious) partner and they were asked to evaluate the others work. The experimenter marked the participants’ exercise. The evaluation sheet asked the participant questions regarding their attitude towards their partner and their performance on the task (Appendix C). The first set of questions was based on the NASA task itself, such as ‘The degree to which your partner’s answers made sense’. This was designed on a scale that ranged from 1 (not good at all) to 7 (extremely good). The second set of questions included statements to which the participant agreed or disagreed with such as ‘Your partner is a competent individual’. This had the same design and the scale ranged from 1(strongly disagree) to 7 (strongly agree).

The cognitive load was then induced for the decision making task. The high cognitive load number (5978305482), or the low cognitive load number (739; Appendix D) was placed face-down on the participants desk. Both these and the following task were created by the researcher. A bucket with ice-cold water was presented for each participant to test for several seconds. They were then administered a paper towel to dry their hand and were given a minute to memorise the number. They were also induced with inhibiting cues or no inhibiting cues (see condition one, two, three and four; Appendix E, F, G, H). They then rehearsed their

load for 30 seconds while they decided how long to distract their partner. This was recorded on a scale that ranged from ‘1 = 0 seconds (no distraction) to ‘9 = 80 seconds (extremely strong distraction) that reflected the number of seconds for the distraction (Appendix I). There were then two categories to indicate whether the participant’s results would or would not be viewed by others and to write down the number they rehearsed.

The subsequent exercise involved a picture category task (Appendix J). There were 33 images, three per page. Each picture listed three categories underneath and the participant had to circle the correct option. They were given 30 seconds to circle as many correct categories as possible while they rehearsed their assigned cognitive load. Following this, 3 scales were administered (Appendix K). The first asked the participant their attitude towards their NASA evaluation, which was designed to be slightly negative (Appendix L). This involved asking questions such as ‘Please indicate the degree to which you felt irritated as a result of your partner’s evaluation of your work on the NASA task’. This was rated by participants using a scale that ranged from 1 (not at all) to 7 (extremely). The second and third scales asked questions such as the degree of anger and curiosity they felt towards the anagram task and secondly the NASA task evaluation. Finally, a suspicion measure, formed by the researcher, was verbally administered (Appendix M). This involved five questions, including ‘did anything seem suspicious to you, if so what in particular’. This used a scale that ranged from 1 (not at all suspicious) to 4 (very suspicious). The researcher completed the scale after asking the participant the questions. The sample was obtained using the University website named the ‘Research Participation Scheme’ (RPS). When all the data had been collected, it was entered into the statistical program IBM SPSS statistics 20 where it was also analysed.

Procedure

Participants were randomly assigned to one of the four conditions before the experiment took place. Condition one was high cognitive load and inhibiting cues, condition two was low cognitive load and inhibiting cues. Condition three had high cognitive load and no inhibiting cues and condition four had low cognitive load and no inhibiting cues (Appendix E, F, G and H). Hence, condition four was the neutral or control condition. Each participant was run individually. Once they had arrived at the laboratory, they were shown to an individual cubicle. As part of the cover story, they were told that they were partaking in an experiment that tested individual skills such as language, creativity and cognitive performance.

Firstly, the researcher read the information to the participant, explaining the aims of the study. They were also informed they would be working with a partner (fictitious) for the decision making element of the study. To reduce suspicion of a fictitious partner, two participants were run simultaneously by two experimenters. The closing of doors and conversing outside the cubicle with the second experimenter contributed to the effect of a partner. The information sheet, two copies of the consent form and a demographics form were presented to the participant to complete (Appendix N, O, P). They were asked to retain the information sheet and one of the consent forms as evidence and understanding of the experiment. The experimenter exited the cubicle for a few minutes while the forms were filled out.

Provocation induction

When the consent and demographic forms were completed, the researcher re-entered to collect these and administer the first exercise. The participant was told they would firstly be tested on their language skills. They were presented with a set of anagrams which they

were given 4 minutes to complete (Appendix A). Approximately 4 minutes later the researcher returned to collect and 'mark' the answers. After this, a memorised script was recited to provoke the participant. They were informed they had not provided sufficient answers and their lack of effort should mean the study should be restarted, however there was not enough time to repeat the experiment and they would have to continue but with more effort. This provocation was found to successfully lead to TDA in previous research (Pedersen, Gonzales & Miller, 2000; Bushman, Bonacci, Pedersen, Vasquez & Miller, 2005). Therefore, the scenario was adopted in order to enhance the reliability of the current study, as we can be sure it successfully arouses negative affect.

Trigger induction

The second exercise was specified as a test of creativity (Appendix B). An astronaut was to be assigned six suitable characteristics for their career within 3 minutes (Bettencourt, Brewer, Croak, & Miller, 1992). These results would then be swapped with the ostensible participant and they would each evaluate the other's work. When the participant had completed the evaluation, these were swapped back, and a counterfeit evaluation was handed back to the participant (Appendix L). This had previously been completed by the experimenter. The participant was then left for a few minutes to read over the partner's evaluation of their NASA task which was slightly negative.

Aggression, cognitive load and inhibiting cues induction

Following the trigger induction, the experimenter re-entered the room with a plastic cup to continue with the aggression condition. It was then explained to the participant that they would complete a decision making exercise. They were to decide how long their partner should be distracted via one of their senses while completing the next exercise. The cup was presented to the participant and they were asked to pick one of the pieces of paper and read it

to the experimenter. This would ostensibly determine the distraction condition they would be assigned to. Condition one was a distraction through the touch sense, condition two via smell, three via the visual sense and four was a no distraction condition. The participant was unaware that all the pieces of paper had the number four written on it, which assigned them the no-distraction condition. When the piece of paper had been chosen and read out, the researcher exited the room, to find out the number their 'partner' had chosen.

The researcher subsequently re-entered the room with a bucket of ice-cold water, the low or high cognitive numbers (Appendix D) and the form to record the distraction time (Appendix I). The cognitive load number was laid face-down on the desk. The participant was told their partner picked condition one out of the cup and would be distracted through their sense of touch. Next, the participant was asked to test the ice water by immersing their hand in it for a few seconds to fully understand the distraction condition their partner would receive. After they had dried their hand, they were then told whether their results would be studied and utilised by a second researcher (inhibiting cues) or whether they should make sure they had not signed their name on any of the papers to remain anonymous (non-inhibiting cues). They were given a minute to memorise the number in front of them on the desk. The water was then taken out of the room as the participant was left for 30 seconds to rehearse the number.

While they rehearsed the number, they circled the amount of seconds on a nine-point scale which ranged from '1 = 0 seconds (no distraction)' increasing by 10 second intervals to '9 = 80 seconds (very strong distraction)' that they wished their partner to be distracted for (see Vasquez et al., 2005). They were also required to tick whether or not others would observe their results after the study was completed, and to write down their rehearsed number. When the 30 seconds had finished, the form was taken out of the room. The

participant was told that the form would be handed to the second experimenter for administration and then the study would continue.

Cognitive load manipulation check

The last exercise was presented to the participant (Appendix J). They were given 30 seconds to complete a picture exercise while rehearsing the same number they were assigned for the decision-making exercise. This involved a series of pictures. Each picture listed 3 categories underneath them and the participant was asked to circle the option that most represented the picture. The task was to circle as many correct categories in the 30 seconds while rehearsing the number. After this, the participant was given three scales to complete (Appendix K). These regarded their attitudes and feelings towards the major elements of the study. The first and third scales were concerned the NASA evaluation while the second scale was in response to the anagram exercise. Lastly, the participant was asked 5 questions to explore any suspicion they may have had in regards to the true aims of the study, and the degree to which their suspicion may have influenced their results (Appendix M). Each participant was then debriefed. The experimenter explained the true aims of the study and each participant was handed a typed debrief sheet before they left the experiment (Appendix Q). Each participant was also reminded that if they had questions regarding the study, or wanted to observe the end results or wished to withdraw their data, the contact details of the experimenters and the university counsellor were on the debrief sheet.

Ethics

Approval for the experiment to be conducted was granted by the University of Kent ethics committee, prior to data collection (Appendix R). This confirmed the study was ethically approved and in accordance with the British Psychological Society (BPS) guidelines. Precautions prior to and during the experiment were implemented to ensure the

operationalization of the study was maintained in accordance with the BPS guidelines. An information sheet was provided for each participant. This detailed the aims of the study and informed the subject they would be interacting with another participant for a period of time during the study. This was in fact an ostensible participant. It was also enforced that the participant would not meet their partner face to face, but would only interact via the experimenter. This promoted anonymity for each participant and ensured they were comfortable throughout the experiment. The subject of a 'partner' was explained by the experimenter prior to the experiment. It was also stated within the information sheet which was handed to each participant to read before they consented to taking part. This meant they were fully aware that they would be working with a second participant and could decide against participating by not consenting. Furthermore, the participant was required to fill out 2 consent forms, 1 copy for themselves and 1 for the experimenter. This was to certify that they had attained a full understanding of the study and wholly consented to taking part.

In addition, each participant was administered a debriefing statement, verbally and via a printout sheet. The statement described in more detail the real aims of the experiment and stated that the study was not an actual test of creativity and language skills on mental performance. It was described that it was actually testing triggered displaced aggression and the paradigm was described. The format was explained in layman's terms so all the participants could understand the true concepts of the study. Finally, the likelihood of anyone experiencing psychological stress as a result of the deception was minimal as there were no intrusive or personal elements included in the study. Nevertheless, contact details of the researcher, supervisor and the local university counsellor were listed on the debrief sheet if this occurred.

Results

The aim of the experiment was to investigate the interaction between cognitive load and inhibiting cues on TDA. It was also predicted that cognitive load would independently increase aggression and inhibiting cues would independently decrease it. The dependent variable of aggression was tested by observing the number of seconds the participants chose to distract their partner with ice-cold water (the opportunity to aggress) for each condition. During the final stages of the procedure, a suspicion measure was administered. This assessed any participant suspicion that may have influenced their behaviour and caused social desirability bias. None of the cases were sceptical about the existence of their partner; therefore no data was removed from the results due to suspicion.

Load Manipulation check

To assess the effectiveness of the induced cognitive load, participants were asked to complete a picture task while reciting their high load or low load numbers. An independent samples t-test compared the available cognitive processing capacity during the high load and low load conditions. This revealed that there was significantly less mental capacity when a high load was induced (M = 8.85, SD = 2.92) compared to low load (M = 11.85, SD = 3.37), $t(78) = -4.25$, $p < .001$.

The data was then analysed by conducting a 2 (cognitive load high/low) x 2 (inhibiting cues yes/no) between-subjects analysis of variance (ANOVA). As predicted, the participants under high cognitive load were significantly more aggressive than the low cognitive load group, demonstrating a main effect of cognitive load F (1, 76) = 23.16, $p < .001$. The main effect of inhibiting cues was also significant, indicating that those in the inhibiting cues condition were significantly less aggressive than the no inhibiting cue condition F (1, 76) = 4.34, p = .04. In turn, the predicted interaction between cognitive load

and inhibiting cues was also significant F (1, 76) = 7.06, p = .01. The results are illustrated in Figure 1.

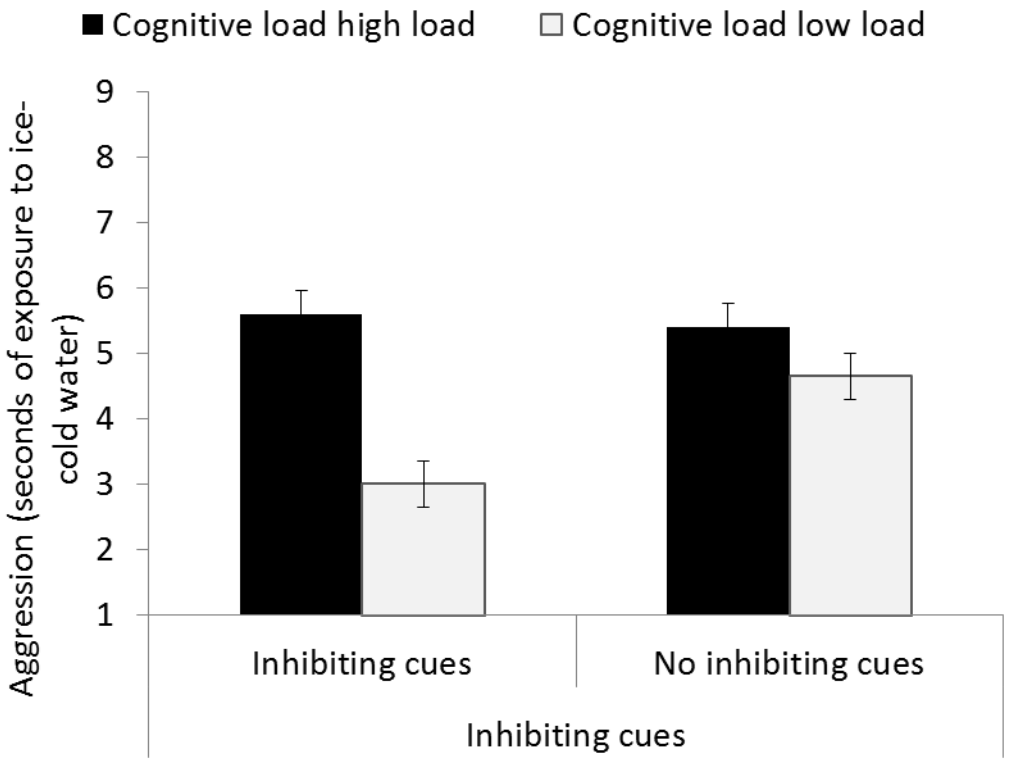


Figure 1. The main and interactive effects of cognitive load and inhibiting cues when participants were given the opportunity to aggress. Aggression was measured using the time in seconds that participants gave a confederate to immerse their hand in ice-cold water.

Also as expected, the 2 x 2 ANOVA showed that aggression levels were highest for condition 1 when high cognitive load and inhibiting cues were induced (M =5.60, SD = 1.76). Furthermore, aggression levels were lowest for condition 2 when low cognitive load and inhibiting cues were induced (M = 3.0, SD = 1.26). The means and standard deviations can be found in Table 1.

Table 1. *Mean distraction time assigned to the trigger as a function of cognitive load and inhibiting cues.*

	Cognitive Load	
	High	Low
Inhibiting Cues	*M(SD)*	*M(SD)*
Yes	5.60 (1.76)	3.00 (1.26)
No	5.40 (1.50)	4.65 (1.66)

Note. Standard deviations appear in parentheses.

An independent samples t-test showed that under low cognitive load, receiving inhibiting cues (M = 3.0, SD = 1.26) significantly decreased aggression compared to not receiving inhibiting cues (M = 4.65, SD = 1.66), $t(38) = -3.54$, p =.001. A second independent samples t-test indicated that under high cognitive load, aggression in the inhibiting cue condition (M = 5.6, SD = 1.76) increased and was not significantly different from the no inhibitory cue condition (M = 5.4, SD = 1.5), $t(38) = .387$, p = .701. Furthermore, a third independent samples t-test showed that aggression levels in the high load/inhibiting cues (M = 5.6, SD = 1.76) condition were significantly higher than the low load/inhibiting cues (M = 3.0, SD = 1.26) condition, $t(38) = 5.38$, $p < .001$).

Correlational Analyses

The manipulation check demonstrated there was significantly less available mental capacity when a high cognitive load was induced compared to the induction of low load. Hence, a Pearson product-moment correlation was conducted to analyse whether cognitive load was associated with aggression. There was a marginally negative correlation between

mental capacity and aggression, r = -.20, p =.074. This indicated that a decrease in mental capacity was associated with higher levels of aggression.

Discussion

Previous research on TDA has demonstrated that cognitive load increases TDA (Vasquez, 2009). It has also shown that inhibiting cues decrease aggression (Giancola, Duke & Ritz, 2011). Until now, however, research had not examined the interaction between inhibiting cues and cognitive load in moderating the magnitude of TDA. Therefore, the current study sought to extend the research by examining the unique and joint effects of cognitive load and inhibiting cues and in the context of the TDA paradigm. As predicted, two main effects and the expected interaction were found. Thus, the three hypotheses were supported. Nevertheless, the main effects were qualified within different levels of the other moderating factor. Inhibiting cues only had an effect on TDA when there was a low cognitive load. In turn, cognitive load only increased aggression when inhibiting cues had been previously induced. Additionally, the simple effects analyses showed the comparisons between each of the inhibiting cues and cognitive load conditions were significant. Aggression levels observed under high cognitive load decreased under low cognitive load. Aggression also increased in the inhibiting cue condition when high cognitive load was induced.

The significant main effect of cognitive load extends the original theories, such as the CNA (Berkowitz, 1989, 1990, 1993). Negative affect had developed in response to the provocations. The associated negative constructs had also been activated. When the cognitive load was then induced, this interfered with the second stage of the CNA. The load prevented the participant from processing and deflating their anger, in the hope of decreasing the likelihood of aggression. So, the load caused the participant to remain angry as they became fixated in the first stage of the CNA. The results also demonstrate that the first provocation ‘primed’ the participants to perceive the second provocation extremely negatively. Under cognitive load, the ‘primed’ or automatic thoughts in response to the second provocation

were most easily triggered and this motivated the participants to exhibit their angry emotions (Berkowitz, 1990). This therefore explains why higher levels of TDA might be expected when high cognitive load is present.

The main effect of cognitive load also lends empirical support to previous research on TDA. The current results demonstrate that cognitive load occupies mental capacity and this leads to inappropriate judgements of normal behaviour (Denson, Aviles, Pollock, Earleywine, Vasquez & Miller, 2008). When high cognitive load was induced, this also depleted the working memory that processes new situations appropriately (Crick & Dodge, 1994; Paas, Tuovinen, Tabbers & Gerven, 2003). Hence, the cognitive load prevented the appropriate recall of the time 2 provocation because the available mental capacity was focussed on the more salient time 1 provocation (Trope & Gaunt, 2000). When deciding how long to distract the fictitious partner, those under cognitive load demonstrated higher levels of aggression as they perceived the time 2 provocation more negatively and so had a higher motivation to retaliate.

Alternatively, the main effect was inconsistent with the argument proposed by Giancola et al. (2010). They suggested cognitive load distracts individuals from negative affect after the provocation and this decreases aggression. The results however suggest cognitive load distracts the participant from self-regulation and focuses upon the more salient negative affect (Trope & Gaunt, 2000). This may also deplete the ability to empathise with the source of provocation (Meiring & Subramoney, 2014). Consequently, cognitive load influences the participant towards acting aggressively rather than against it. As a result, we can conclude cognitive load contributes to augment aggression.

In addition, receiving a negative evaluation from an ostensible partner may have influenced the participants under high cognitive load to perceive their partner's ambiguous

intentions more negatively than those under low load. This supports Anderson, Krull and Weiner (1996) that the provocation from the partner was surprising and ambiguous, leading to a negative perception of the partner and an aggressive response. The fictitious partner was a stranger and they had no known reason to evaluate the participant's work negatively. However, the participants had to decide how long to distract their partner (the opportunity to aggress). Their decision was then based on their current cognitions of the social situation, in accordance with research by Pedersen et al. (2014) and Schwarz (2010). Those under high cognitive load experienced more negative affect as their depleted mental capacity was focussed on the time 1 provocation. This promoted anger towards the associated stimuli, which was the second provocateur (Cohen, Eckhardt & Schagat, 1998). Hence, this increased aggression, compared to those under low load who had less negative cognitions and were able to process the intentions of the time 2 provocation more realistically. Consequently, this demonstrated that cognitive load is a relevant factor in the augmentation of TDA and future research should take its influence on aggression into account.

However, Vasquez (2009) found inducing cognitive load did not significantly increase TDA when it was induced in the aggression condition, even though this was predicted. This was thought to be due to a weak cognitive load that did not sufficiently increase the cognitive processing capacity, even though the same procedure had previously been found successful in cognitive load manipulation (Gilbert & Hixon, 1991). Therefore, the current results provide evidence to narrow the gap that cognitive load augments TDA within the aggression stage of the paradigm.

Nevertheless, Vasquez (2009) did report that a high cognitive load augmented TDA when it was induced during the trigger. Thus, research by Vasquez (2009) and the current results demonstrate that load has different effects on TDA, depending on other factors. During this experiment, cognitive load was able to augment aggression to a higher level when

it was induced after inhibiting information, compared to no inhibiting cues. This provides evidence that a lack in cognitive processing capacity prevented the cues from being recalled and decreasing TDA. Future research may attempt to determine where in the paradigm a high cognitive load is likely to augment the highest levels of aggression, and if an interaction with factors other than inhibiting cues influences a further aggression.

Furthermore, the main effect of inhibiting cues indicates that inhibition successfully decreases TDA in comparison to those who did not receive inhibiting cues. This concurred with existing research conducted by Vasquez (2009) that inhibiting cues provide an external aid to our self-regulation. This therefore explains that inhibiting cues can decrease aggression. When the participants were informed their work was being examined and utilised by other psychological researchers, this decreased their motivation to act aggressively (Card & Little, 2006). This was demonstrated when inhibiting cues were induced before a low cognitive load. This suggests that a highly salient provocation was induced, followed by a negative trigger. Self-regulatory processes then stopped the participant exhibiting their negative affect despite their desire to do so. This was because they were aware that acting aggressively is socially undesirable (Muraven, Tice & Baumeister, 1998). The results from the current experiment demonstrated that participants in the low cognitive load / inhibiting cues condition had the necessary degree of self-regulation available following the time 1 and time 2 provocation to decide against behaving extremely aggressively. Thus, this supports Vasquez (2009) that external inhibiting cues can significantly lower aggression. However, this is only the case when an increase in cognitive load does not then follow, in order to for the cues to be processed and used.

In addition, this suggests that self-regulatory processes are less restricted than was suggested by Stucke and Baumeister (2006) and we are capable of restraining aggressive behaviour following 2 provocations. Although, when inhibiting cues were then induced

without the presence of cognitive load (condition 2), this further enhanced the participants' self-regulation and provided additional motivation to act desirably (Vasquez, 2009). Hence, the results support the conclusion that inhibiting cues decrease TDA when there is a large degree of available mental capacity (Giancola & Corman, 2007).

Moreover, the present results can be applied to universal situations where inhibiting cues may prevent TDA, such as being advised by co-workers against acting aggressively, because this is usually undesirable (Abderhalden et al., 2002). It can be assumed those with higher moral values may elicit less triggered displaced aggression. However, when alternative variables are introduced, such as a high cognitive load, this blocks the processing of inhibiting cues. Hence, even those with the highest moral values can be expected to aggress impulsively towards the source of a trigger when under cognitive load.

Furthermore, one of the most important findings of the study was when inhibiting cues were induced (stating another person would study their decision), a subsequent increase in cognitive load (rehearsing the memorised number) prevented the cues from being utilised to decrease aggression. This lends support to research by Bari and Robbins (2013) that a high level of cognitive awareness is necessary to be able to use inhibiting cues to decrease aggression. It also supports research on the association between ECF and aggression. The negative correlation between the degree of available cognitive capacity and magnitude of aggression demonstrated that a decrease in cognitive capacity led to a decrease in working memory (Seguin, Boulerice, Harden, Tremblay and Pihl 1999; MacTavish, 2011).This then prevented ECF from processing and utilising the inhibiting cues. As a result, this led to the increase of aggression, compared to those who had a low cognitive load and could process the inhibiting cues in a fully working memory (Brower and Price, 2001).

In addition, evidence put forward by Denson et al. (2008) can be developed to explain an interaction between cognitive load and inhibiting cues in moderating the magnitude of TDA. Alternatively to alcohol, cognitive load engages the majority of available cognitive processing capacity. This causes difficulty in attempting to moderate behaviour as the cognitive load prevents access to ECF and the contemplation of the consequences of reacting aggressively. As a result, the available mental capacity focuses on the motivation to aggress, increasing the likelihood of its exhibition (Friese, Hofmann and Wänke, 2008). Thus, a high cognitive load effectively prevents inhibiting cues from being used to decrease aggression.

The main effects and interaction can also be used to expand the GAM (Anderson & Bushman, 2002). They demonstrate that when our mental capacity is reduced by high cognitive load, the negative affect that remains from the provocation is likely to lead to a more intense aggressive response compared to a situation with low cognitive load. In regards to inhibiting cues, we could argue these effectively deflated the anger the participants felt in response to the first provocation. However, when cognitive load was induced after the cues, participants lacked the required mental capacity to decrease their anger and regulate their behaviour. Instead, the load focussed attention towards the anger (Anderson & Bushman, 2002). This increased the motivation to respond, leading to a decrease in social control (Fonseca et al., 2013) and aggression was the result.

Limitations and implications for future research

The current study lent empirical support to existing research that has demonstrated cognitive load augments aggression (Vasquez, 2009) and inhibiting cues decrease it (Giancola, Duke and Ritz, 2011). However, a novel interaction was also investigated. So, we cannot be certain that future research would yield the same results without replication of the

study. The current study aimed to test the interaction between cognitive load and inhibiting cues within the context of TDA and these predictions were supported. The current procedure was adopted that had been previously been found to effectively lead to TDA (Pedersen, Gonzales & Miller, 2000; Bushman, Bonacci, Pedersen, Vasquez & Miller, 2005, Bettencourt, Brewer, Croak, & Miller, 1992). Thus, this enhances the internal validity of the study. Nevertheless, future research is needed to strengthen both the internal validity of the induced cognitive load and inhibiting cues. Replication of the study is also required to increase the external validity so the findings may be generalized to real-life populations.

A limitation of this study was that the sample tested was not representative of the wider population. In particular, the sample had a narrow age range between 18-24 years of age. The sample size should ideally test a much larger sample than 80 participants to reflect a wider age-range. Due to these demographics, further research in this area should target a larger population, outside of the university environment. The ideal population involves both young and old age ranges. This may determine that younger people are likely to engage in more aggression than older people who believe they are weaker and are less motivated to respond aggressively. Both normal and criminal environments should also be included. We can then assess the degree to which TDA is involved in criminal actions as well as universal situations, and which crimes are most likely to be committed as a result of TDA.

A second limitation was that the exclusion criteria determined that the sample consisted only of those who spoke English as their native language. This was due to the nature of the first anagram exercise. In order to elicit a believable provocation, it was essential the participants completely understood the requirements of the exercise, so when they were insulted about their performance, they were primed with the negative affect. Consequently, the results can only be generalised to those with English as their native language. Therefore, future research should aim to investigate the effect of cognitive load and

inhibiting cues within differing cultures. This will establish whether cognitive load and inhibiting cues effects TDA similarly within differing cultures. Hence a universal explanation can then be produced for variables that increase or decrease the degree of TDA that is commonly exhibited.

Furthermore, the format of the aggression condition could be argued as unrealistic. The example cannot easily be applied to TDA within the work place or at home, unless we examine individual events of TDA where someone may need to learn a telephone number after a provocation and a trigger. The cognitive load induced in future studies should represent a realistic situation, such as writing out a response to an important work email or creating an advertisement for a company the participants aim to work for. This may seem less trivial than rehearsing a sequence of numbers and this would more likely distract the participants from the inhibiting cues. We might then be able to assess the types of everyday situations where cognitive load leads increases aggression and where interventions to decrease this response are necessary.

Moreover, we should take into consideration the inhibiting cue 'type'. The participants may have aggressed strongly as the inhibiting cue was an unknown, authoritative figure. What's more, the participant had no contact with this figure, nor did they see their face. This promoted anonymity. If the authoritative figure mentioned in the study was known to the participant, even by being shown a photograph, this may have influenced their behaviour differently. In turn, if the authoritative figure had been present during the decision making process, this may have further decreased the behaviour. Future research should involve this, to test the interaction between cognitive load and inhibiting cues when the inhibition salience is manipulated. This will determine whether cognitive load still prevents inhibiting cues from decreasing aggression when inhibitory information is stronger.

In addition, we cannot be sure the participants were rehearsing the number during the decision making process and the picture category task.as they were asked to recite it mentally. Nevertheless the participants were asked to write the number they had memorised on the decision-making sheet, and only 1 participant in the high cognitive load conditions recorded this incorrectly. Therefore we could argue that cognitive load was induced and rehearsed. However we cannot be certain the number was written down after the decision had been made. Hence, during future research cognitive load may be manipulated through a writing or mathematical exercise that demonstrates the presence of a high cognitive load.

Following this, participants chose the number of seconds for their partner to immerse their hand in the ice-cold water; although they did not have to administer the distraction themselves. They did not have to inform their partner how many seconds they had chosen or observe the distraction as they were told the experimenter would administer this. In reality, TDA is often a response where the person who has undergone the time 1 and 2 provocation reacts directly towards the source of the time 2 provocation, so they are present when administering the aggression. Therefore, we could argue that the participants chose a more aggressive response as they did not have to administer the distraction or watch their partner suffer the ice-cold water. The participants may think the experimenter is likely to receive the blame for the punishing distraction rather than themselves. Thus, future research should involve monitoring a population where some form of direct TDA can be given, although ethical restrictions may make this difficult.

The current study aimed to find a general explanation for the increase or decrease of TDA occurring universally. Nevertheless, future research should study individual differences within the causation of TDA. Denson et al. (2006) stressed the importance of accounting for this as they reported qualitative differences between those who display general trait aggression and those who display trait displaced aggression. They explained those who

exhibit trait displaced aggression are more likely to engage in spousal abuse, road rage and alcoholism. This personality trait may result in the more extreme cases of TDA. Therefore future research may reconstruct the current study, including measures for trait inhibition and trait displaced aggression. It can also be investigated whether inhibiting cues similarly succeed in decreasing TDA in these personalities and if cognitive load interacts to prevent the decrease.

On another note, gender differences should be considered. There was an unequal gender split of 21 males and 59 females that took part in the experiment. Kokko and Pulkinnen (2005) argued that males have a higher level of aggressive behaviour throughout their lives, compared to females, so they are more likely to elicit TDA. However, Bushman, Bonacci, Pedersen, Vasquez and Miller (2005) tested a sample of 54 females and 34 males on the effects of rumination on TDA. They found no sex differences in the TDA responses, suggesting there are no sex differences in TDA behaviour. Although, it might be the sample was too small to determine any sex differences. Furthermore, there were more females than males, so it could be argued that if differences did exist, these would not appear in the analyses.

Furthermore, Vasquez et al. (2013) reported no gender effects within their research. They attained an unequal gender split within their tested sample but they argued gender differences are not expected in TDA research. Pedersen, Denson, Goss, Vasquez, Kelley and Miller (2011) argued males are often portrayed as the more aggressive gender so it should be predicted that they elicit higher levels of aggression. However, the element of a provocation should eliminate these differences (Bettencourt & Miller, 1996). Nevertheless, due to the ambiguity of gender differences in TDA research, future experiments should include a measure to asses if one gender is more likely to aggress at higher levels of TDA. This would be challenging to investigate within a university population, as the majority of psychological

students and experiment participants are female. Nevertheless, future research should target a large sample with an equal gender split to investigate gender differences.

Moreover, the current study occurred over a short period of time. This does not account for instances where the paradigm occurs over a longitudinal period. For example, the results could not explain TDA caused by re-occurring provocation and triggers, such as being bullied by a boss at work and aggressing recurrently towards family members. Previous evidence has stated this can lead to serious issues such as family dysfunction (Del-Priore, Aticell & Barnes Farrell, 2006). Accounting for longitudinal or recurring TDA was not possible as the sample involved university students volunteering to take part in a single study. However, future research may induce cognitive load and inhibiting cues in the context of the TDA paradigm over a longitudinal period and in an extensive population. This could determine whether the degree of aggression over a longitudinal period is likely to increase or decrease. Hence, the influence of inhibiting cues on aggression over a long period of time, that may be more representative of real life aggression-arousing situations could be monitored. Thus, we can then formulate interventions to manage aggression, under high cognitive load and inhibiting cues, in the short term and over a longitudinal period..

Moreover, the experiment did not take into account the participants' previous experience with aggression. Huesmann, Dubow and Boxer (2009) argued those children who experience a highly level of aggression at home are more aggressive in adulthood. So, it could be argued that participants who expressed more aggression towards their partner perceive aggression as more acceptable compared to those who experienced less aggression. This could be because they have become less sensitive to aggression (Guerra, Huesmann & Spindler, 2003). Future research may incorporate a larger amount of demographic information regarding the participants' upbringing to observe whether this contributes towards the magnitude of TDA.

The present study has demonstrated that cognitive load and inhibiting cues significantly influence TDA. However, one factor that was not controlled for was rumination. Previous research has found rumination following a provocation significantly increases TDA, as the participant inflates their anger in regards to the provocation. A trigger then causes the aggression to be exposed (Vasquez, Pedersen, Bushman, Kelley, Demeestere & Miller, 2013). This also refers to the CNA (Berkowitz, 1989, 1990, 1993) and the second stage of the model where we permit ourselves to dissipate or inflate our negative emotion. Denson, Spanovic, Aviles, Pollock, Earleywine and Miller (2008) argued that rumination is likely to increase TDA, although when there is an alternative distraction this is less likely to be true.

Nordgren and Chou (2012) supported that rumination after an event that has promoted impulsive behaviour poses a threat to our inhibitory system. However, if these ruminations were prevented due to a high cognitive load, this would permit inhibitory control over the impulsive behaviour and a decrease in aggression (May, Andrade, Panabokke, & Kavanagh, 2010). It would also promote biased information processing as inhibiting information activates constructs that are associated with the advantages of delaying gratification (Strack and Deutsch, 2004). This suggests possible research where cognitive load interacts with rumination, allowing inhibiting cues to decreases the behaviour. Cognitive load would act to deny participants from ruminating and inflating their anger (CNA; Berkowitz, 1989, 1990, 1993). So they would be less likely to respond aggressively towards a triggering provocation as less negative constructs are activated to motivate an aggressive response (Berkowitz, 1989, 1990, 1993). Future research may include a main effect of rumination, to investigate whether this alters the moderation of cognitive load on TDA.

Giancola and Corman (2007) found a moderate cognitive load decreased aggression when it was coupled with alcohol, as it served to distract the participant from their negative affect following the time 1 provocation. Steele and Josephs (1990) supported that intoxicated

and sober participants will act with the same level of aggression when provoked. Consequently, this research can be applied to a non-intoxicated population. If cognitive load was combined with the provocation, this may decrease the salience of the provocation and the consequent negative affect the participant develops. If inhibitory cues were then induced, their salience may be processed as significantly higher than the provocation salience and this may lead to less aggression. This therefore presents an intervention that may reduce TDA, by decreasing the provocation salience and increasing the salience of the inhibiting cues.

Furthermore, Giancola, Duke and Ritz (2011) found the presence of alcohol in the paradigm increases aggression. They also found this can decrease the behaviour in the presence of inhibiting cues. When inhibiting cues are the most salient cue in the environment, these are the sole focus of attention, other than the distraction. Therefore, if the cognitive load is induced earlier in the paradigm alongside the provocation, we can observe if highly salient inhibiting cues then decrease aggression. If this occurs, this presents evidence of how TDA may be intervened and decreased.

In addition, Giancola, Duke and Ritz (2011) suggested if our mental capacity is occupied with inhibiting cue information, this will prevent other distracting cues intervening. As a result, participants will exhibit a decreased magnitude of TDA. Therefore, this suggests if a high cognitive load was induced by increasing the amount of inhibiting information, this would surely decrease aggression. If this is successful, this will provide evidence for an intervention to decrease aggressive behaviour, by increasing the load of inhibiting information.

Alternatively, Smits, Boeck and Vansteelandt (2004) argued sensitivity to inhibition is a trait. They demonstrated that trait inhibition was negatively correlated with external aggression. Those who have trait inhibition are less likely to respond aggressively towards a

trigger as they are more sensitive to inhibiting cues. Furthermore, the trait was also positively correlated with the control of aggression. Therefore those with this trait are more likely to regulate their anger. As a result, the population that contain trait inhibition are expected to show the lowest magnitude of TDA, as they are sensitive to inhibition and regulate aggressive actions before they respond towards a trigger. In addition Roloff (1996) agreed that inhibiting cues prevent aggression as this type of behaviour goes against personal norms. Those who have the trait are likely to perceive aggression as more abnormal and are less likely to aggress. In the context of cognitive load, we could argue those with the trait are also likely to aggress although, to a lesser extent than those without the trait. Future research may test the interaction of cognitive load and inhibiting cues in those with trait inhibition to investigate if cognitive load fails to interfere and increase aggression. If this is the case, we could test if higher inhibition cue salience is likely to decrease aggression in the presence of cognitive load.

Furthermore, Dollard, Doob, Mowrer and Sears (1939) argued we are more likely to aggress when we are certain that we will not be punished for our behaviour. Hence, if we think we will be punished, we are less likely to behave aggressively. Carnagey and Anderson (2005) found children who are rewarded for violent behaviour in a video game are likely to exhibit more aggression in realistic environments compared to those who are punished for their violent game behaviour. This can be applied to TDA. If the time 2 provocateur acts neutrally towards the aggressor, they may be more likely to continue with an increasing level of TDA (Anderson, Krull and Weiner, 1996). Although, if the trigger punishes the aggressor by getting upset or responding with a more powerful aggression, this may influence a decrease in future TDA (Vasquez, Lickel & Hennigan, 2010).

In addition, Parke and Deur (1972) found consistent punishment in response to aggressive behaviour resulted in increased inhibition towards future aggression arousing

situations. Therefore this evidence proposes that inhibiting cues, alongside punishment of bad behaviour, would influence a decrease in aggression. If future research found cognitive load failed to interact with the effect of reward or punishment on aggression, this will suggest another relevant factor that could be investigated alongside inhibiting cues to study their influence on the magnitude of TDA.

In regards to the GAM (Anderson and Bushman, 2002) the experiment did not measure physiological arousal, which was explained as one of the three fundamental aspects proposed by the model (Kroas, Ayduk and Mischel, 2005). By measuring this, the participants may have realised their behaviour was being monitored and this may have led to demand characteristics. Nevertheless, if this was incorporated into the current experiment, this would determine where in the paradigm an intense increase or decrease in physiological arousal was experienced. Future research that incorporates a measure of physiological arousal can establish universally, where in the paradigm the participant is most sensitive to the trigger. Thus, we can then start to formulate interventions that can decrease sensitivity and extreme TDA. The current study has established the impact of cognitive load, its effect upon inhibiting cues and the magnitude of the TDA response.

The current results and relevant existing research will next be discussed to imply possible interventions that may reduce this behaviour. The current experiment found evidence for some circumstances when inhibiting cues fail to decrease aggression. This involved criticising (provoking) the participant on their performance level. For example, if someone is criticised on their performance at work or school, this might produce extreme negative effect. Questioning someone's ability can be extremely hurtful because people are encouraged from an early age to reach high standards. This may damage self-esteem and increase the likelihood of aggressing towards a source of anger (Salmivalli, 2001). Hence, a

trigger provides the excuse to aggress to improve one's own negative affect (Bushman, Baumeister & Phillips, 2001).

An intervention may be introduced within the work place or school to train those with authority to employ a calmer approach with their employee's or students when it comes to questioning work performance. This intervention targets the population that are likely to provide the provocation. By providing a calmer discussion-based way of communicating with employees or students, this forms a less salient provocation. We would therefore expect to see a decrease in aggression as the person is no longer primed with negative affect, therefore when a trigger elicits a source of frustration, this can be ignored by self-regulatory processes (Dewall, Baumeister, Stillman, and Gailliot, 2007).

Giancola, Josephs, Parrott and Duke (2010) proposed an intervention that was directed towards the aggressor. They argued that it is necessary to interrupt the relationship between provocative cues and aggressive responses. Therefore, this suggests an intervention to reduce an aggression involving behavioural management. When experiencing a provocation and a second source of frustration, the participant should be trained to process the true magnitude of the trigger, especially when under cognitive stress. By being educated to re-evaluate the true trigger salience, the individual within the paradigm will learn to realise an aggressive retaliation is not necessary or desirable (Abderhalden et al., 2002). .

Moreover, Thomas and Cain (2011) proposed an aggression-reducing intervention. They taught a group of males in a high-risk population to restructure their cognitive processes in response to aggression-inducing environments. They found levels of aggression following the intervention were significantly lower compared to before. Furthermore, Brigell (2012) utilised this intervention and also found a significant decrease in aggressive behaviour. This research has only been tested on male participants in a high-risk population. However, this

population is likely to be the most difficult at reducing aggression as this behaviour is likely to be perceived as the norm (Levermore, 2004). This therefore suggests an intervention that can restructure cognitive processes in response to aggressive behaviour.

In turn, this or other successful interventions should target children within school. This age group have been found to seek more information than older ages before deciding how to act (Smetana, Campione-Barr & Yell, 2003). Role play or games that demonstrate the paradigm of TDA, while completing exercises that induce cognitive load could be implemented. The children will then be trained to separate the exercise from the situation and take the perspective of the sources of the provocation and trigger. Laible, Murphy and Augustine (2014) stated the ability to take perspective of the provocateur is vital in promoting prosocial behaviour and in turn, decreases the motivation to aggress. The intervention will aim to increase understanding of why they may have behaved aggressively and why lots of activities may have increased their hostility. This may also increase the process of actively seeking mitigating circumstances as to why the trigger was a source of frustration and if necessary, activate empathy.

Furthermore, Posick, Roque and Rafter (2014) found aggression is likely to be more extreme when the being has a lack of empathy (Wastell, Cairns &Haywood, 2009). Therefore, the intervention will prevent the child from perceiving the sources of frustration as hostile or frightening but rather an event that can be overcome. As a result, the degree of negative constructs explained by the CNA (Berkowitz, 1989, 1990, 1993) will be decreased, even under a high cognitive load. Hence a weaker aggressive response should result as there is less negative affect to displace towards the trigger (Hoobler & Brass, 2006).

Wilowski, Crowe and Ferguson (2014) tested an intervention using cognitive control to decrease the motivation to aggress, following a provocation. This taught participants to

override the impulse to aggress when they experienced aggression inducing primes. Compared to the control condition, participants in the experimental group exercised more control over aggressive urges when faced with provocation. As a result, if this were practiced in the context of TDA, this may encourage cognitive control in response to a time 1 and time 2 provocation. Furthermore, if it were practiced under the influence of cognitive load, this would influence cognitive control to become habitual rather than a proactive process. Jasinska (2013) supported that as the impulse to aggress can be automatic, the inhibition of aggressive responding can also become automatic if it is practiced enough (Verbruggen & Logan, 2009). This research suggests practice of inhibiting impulsive aggression in the context of TDA leads to habitual restraining of aggression in response to provocation. As a result, if this were practiced under cognitive load, this serves to decrease TDA automatically by increasing the automatic processing of self-regulation and inhibiting aggression.

An addition to the proposed interventions is the inclusion of cognitive behavioural therapy (CBT; Meichenbaum, 1977). Blacker, Watson and Beech (2008) assigned this therapy technique to a group of male offenders. It included both role-play and cognitive behavioural techniques to discover pride or shame within the males themselves and encouraged their awareness towards the victim of their anger. This method significantly decreased their anger. In turn, LeSure-Lester (2002) tested CBT against alternative therapeutic methods and found CBT was most likely to reduce aggression. Goldstein, Nensen, Daleflod, and Kalt (2004) explained this therapy aids the aggressor to focus on a combination of the context of the situation alongside their own behaviour, rather than concentrating on a single aspect. Therefore, this will aid the separation of the induced cognitive load and the context of the TDA paradigm. This may then enhance socially desirable behaviour (Bereczkei, Birkas & Kerekes, 2010). Therefore, future research may

apply this to a TDA paradigm involving cognitive load, in the hope to decrease aggression. If this successfully decreases TDA, this may be applied universally.

Hence, an appropriate intervention can be suggested by fusing some of the previous research. This involves CBT to encourage the person within the paradigm to actively reduce their anger. Role play acts to increase awareness and empathy towards the source of the trigger. Training participants using these methods, while under induced cognitive load, may reduce the magnitude of TDA. What is more, Blacker, Watson and Beech (2008) found the use of drama reduced anger even the most violent participants. This indicates the intervention may reduce aggression in those who demonstrate the largest magnitude of TDA. On the other hand, this intervention would need to be tested within the context of an induced cognitive load and differing age groups, to investigate the age range that is most positively affected.

Therefore, this section has demonstrated the importance of cognitive load and inhibiting cues as relevant factors that moderate TDA. It has extended research on cognitive load and its role in augmenting aggression (Denson et al., 2008; Vasquez, 2009). It has also highlighted the importance of inhibiting cues in executive cognitive functioning to enhance self-regulation and promote the inhibition of aggression (MacTavish, 2011). These results have been applied to possible interventions that may be implemented to reduce TDA which is a universal phenomenon (Dollard, 1938). The problem of when cognitive load is most likely to moderate the highest levels of cognitive load is still questionable. In turn, further research is needed to investigate whether cognitive load fails to interfere with highly salient inhibiting cues. Nevertheless, the results have furthered our understanding of the influence of cognitive load and inhibiting cues in moderating the magnitude of TDA.

Conclusion

The aim of the current experiment was to investigate the effect of cognitive load and inhibiting cues on TDA. Previous research had demonstrated that cognitive load augments TDA, (Vasquez, 2009) and inhibiting cues decrease it (Giancola, Duke and Ritz, 2011) However, this was the first study to investigate the interaction between cognitive load and inhibiting cues on the magnitude of TDA. It was hypothesised that cognitive load would independently augment aggression. It was also predicted that inhibiting cues would independently decrease it. The third hypothesis stated when cognitive load was induced after inhibiting cues, it would interact to stop them from decreasing aggression. There was a significant main effect for both cognitive load and inhibiting cues; however these seem to be qualified by the presence of the other moderator. There was also a significant interaction. Thus, the three hypotheses were supported and the null hypothesis could be rejected that the two variables would not significantly influence the TDA response. Due to these results, we have been able to broaden existing theories that explain TDA, such as the CNA (Berkowitz, 1989, 1990, 1993) and the GAM (Anderson & Bushman, 2002) by including variables that influence the magnitude of TDA.

The current results aid to a more concrete explanation that inhibiting cues can decrease TDA when there is no other highly salient information present in the paradigm. Cognitive load augments TDA, even when cues that are induced to inhibit aggression are present. Their significance provides an explanation that can be applied to universal environments, unlike most of the existing research on TDA which has focussed on specific personality traits that are likely to moderate TDA. As a result, this study has lessened the gap in our understanding of the general causes of TDA. It also explains how inhibition fails to decrease aggression. Future research is necessary to understand where in the paradigm cognitive load is most likely to augment the highest levels of aggression. It is also required to

test the interaction when the salience of the inhibiting cues is of a higher magnitude. Once this is achieved, interventions that may decrease TDA can be tested.

References

Abderhalden, C., Needham, I., Friedli, T. K., Poelmans, J. & Dassen, T. (2002), Perception of aggression among psychiatric nurses in Switzerland. *Acta Psychiatrica Scandinavica, 106,* 110–117. doi: 10.1034/j.1600-0447.106.s412.24

Anderson, C. A., & Bushman, B. J. (2002). Human aggression. *Annual Review Of Psychology*, *53*(1), 27-51. doi:10.1146/annurev.psych.53.100901.135231

Anderson, C. A., Carnagey, N. L., & Eubanks, J. (2003). Exposure to violent media: The effects of songs with violent lyrics on aggressive thoughts and feelings. *Journal Of Personality And Social Psychology*, *84*(5), 960-971. doi:10.1037/0022-3514.84.5.960

Anderson, C. A., Krull, D. S., & Weiner, B. (1996). Explanations: Processes and consequences. In E. T. Higgins, A. W. Kruglanski, E. T. Higgins, A. W. Kruglanski (Eds.) , *Social psychology: Handbook of basic principles* (pp. 271-296). New York, NY, US: Guilford Press.

Axelrod, R. (1984). *The evolution of cooperation*. New York: Basic Books.

Bari, A., & Robbins, T. W. (2013). Inhibition and impulsivity: Behavioural and neural basis of response control. *Progress in Neurobiology, 108,* 44–79. doi: 10.1016/j.pneurobio.2013.06.005

Bereczkei, T., Birkas, B., & Kerekes, Z. (2010). Altruism towards strangers in need: Costly signaling in an industrial society. *Evolution And Human Behavior, 31*(2), 95-103. doi:10.1016/j.evolhumbehav.2009.07.004

Berkowitz, L. (1989). Frustration-aggression hypothesis: Examination and reformulation. *Psychological Bulletin*, *106*(1), 59-73. doi:10.1037/0033-2909.106.1.59

Berkowitz, L. (1990). On the formation and regulation of anger and aggression: A cognitive-neoassociationistic analysis. *American Psychologist*, *45*(4), 494-503. doi:10.1037/0003-066X.45.4.494

Berkowitz, L. (1993). *Aggression: Its causes, consequences, and control*. New York, NY, England: Mcgraw-Hill Book Company.

Bettencourt, B. A., Brewer, M. B., Croak, M. R., & Miller, N. (1992). Cooperation and the reduction of intergroup bias: The role of reward structure and social orientation. *Journal Of Experimental Social Psychology*, *28*(4), 301-319. doi:10.1016/0022-1031(92)90048-O

Bettencourt, B. A., & Miller, N. (1996). Gender differences in aggression as a function of provocation: A meta-analysis. *Psychological Bulletin*, *119*(3), 422-447. doi:10.1037/0033-2909.119.3.422

Blacker, J., Watson, A., & Beech, A. R. (2008). A combined drama-based and CBT approach to working with self-reported anger aggression. *Criminal Behaviour And Mental Health*, *18*(2), 129-137. doi:10.1002/cbm.686

Brigell, R. H. (2012). Behavioural Outcomes for Caribbean Adolescents in an Aggression-Reducing Intervention in a Custodial Setting (Master's Thesis). Retrieved from http://hdl.handle.net/2027.42/91884

Brower, M. C., & Price, B. H. (2001). Neuropsychiatry of frontal lobe dysfunction in violent and criminal behaviour: A critical review. *Journal Of Neurology, Neurosurgery & Psychiatry*, *71*(6), 720-726. doi:10.1136/jnnp.71.6.720

Bushman, B. J., Bonacci, A. M., Pedersen, W. C., Vasquez, E. A., & Miller, N. (2005). Chewing on It Can Chew You Up: Effects of Rumination on Triggered Displaced Aggression. *Journal Of Personality And Social Psychology*, *88*(6), 969-983. doi:10.1037/0022-3514.88.6.969

Bushman, B. J., Baumeister, R. F., & Phillips, C. M. (2001). Do people aggress to improve their mood? Catharsis beliefs, affect regulation opportunity, and aggressive responding. *Journal Of Personality And Social Psychology*, *81*(1), 17-32. doi:10.1037/0022-3514.81.1.17

Card, N. A., & Little, T. D. (2006). Proactive and reactive aggression in childhood and adolescence: A meta-analysis of differential relations with psychosocial adjustment. *International Journal Of Behavioral Development*, *30*(5), 466-480. doi:10.1177/0165025406071904

Carlson, D. S., Ferguson, M., Perrewé, P. L., & Whitten, D. (2011). The fallout from abusive supervision: An examination of subordinates and their partners. *Personnel Psychology*, *64*(4), 937-961. doi:10.1111/j.1744-6570.2011.01232.x

Carnagey, N. L., & Anderson, C. A. (2005). The Effects of Reward and Punishment in Violent Video Games on Aggressive Affect, Cognition, and Behavior. *Psychological Science*, *16*(11), 882-889. doi:10.1111/j.1467-9280.2005.01632.x

Cherek, D. R., & Lane, S. D. (2000). Fenfluramine effects on impulsivity in a sample of adults with and without history of conduct disorder. *Psychopharmacology*, *152*(2), 149-156. doi:10.1007/s002130000530

Cohen, D. J., Eckhardt, C. I., & Schagat, K. D. (1998). Attention allocation and habituation to anger-related stimuli during a visual search task. *Aggressive Behavior*, *24*(6), 399-409. doi:10.1002/(SICI)1098-2337(1998)24:6<399::AID-AB1>3.0.CO;2-I

Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological Bulletin*, *115*(1), 74-101. doi:10.1037/0033-2909.115.1.74

Cummings, J. L. (1995). Anatomic and behavioral aspects of frontal-subcortical circuits. In J. Grafman, K. J. Holyoak, F. Boller, J. Grafman, K. J. Holyoak, F. Boller (Eds.), *Structure and functions of the human prefrontal cortex* (pp. 1-13). New York, NY, US: New York Academy of Sciences.

Denson, T. F., Aviles, F. E., Pollock, V. E., Earleywine, M., Vasquez, E. A., & Miller, N. (2008). The effects of alcohol and the salience of aggressive cues on triggered displaced aggression. *Aggressive Behavior*, *34*(1), 25-33. doi:10.1002/ab.20177

Denson, T. F., Capper, M. M., Oaten, M., Friese, M., & Schofield, T. P. (2011). Self-control training decreases aggression in response to provocation in aggressive individuals. *Journal Of Research In Personality*, *45*(2), 252-256. doi:10.1016/j.jrp.2011.02.001

Denson, T. F., DeWall, C. N., & Finkel, E. J. (2012). Self-control and aggression. *Current Directions In Psychological Science*, *21*(1), 20-25. doi:10.1177/0963721411429451

Denson, T. F., Pedersen, W. C., & Miller, N. (2006). The Displaced Aggression Questionnaire. *Journal of Personality and Social Psychology, 90,* 1032-1051.

Denson, T. F., White, A. J., & Warburton, W. A. (2009). Trait displaced aggression and psychopathy differentially moderate the effects of acute alcohol intoxication and

rumination on triggered displaced aggression. *Journal Of Research In Personality*, *43*(4), 673-681. doi:10.1016/j.jrp.2009.04.003

DeWall, C. N., Anderson, C. A., & Bushman, B. J. (2011). The general aggression model: Theoretical extensions to violence. *Psychology Of Violence*, *1*(3), 245-258. doi:10.1037/a0023842

Dewall, C. N., Baumeister, R. F., Stillman, T. F., & Gailliot, M. T. (2007). Violence restrained: Effects of self-regulation and its depletion on aggression. *Journal Of Experimental Social Psychology*, *43*(1), 62-76. doi:10.1016/j.jesp.2005.12.005

Dollard, J. (1938). Hostility and fear in social life. *Social Forces*, *17*,15-29. doi:10.2307/2571143

Dollard, J., Doob, L.W., Miller, N. E., Mowrer, O. H.,& Sears, R. R. (1939). *Frustration and aggression*. New Haven, CT: Yale University Press.

Easton, C. J., Sacco, K. A., Neavins, T. M., Wupperman, P., & George, T. P. (2008). Neurocognitive performance among alcohol dependent men with and without physical violence toward their partners: A preliminary report. *The American Journal Of Drug And Alcohol Abuse*, *34*(1), 29-37. doi:10.1080/00952990701764326

Eisenberg, N., Fabes, R. A., Murphy, B., Karbon, M., Maszk, P., Smith, M., & ... Suh, K. (1994). The relations of emotionality and regulation to dispositional and situational empathy-related responding. *Journal Of Personality And Social Psychology*, *66*(4), 776-797. doi:10.1037/0022-3514.66.4.776

Fonseca, A., Brauer, M., Moisuc, A., & Nugier, A. (2013). Cognitive load causes people to react ineffectively to others' norm transgressions. *Journal Of Applied Social Psychology*, *43*(7), 1518-1527. doi:10.1111/jasp.12145

Forgas, J. P. (1995). Mood and judgment: The affect infusion model (AIM). *Psychological Bulletin*, *117*(1), 39-66. doi:10.1037/0033-2909.117.1.39

Friese, M., Hofmann, W., & Wänke, M. (2008). When impulses take over: Moderated predictive validity of explicit and implicit attitude measures in predicting food choice and consumption behaviour. *British Journal Of Social Psychology*, *47*(3), 397-419. doi:10.1348/014466607X241540

Fujita, K. (2011). On conceptualizing self-control as more than the effortful inhibition of impulses. *Personality And Social Psychology Review*, *15*(4), 352-366. doi:10.1177/1088868311411165

Gannon, T. A., Ward, T., Beech, A. R., & Fisher, D. (2007). *Aggressive offenders' cognition: Theory, research and practice*. New York, NY, US: John Wiley & Sons Ltd. doi:10.1002/9780470746295

Giancola, P. R. (2000). Executive functioning: A conceptual framework for alcohol-related aggression. *Experimental And Clinical Psychopharmacology*, *8*(4), 576-597. doi:10.1037/1064-1297.8.4.576

Giancola, P. R., & Corman, M. D. (2007). Alcohol and aggression: A test of the attention-allocation model. *Psychological Science*, *18*(7), 649-655. doi:10.1111/j.1467-9280.2007.01953.x

Giancola, P. R., Duke, A. A., & Ritz, K. Z. (2011). Alcohol, violence, and the alcohol myopia model: Preliminary findings and implications for prevention. *Addictive Behaviors*, *36*(10), 1019-1022. doi:10.1016/j.addbeh.2011.05.006

Giancola, P. R., Josephs, R. A., Parrott, D. J., & Duke, A. A. (2010). Alcohol myopia revisited: Clarifying aggression and other acts of disinhibition through a distorted lens. *Perspectives On Psychological Science*, *5*(3), 265-278. doi:10.1177/1745691610369467

Giancola, P. R., & Tarter, R. E. (1999). Executive cognitive functioning and risk for substance abuse. *Psychological Science*, *10*(3), 203-205. doi:10.1111/1467-9280.00135

Godlaski, A. J., & Giancola, P. R. (2009). Executive functioning, irritability, and alcohol-related aggression. *Psychology Of Addictive Behaviors*, *23*(3), 391-403. doi:10.1037/a0016582

Goldstein A. P. Nensen R. Daleflod B. Kalt M. (2004). *New perspectives on aggression replacement training.* Chichester: John Wiley & Sons.

Guerra, N. G., Huesmann, L. R., & Spindler, A. (2003). Community Violence Exposure, Social Cognition, and Aggression Among Urban Elementary School Children. *Child Development*, *74*(5), 1561-1576. doi:10.1111/1467-8624.00623

Hoaken, P. S., Shaughnessy, V. K., & Pihl, R. O. (2003). Executive cognitive functioning and aggression: Is it an issue of impulsivity?. *Aggressive Behavior*, *29*(1), 15-30. doi:10.1002/ab.10023

Hoobler, J. M., & Brass, D. J. (2006). Abusive supervision and family undermining as displaced aggression. *Journal Of Applied Psychology*, *91*(5), 1125-1133. doi:10.1037/0021-9010.91.5.1125

Hovland, C. I., & Sears, R. R. (1940). Minor studies of aggression: VI. Correlation of lynchings with economic indices. *The Journal Of Psychology: Interdisciplinary And Applied*, *9*, 301-310. doi:10.1080/00223980.1940.9917696

Huesmann, L. R., Dubow, E. F., & Boxer, P. (2009). Continuity of aggression from childhood to early adulthood as a predictor of life outcomes: Implications for the adolescent-limited and life-course-persistent models. *Aggressive Behavior*, *35*(2), 136-149. doi:10.1002/ab.20300

Jasinska, A. J. (2013). Automatic inhibition and habitual control: alternative views in neuroscience research on response inhibition and inhibitory control. *Frontiers in behavioural neuroscience*, *7*. doi:10.3389/fnbeh.2013.00025

Johnson, T. E., & Rule, B. G. (1986). Mitigating circumstance information, censure, and aggression. *Journal Of Personality And Social Psychology*, *50*(3), 537-542. doi:10.1037/0022-3514.50.3.537

Kokko, K., & Pulkkinen, L. (2005). Stability of Aggressive Behavior from Childhood to Middle Age in Women and Men. *Aggressive Behavior*, *31*(5), 485-497. doi:10.1002/ab.20063

Kross, E., Ayduk, O., & Mischel, W. (2005). When Asking 'Why' Does Not Hurt: Distinguishing Rumination From Reflective Processing of Negative Emotions. *Psychological Science*, *16*(9), 709-715. doi:10.1111/j.1467-9280.2005.01600.x

Kuo, F. E., & Sullivan, W. C. (2001). Environment and crime in the inner city: Does vegetation reduce crime?. *Environment And Behavior*, *33*(3), 343-367. doi:10.1177/00139160121973025

Laible, D. J., Murphy, T. P., & Augustine, M. (2014). Adolescents' aggressive and prosocial behaviors: Links with social information processing, negative emotionality, moral affect, and moral cognition. *The Journal Of Genetic Psychology: Research And Theory On Human Development*, *175*(3), 270-286. doi:10.1080/00221325.2014.885878

Lanciano, T., Curci, A., & Zatton, E. (2010). Individual differences on mental rumination: The role of Emotional Intelligence. *Europe's Journal of Psychology, 2,* 65–84. doi:10.5964/ejop.v6i2.185

LeSure-Lester, G. E. (2002). An application of cognitive-behavior principles in the reduction of aggression among abused African American adolescents. *Journal Of Interpersonal Violence*, *17*(4), 394-402. doi:10.1177/0886260502017004003

Levermore, M. A. (2004). Violent Media and Videogames, and Their Role in Creating Violent Youth. *Forensic Examiner*, *13*(3).

Lieberman, M. D., Jarcho, J. M., & Obayashi, J. (2005). Attributional Inference Across Cultures: Similar Automatic Attributions and Different Controlled Corrections. *Personality And Social Psychology Bulletin*, *31*(7), 889-901. doi:10.1177/0146167204274094

MacTavish, A. (2011). *Executive Functioning in Provoked Physical Aggression* (Master's Thesis). Retrieved from https://atrium.lib.uoguelph.ca/xmlui/handle/10214/3090.

Marcus-Newhall, A., Pedersen, W. C., Carlson, M., & Miller, N. (2000). Displaced aggression is alive and well: A meta-analytic review. *Journal Of Personality And Social Psychology*, *78*(4), 670-689. doi:10.1037/0022-3514.78.4.670

Matthews, R. A., Del Priore, R. E., Acitelli, L. K., & Barnes-Farrell, J. L. (2006). Work-to-relationship conflict: Crossover effects in dual-earner couples. *Journal Of Occupational Health Psychology*, *11*(3), 228-240. doi:10.1037/1076-8998.11.3.228

Meichenbaum, D. H. (1972). Cognitive modification of test anxious college students. *Journal Of Consulting And Clinical Psychology*, *39*(3), 370-380. doi:10.1037/h0033896

Meiring, L., Subramoney, S., Thomas, K. F., Decety, J., & Fourie, M. M. (2014). Empathy and helping: Effects of racial group membership and cognitive load. *South African Journal Of Psychology*, *44*(4), 426-438. doi:10.1177/0081246314530280

Marcus-Newhall, A., Pedersen, W. C., Carlson, M., & Miller, N. (2000). Displaced aggression is alive and well: a meta-analytic review. *Journal of personality and social psychology*, *78*(4), 670.

Miller, N., Pedersen, W. C., Earleywine, M., & Pollock, V. E. (2003). A theoretical model of triggered displaced aggression. *Personality And Social Psychology Review*, *7*(1), 75-97. doi:10.1207/S15327957PSPR0701_5

Mitchell, M. S., & Ambrose, M. L. (2007). Abusive supervision and workplace deviance and the moderating effects of negative reciprocity beliefs. *Journal Of Applied Psychology*, *92*(4), 1159-1168. doi:10.1037/0021-9010.92.4.1159

Muraven, M., Tice, D. M., & Baumeister, R. F. (1998). Self-control as a limited resource: Regulatory depletion patterns. *Journal Of Personality And Social Psychology*, *74*(3), 774-789. doi:10.1037/0022-3514.74.3.774

Nigg, J. T. (2000). On inhibition/disinhibition in developmental psychopathology: Views from cognitive and personality psychology and a working inhibition taxonomy. *Psychological Bulletin, 126*(2), 220-246. doi:10.1037/0033-2909.126.2.220

Nordgren, L. F., & Chou, E. Y. (2013). A devil on each shoulder: When (and why) greater cognitive capacity impairs self-control?. *Social Psychological And Personality Science, 4*(2), 233-237. doi:10.1177/1948550612451622

Olweus, D. (1995). Bullying or peer abuse at school: Facts and interventions. *Current Directions In Psychological Science, 4*(6), 196-200. doi:10.1111/1467-8721.ep10772640

Parke, R. D., & Deur, J. L. (1972). Schedule of punishment and inhibition of aggression in children. *Developmental Psychology, 7*(3), 266-269. doi:10.1037/h0033347

Paas, F. C., & Van Merriënboer, J. G. (1994). Instructional control of cognitive load in the training of complex cognitive tasks. *Educational Psychology Review, 6*(4), 351-371. doi:10.1007/BF02213420

Paas, F., Tuovinen, J. E., Tabbers, H., & Van Gerven, P. M. (2003). Cognitive load measurement as a means to advance cognitive load theory. *Educational Psychologist, 38*(1), 63-71. doi:10.1207/S15326985EP3801_8

Pedersen, W. C., Bushman, B. J., Vasquez, E. A., & Miller, N. (2008). Kicking the (barking) dog effect: The moderating role of target attributes on triggered displaced aggression. *Personality And Social Psychology Bulletin, 34*(10), 1382-1395. doi:10.1177/0146167208321268

Pedersen, W. C., Gonzales, C., & Miller, N. (2000). The moderating effect of trivial triggering provocation on displaced aggression. *Journal Of Personality And Social Psychology*, *78*(5), 913-927. doi:10.1037/0022-3514.78.5.913

Pedersen, W. C., Vasquez, E. A., Bartholow, B. D., Grosvenor, M., & Truong, A. (2014). Are you insulting me? Exposure to alcohol primes increases aggression following ambiguous provocation. *Personality And Social Psychology Bulletin*, *40*(8), 1037-1049. doi:10.1177/0146167214534993

Pellegrini, A. D., Bartini, M., & Brooks, F. (1999). School bullies, victims, and aggressive victims: Factors relating to group affiliation and victimization in early adolescence. *Journal Of Educational Psychology*, *91*(2), 216-224. doi:10.1037/0022-0663.91.2.216

Polivy, J. (1998). The effects of behavioral inhibition: Integrating internal cues, cognition, behavior, and affect. *Psychological Inquiry*, *9*(3), 181-204. doi:10.1207/s15327965pli0903_1

Posick, C., Rocque, M., & Rafter, N. (2014). More Than a Feeling: Integrating Empathy Into the Study of Lawmaking, Lawbreaking, and Reactions to Lawbreaking. *International Journal of Offender Therapy and Comparative Criminology*, *58*, 5-26. doi: 10.1177/0306624X12465411

Rusting, C. L., & Nolen-Hoeksema, S. (1998). Regulating responses to anger: Effects of rumination and distraction on angry mood. *Journal Of Personality And Social Psychology*, *74*(3), 790-803. doi:10.1037/0022-3514.74.3.790

Schwarz, N. (2012). Feelings-as-information theory. In P. M. Van Lange, A. W. Kruglanski, E. T. Higgins, P. M. Van Lange, A. W. Kruglanski, E. T. Higgins (Eds.) ,

Handbook of theories of social psychology (Vol 1) (pp. 289-308). Thousand Oaks, CA: Sage Publications Ltd.

Séguin, J. R., Boulerice, B., Harden, P. W., Tremblay, R. E., & Pihl, R. O. (1999). Executive functions and physical aggression after controlling for attention deficit hyperactivity disorder, general memory and IQ. *Journal Of Child Psychology And Psychiatry, 40*(8), 1197-1208. doi:10.1111/1469-7610.00536

Smetana, J. G., Campione-Barr, N., & Yell, N. (2003). Children's moral and affective judgments regarding provocation and retaliation. *Merrill-Palmer Quarterly, 49*(2), 209-236. doi:10.1353/mpq.2003.0010

Smits, D. M., De Boeck, P., & Vansteelandt, K. (2004). The Inhibition of Verbally Aggressive Behaviour. *European Journal Of Personality*, *18*(7), 537-555. doi:10.1002/per.529

Steele, C. M., & Josephs, R. A. (1988). Drinking your troubles away: II. An attention-allocation model of alcohol's effect on psychological stress. *Journal Of Abnormal Psychology*, *97*(2), 196-205. doi:10.1037/0021-843X.97.2.196

Steele, C. M., & Southwick, L. (1985). Alcohol and social behavior: I. The psychology of drunken excess. *Journal Of Personality And Social Psychology*, *48*(1), 18-34. doi:10.1037/0022-3514.48.1.18

Strack, F., & Deutsch, R. (2004). Reflective and Impulsive Determinants of Social Behavior. *Personality And Social Psychology Review*, *8*(3), 220-247. doi:10.1207/s15327957pspr0803_1

Stucke, T. S., & Baumeister, R. F. (2006). Ego depletion and aggressive behavior: Is the inhibition of aggression a limited resource?. *European Journal Of Social Psychology*, *36*(1), 1-13. doi:10.1002/ejsp.285

Thomas, A., & Cain, A. (2011). *Our throw away children: Extending and developing interventions in the Caribbean: Working with high risk populations. Psychological sciences and well-being: Building bridges for tomorrow*. Paper presented at the Caribbean Regional Conference of Psychology, Nassau, Bahamas, November 17, 2011.

Trope, Y., & Gaunt, R. (2000). Processing alternative explanations of behavior: Correction or integration?. *Journal Of Personality And Social Psychology*, *79*(3), 344-354. doi:10.1037/0022-3514.79.3.344

Vasquez, E. A. (2009). Cognitive, load, trigger salience, and the facilitation of triggered displaced aggression. *European Journal Of Social Psychology*, *39*(5), 684-693. doi:10.1002/ejsp.566

Vasquez, E. A., Denson, T. F., Pedersen, W. C., Stenstrom, D. M., & Miller, N. (2005). The moderating effect of trigger intensity on triggered displaced aggression. *Journal Of Experimental Social Psychology*, *41*(1), 61-67. doi:10.1016/j.jesp.2004.05.007

Vasquez, E. A., Lickel, B., & Hennigan, K. (2010). Gangs, displaced, and group-based aggression. *Aggression And Violent Behavior*, *15*(2), 130-140. doi:10.1016/j.avb.2009.08.001

Vasquez, E. A., Osman, S., & Wood, J. L. (2012). Rumination and the displacement of aggression in United Kingdom gang-affiliated youth. *Aggressive Behaviour*, *38*, 89–97. doi:10.1002/ab.20419

Vasquez, E. A., Pedersen, W. C., Bushman, B. J., Kelley, N. J., Demeestere, P., & Miller, N. (2013). Lashing out after stewing over public insults: The effects of public provocation, provocation intensity, and rumination on triggered displaced aggression. *Aggressive Behavior*, *39*(1), 13-29. doi:10.1002/ab.21453

Verbruggen, F., & Logan, G. D. (2009). Automaticity of cognitive control: Goal priming in response-inhibition paradigms. *Journal Of Experimental Psychology: Learning, Memory, And Cognition*, *35*(5), 1381-1388. doi:10.1037/a0016645

Vigil-Colet, A., & Codorniu-Raga, M. J. (2004). Aggression and inhibition deficits, the role of functional and dysfunctional impulsivity. *Personality And Individual Differences*, *37*(7), 1431-1440. doi:10.1016/j.paid.2004.01.013

Vitaro, F., Barker, E. D., Boivin, M., Brendgen, M., & Tremblay, R. E. (2006). Do Early Difficult Temperament and Harsh Parenting Differentially Predict Reactive and Proactive Aggression?. *Journal Of Abnormal Child Psychology*, *34*(5), 685-695. doi:10.1007/s10802-006-9055-6

Watson, M. W., Fischer, K.W., Andreas, J., & Smith, K.W. (2004) "Pathways to aggression in children and adolescents." *Harvard Educational Review, 74,* 404-430.

Wastell, C. A., Cairns, D., & Haywood, H. (2009). Empathy training, sex offenders and re-offending. *Journal Of Sexual Aggression*, *15*(2), 149-159. doi:10.1080/13552600902792599

Westman, M. (2001). Stress and strain crossover. *Human Relations, 54,* 717–751. doi:10.1177/0018726701546002

Wegener, D. T., Clark, J. K., & Petty, R. E. (2006). Not all stereotyping is created equal: Differential consequences of thoughtful versus non thoughtful stereotyping. *Journal Of Personality And Social Psychology, 90*(1), 42-59. doi:10.1037/0022-3514.90.1.42

Wilkowski, B. M., Crowe, S. E., & Ferguson, E. L. (2015). Learning to keep your cool: Reducing aggression through the experimental modification of cognitive control. *Cognition And Emotion, 29*(2), 251-265. doi:10.1080/02699931.2014.911146

Yeh, W., & Barsalou, L. W. (2006). The situated nature of concepts. *The American Journal Of Psychology, 119*(3), 349-384. doi:10.2307/20445349

Zillmann, D. (1971). Excitation transfer in communication-mediated aggressive behavior. *Journal Of Experimental Social Psychology, 7*(4), 419-434. doi:10.1016/0022-1031(71)90075-8

Zillmann, D. (1994). Cognition-excitation interdependencies in the escalation of anger and angry aggression. In M. Potegal, J. F. Knutson, M. Potegal, J. F. Knutson (Eds.), *The dynamics of aggression: Biological and social processes in dyads and groups* (pp. 45-71). Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.

Appendix A

Anagram Exercise

etonmsr _____

mtvnnreieon _____

zziap _____

srasg _____

ersispru _____

apsonexho _____

drnstcoetiu _____

eanhgc _____

sivydcero _____

syiufjt _____

ehsytrai _____

blaet _____

taaficnts _____

srlueeap _____

hopggraye _____

Appendix B

NASA Task Instructions:

In this task you must think of six useful characteristics for an astronaut of a space station crew.

THE SITUATION AND PROBLEM: In the year 2010, NASA will have a fully operational orbiting space station around the earth. Teams of 7 – 8 persons will be stationed there for a period of six months at a time. What characteristics would be useful traits, qualities, or beliefs for a member of the space station crew? That is, think of six (6) characteristics that are likely to enhance an astronaut's performance in terms of either attitudes, interests, skills, education, personality traits, experiences, or beliefs. For instance, a useful quality for a member would be the ability to follow order. You are provided with a sheet on which to write the six qualities you actually chose. Most people complete this task in four minutes, but if you need another minute, that's fine.

Six characteristics:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Appendix C

Partner Task Evaluation

Please, use the following scale to rate the NASA task and your partner's performance on the Astronaut-Traits task you just completed along the areas described below:

1 = Not at all (Not good at all)
2 = slightly
3 = moderately
4 = average
5 = quite
6 = very
7 = extremely (extremely good)

1) How challenging was the NASA task? _____
2) How important was the task? _____
3) Was the NASA task interesting to you? _____
4) The quality of your partner's answers: _____
5) The degree to which your partner's answers (traits listed) made sense: _____
6) Your overall evaluation of your partner's performance: _____

Please, make any additional comments you feel are relevant to evaluating the NASA task you just completed and evaluating your partner's performance on this task:

_____
_____
_____
_____
_____
_____
_____
_____
_____

NASA ctd. Indicate the degree to which you agree with the following statements:

1) Your partner is an intelligent person

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

2) Your partner is **not** a capable person

1	2	3	4	5	6	7

Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

3) Your partner has lots of potential

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

4) Your partner is a competent individual

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

4) Your partner is **not** a likeable person

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

6) Your partner is a friendly individual

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

7) You like your partner

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

Appendix D

High cognitive load: 5978305482

Low cognitive load: 739

Appendix E

Condition 1 (high cognitive load and inhibiting cues)

Experiment Protocol

Have all the forms and materials ready for the participant. On arrival, place participant in the study room, alone. Following this, experimenter **walks in holding the protocol, info page, 2 consent forms and information sheet**. They introduce them self and continues by reading the first paragraph clearly, maintaining some eye contact:

To the participant:

"Welcome to our study 'The effect of language and creativity on decision making and mental performance'. The purpose of this study is to understand the relationship between cognitive or mental performance related to creativity, language skills and decision making. We also want to study how these factors might be related to distant interactions between two people and the impression that they can form of their partner in such interactions. So, part of this study involves a second person who will be doing the same tasks as you, but in another room. You will interact with this person later in the study, but you will not meet face to face. We want to study distant social interactions because, as you may already know, many people meet and chat with others on the internet, without face to face social contact. The effects of this type of social interactions in not yet understood, so, we want to better understand the types of impressions that people can form of one another in distant interaction. Does all of this make sense? We also want to see if cognitive skills and decision making have an effect on the impression one can form of another person we have not met directly. I just needed to explain this to you before we continue. Do you have any questions? . I will remind you that your participation in this research is completely voluntary. You can stop the study and your

participation at any time and you will still receive credit. Any questions? Now please read through and fill out these forms, and I'll come back in a few minutes to start the study".

Hand the initial info sheet and consent form to participant and return four or five minutes later with exercise 1. Briefly check they have filled it out and collect forms. Then read:

"As I mentioned before, the aim of the study is to investigate how language and creativity may be related to decision making and impression formation. You and the other participant will interact to some degree during the experimental session as part of the decision making element of the study. I will give you instructions about that later on. The first and second exercises will assess some of your language and creativity skills. You and the second participant will also evaluate each other's work as part of an exercise on impression formation. The third task will involve decision-making while under different conditions of distraction. Finally, you will indicate the impression that you formed of the other participant"

Provocation induction:

Place the form face down on the desk and state: "This first exercise you will complete by yourself. This will help us assess individual cognitive performance by testing your language skills. I will give you 4 minutes to complete 15 anagrams or to rearrange the scrambled up letters to make an actual word. So your job is to complete all fifteen anagrams in the 4 minutes. Get ready and…you can start".

After 4 minutes, collect the anagram answer sheet, telling the participant to wait while it is marked in another room. Leave the room to 'mark' work, and then return to subject to induce the provocation:

Provocation: read in an agitated voice:

“You actually got a lot of these wrong! You only got 5 correct!” (Looking at the anagram sheet.) “Well, I suppose you are a first year and first years always seem to mess this up. I’m not sure this data is any good. To be honest I should start this again, but I don’t want to waste time. So let’s just move on to the next exercise.”

Trigger, part 1

State:

“The next exercise also investigates your creativity skills. After finishing this exercise, you and the other participant will evaluate each other’s work as part of the decision making aspect of the study. Inside this envelope are the second exercise and its instructions. Read the instructions carefully first, then finish the exercise. I’ll be back in a few minutes to collect the paper.”

Return to the participant after 3 minutes to collect the exercise and state:

“Thank you, I'll go and get the other participant’s finished exercise and give it to you to assess and evaluate. I'll also give them your work to do the same."

Leave the participant and re-enter a minute later with the other participants ‘work’, saying:

"Here's the other participants exercise. Please use the sheet I’ve attached to evaluate their work as much as you can and I will come back in a few minutes to collect it."

(task and evaluation sheets should be in an envelope)**.**

Trigger Part 2

Return to the room after 3 minutes to collect the evaluation and swap it with the subject's evaluation (triggering evaluation form). State "This is your work, alongside the other participant's evaluation of it. I will leave you to read the evaluation for a few minutes then I will come back to carry on the experiment".

Return to room to collect evaluation, holding **the cup with condition numbers in it**. Then, continue with the aggression measure, involving cognitive/no cognitive load and inhibiting cue salience/no inhibiting cue salience.

State: "The last task investigates decision making while being distracted. Some research suggests that being distracted makes it harder to perform to your highest cognitive ability. So being distracted may mean it is harder to make decisions. You and the other participant will have to count a series of numbers in your head. For the decision-making part, you and the other participant will decide how long each other is distracted, and you will decide this at the same time. The length of time you decide your partner should be distracted won't influence their decision on how long you should be distracted."

"We also want to see if the stimulation of senses alters the effects of the distraction. For instance, someone can be distracted visually or audibly, or through the taste and touch senses. We'll now determine the distraction condition you will be in by choosing one of these pieces of paper. In condition 1, you would be distracted through your sense of touch. Condition 2 involves smell, condition 3 involves visual sense and condition 4 is no distraction.

Let the subject take a paper from the cup. Each participant however receives condition 4. Let them read the paper then see the condition they have picked.

Memorize and state: “You got condition four so it has been randomly determined that you are in the no distraction group. So you won’t be distracted. So I will go and tell the other experimenter your condition’.

Leave the room and return with distraction materials and decision form in an envelope and say: ‘So you will not be distracted, however the other experimenter has told me the other participant picked condition 1 and will be distracted by their sense of touch. So their touch distraction will involve putting their hand in very cold water while completing the next exercise.’

High Cognitive load condition:

Re-enter room and put the high cognitive load number series on the desk in front of the participant, as well as the cold water in the bucket and the form to circle the number of seconds.

State: "While you are deciding how long your partner should be distracted, we want to assess your cognitive capacity by asking you to memorize this number. Don’t start to do that until I have told you the rest of the instructions. You will rehearse the number in your mind as you make your decision. As you do this you will also circle the time you want to distract the other participant with. So while you record this, keep rehearsing the number. It is important that you rehearse the number in your head until I ask you to stop. Before I let you memorize the number, if you could just test the cold water with your hand for a few seconds so you can feel the temperature. (Give the participant a towel to dry their hand). Ok, now take a minute to read it and become familiar with it”. Give the participants 30 seconds to memorize it.

Inhibition condition, say:

“Before you start, I will tell you that your information collected today is very important. Some important faculty members, such as the chair of the school of psychology, will also be examining the information given today, including how long you decide to distract the other participant.”

Then say:

“So when I say start, rehearse the number in your head while you decide on the time to distract your partner. When I say stop, you can stop rehearsing the number. We will ask for your recollection of the number later. If you then put your response in the envelope I will pass it to the experimenter dealing with the other participant’s distraction to administer.

After 30 seconds, tell participant to stop rehearsing and ask if they have circled a number on the scale. Then collect the envelope and the bucket of cold water to take out the room and state you will give this to the second experimenter for the other participant.

Re-enter room with last exercise and state ‘For the last exercise, you will complete this picture task while rehearsing the number, in order to test your mental performance once more. So when I say start please continue rehearsing the number while you categorize the pictures until I say stop. Ok, begin’.

Finally, re-enter with debrief, collect the last exercise and issue the participant with the final manipulation check that determines their suspicion measure. Then debrief participant verbally and hand them debrief sheet.

Appendix F

Condition 2 (low cognitive load, inhibiting cues)

Experiment Protocol

Have all the forms and materials ready for the participant. On arrival, place participant in the study room, alone. Following this, experimenter **walks in holding the protocol, info page, 2 consent forms and information sheet**. They introduce them self and continues by reading the first paragraph clearly, maintaining some eye contact:

To the participant:

"Welcome to our study 'The effect of language and creativity on decision making and mental performance'. The purpose of this study is to understand the relationship between cognitive or mental performance related to creativity, language skills and decision making. We also want to study how these factors might be related to distant interactions between two people and the impression that they can form of their partner in such interactions. So, part of this study involves a second person who will be doing the same tasks as you, but in another room. You will interact with this person later in the study, but you will not meet face to face. We want to study distant social interactions because, as you may already know, many people meet and chat with others on the internet, without face to face social contact. The effects of this type of social interactions in not yet understood, so, we want to better understand the types of impressions that people can form of one another in distant interaction. Does all of this make sense? We also want to see if cognitive skills and decision making have an effect on the impression one can form of another person we have not met directly. I just needed to explain this to you before we continue. Do you have any questions? . I will remind you that

your participation in this research is completely voluntary. You can stop the study and your participation at any time and you will still receive credit. Any questions? Now please read through and fill out these forms, and I'll come back in a few minutes to start the study".

Hand the initial info sheet and consent form to participant and return four or five minutes later with exercise 1. Briefly check they have filled it out and collect forms. Then read:

"As I mentioned before, the aim of the study is to investigate how language and creativity may be related to decision making and impression formation. You and the other participant will interact to some degree during the experimental session as part of the decision making element of the study. I will give you instructions about that later on. The first and second exercises will assess some of your language and creativity skills. You and the second participant will also evaluate each other's work as part of an exercise on impression formation. The third task will involve decision-making while under different conditions of distraction. Finally, you will indicate the impression that you formed of the other participant"

Provocation induction:

Place the form face down on the desk and state: "This first exercise you will complete by yourself. This will help us assess individual cognitive performance by testing your language skills. I will give you 4 minutes to complete 15 anagrams or to rearrange the scrambled up letters to make an actual word. So your job is to complete all fifteen anagrams in the 4 minutes. Get ready and…you can start".

After 4 minutes, collect the anagram answer sheet, telling the participant to wait while it is marked in another room. Leave the room to 'mark' work, and then return to subject to induce the provocation:

Provocation: read in an agitated voice:

"You actually got a lot of these wrong! You only got 5 correct!" (Looking at the anagram sheet.) "Well, I suppose you are a first year and first years always seem to mess this up. I'm not sure this data is any good. To be honest I should start this again, but I don't want to waste time. So let's just move on to the next exercise."

Trigger, part 1

State:

"The next exercise also investigates your creativity skills. After finishing this exercise, you and the other participant will evaluate each other's work as part of the decision making aspect of the study. Inside this envelope are the second exercise and its instructions. Read the instructions carefully first, then finish the exercise. I'll be back in a few minutes to collect the paper."

Return to the participant after 3 minutes to collect the exercise and state:

"Thank you, I'll go and get the other participant's finished exercise and give it to you to assess and evaluate. I'll also give them your work to do the same."

Leave the participant and re-enter a minute later with the other participants 'work', saying:

"Here's the other participants exercise. Please use the sheet I've attached to evaluate their work as much as you can and I will come back in a few minutes to collect it."

(task and evaluation sheets should be in an envelope).

Trigger Part 2

Return to the room after 3 minutes to collect the evaluation and swap it with the subject's evaluation (triggering evaluation form). State "This is your work, alongside the other participant's evaluation of it. I will leave you to read the evaluation for a few minutes then I will come back to carry on the experiment".

Return to room to collect evaluation, holding **the cup with condition numbers in it**. Then, continue with the aggression measure, involving cognitive/no cognitive load and inhibiting cue salience/no inhibiting cue salience.

State: "The last task investigates decision making while being distracted. Some research suggests that being distracted makes it harder to perform to your highest cognitive ability. So being distracted may mean it is harder to make decisions. You and the other participant will have to count a series of numbers in your head. For the decision-making part, you and the other participant will decide how long each other is distracted, and you will decide this at the same time. The length of time you decide your partner should be distracted won't influence their decision on how long you should be distracted."

"We also want to see if the stimulation of senses alters the effects of the distraction. For instance, someone can be distracted visually or audibly, or through the taste and touch senses. We'll now determine the distraction condition you will be in by choosing one of these pieces of paper. In

condition 1, you would be distracted through your sense of touch. Condition 2 involves smell, condition 3 involves visual sense and condition 4 is no distraction.

Let the subject take a paper from the cup. Each participant however receives condition 4. Let them read the paper then see the condition they have picked.

Memorize and state: "You got condition four so it has been randomly determined that you are in the no distraction group. So you won't be distracted. So I will go and tell the other experimenter your condition'.

Leave the room and return with distraction materials and decision form in an envelope and say: 'So you will not be distracted, however the other experimenter has told me the other participant picked condition 1 and will be distracted by their sense of touch. So their touch distraction will involve putting their hand in very cold water while completing the next exercise.'

Low Cognitive load condition:

Re-enter room and put the low cognitive load number series on the desk in front of the participant, as well as the cold water in the bucket and the form to circle the number of seconds.

State: "While you are deciding how long your partner should be distracted, we want to assess your cognitive capacity by asking you to memorize this number. Don't start to do that until I have told you the rest of the instructions. You will rehearse the number in your mind as you make your decision. As you do this you will also circle the time you want to distract the other participant with. So while you record this, keep rehearsing the number. It is important that you rehearse the number in your head until I ask you to stop. Before I let you memorize the number, if you could just test the

cold water with your hand for a few seconds so you can feel the temperature. (Give the participant a towel to dry their hand). Ok, now take a minute to read it and become familiar with it". Give the participants 30 seconds to memorize it.

Inhibition condition, say:

"Before you start, I will tell you that your information collected today is very important. Some important faculty members, such as the chair of the school of psychology, will also be examining the information given today, including how long you decide to distract the other participant."

Then say:

"So when I say start, rehearse the number in your head while you decide on the time to distract your partner. When I say stop, you can stop rehearsing the number. We will ask for your recollection of the number later. If you then put your response in the envelope I will pass it to the experimenter dealing with the other participant's distraction to administer.

After 30 seconds, tell participant to stop rehearsing and ask if they have circled a number on the scale. Then collect the envelope and the bucket of cold water to take out the room and state you will give this to the second experimenter for the other participant.

Re-enter room with last exercise and state 'For the last exercise, you will complete this picture task while rehearsing the number, in order to test your mental performance once more. So when I say start please continue rehearsing the number while you categorize the pictures until I say stop. Ok, begin'.

Finally, re-enter with debrief, collect the last exercise and issue the participant with the final manipulation check that determines their suspicion measure. Then debrief participant verbally and hand them debrief sheet.

Appendix G

Condition 3 (high cognitive load, no inhibiting cues)

Experiment Protocol

Have all the forms and materials ready for the participant. On arrival, place participant in the study room, alone. Following this, experimenter **walks in holding the protocol, info page, 2 consent forms and information sheet**. They introduce them self and continues by reading the first paragraph clearly, maintaining some eye contact:

To the participant:

"Welcome to our study 'The effect of language and creativity on decision making and mental performance'. The purpose of this study is to understand the relationship between cognitive or mental performance related to creativity, language skills and decision making. We also want to study how these factors might be related to distant interactions between two people and the impression that they can form of their partner in such interactions. So, part of this study involves a second person who will be doing the same tasks as you, but in another room. You will interact with this person later in the study, but you will not meet face to face. We want to study distant social interactions because, as you may already know, many people meet and chat with others on the internet, without face to face social contact. The effects of this type of social interactions in not yet understood, so, we want to better understand the types of impressions that people can form of one another in distant interaction. Does all of this make sense? We also want to see if cognitive skills and decision making have an effect on the impression one can form of another person we have not met directly. I just needed to explain this to you before we continue. Do you have any questions? . I will remind you that

your participation in this research is completely voluntary. You can stop the study and your participation at any time and you will still receive credit. Any questions? Now please read through and fill out these forms, and I'll come back in a few minutes to start the study".

Hand the initial info sheet and consent form to participant and return four or five minutes later with exercise 1. Briefly check they have filled it out and collect forms. Then read:

"As I mentioned before, the aim of the study is to investigate how language and creativity may be related to decision making and impression formation. You and the other participant will interact to some degree during the experimental session as part of the decision making element of the study. I will give you instructions about that later on. The first and second exercises will assess some of your language and creativity skills. You and the second participant will also evaluate each other's work as part of an exercise on impression formation. The third task will involve decision-making while under different conditions of distraction. Finally, you will indicate the impression that you formed of the other participant"

Provocation induction:

Place the form face down on the desk and state: "This first exercise you will complete by yourself. This will help us assess individual cognitive performance by testing your language skills. I will give you 4 minutes to complete 15 anagrams or to rearrange the scrambled up letters to make an actual word. So your job is to complete all fifteen anagrams in the 4 minutes. Get ready and…you can start".

After 4 minutes, collect the anagram answer sheet, telling the participant to wait while it is marked in another room. Leave the room to 'mark' work, and then return to subject to induce the provocation:

Provocation: read in an agitated voice:

“You actually got a lot of these wrong! You only got 5 correct!” (Looking at the anagram sheet.) “Well, I suppose you are a first year and first years always seem to mess this up. I’m not sure this data is any good. To be honest I should start this again, but I don’t want to waste time. So let’s just move on to the next exercise.”

Trigger, part 1

State:

“The next exercise also investigates your creativity skills. After finishing this exercise, you and the other participant will evaluate each other’s work as part of the decision making aspect of the study. Inside this envelope are the second exercise and its instructions. Read the instructions carefully first, then finish the exercise. I’ll be back in a few minutes to collect the paper.”

Return to the participant after 3 minutes to collect the exercise and state:

“Thank you, I'll go and get the other participant’s finished exercise and give it to you to assess and evaluate. I'll also give them your work to do the same."

Leave the participant and re-enter a minute later with the other participants ‘work’, saying:

"Here's the other participants exercise. Please use the sheet I’ve attached to evaluate their work as much as you can and I will come back in a few minutes to collect it."

(task and evaluation sheets should be in an envelope)**.**

Trigger Part 2

Return to the room after 3 minutes to collect the evaluation and swap it with the subject's evaluation (triggering evaluation form). State "This is your work, alongside the other participant's evaluation of it. I will leave you to read the evaluation for a few minutes then I will come back to carry on the experiment".

Return to room to collect evaluation, holding **the cup with condition numbers in it**. Then, continue with the aggression measure, involving cognitive/no cognitive load and inhibiting cue salience/no inhibiting cue salience.

State: "The last task investigates decision making while being distracted. Some research suggests that being distracted makes it harder to perform to your highest cognitive ability. So being distracted may mean it is harder to make decisions. You and the other participant will have to count a series of numbers in your head. For the decision-making part, you and the other participant will decide how long each other is distracted, and you will decide this at the same time. The length of time you decide your partner should be distracted won't influence their decision on how long you should be distracted."

"We also want to see if the stimulation of senses alters the effects of the distraction. For instance, someone can be distracted visually or audibly, or through the taste and touch senses. We'll now determine the distraction condition you will be in by choosing one of these pieces of paper. In condition 1, you would be distracted through your sense of touch. Condition 2 involves smell, condition 3 involves visual sense and condition 4 is no distraction.

Let the subject take a paper from the cup. Each participant however receives condition 4. Let them read the paper then see the condition they have picked.

Memorize and state: “You got condition four so it has been randomly determined that you are in the no distraction group. So you won’t be distracted. So I will go and tell the other experimenter your condition’.

Leave the room and return with distraction materials and decision form in an envelope and say: ‘So you will not be distracted, however the other experimenter has told me the other participant picked condition 1 and will be distracted by their sense of touch. So their touch distraction will involve putting their hand in very cold water while completing the next exercise.’

High Cognitive load condition:

Re-enter room and put the high cognitive load number series on the desk in front of the participant, as well as the cold water in the bucket and the form to circle the number of seconds.

State: "While you are deciding how long your partner should be distracted, we want to assess your cognitive capacity by asking you to memorize this number. Don’t start to do that until I have told you the rest of the instructions. You will rehearse the number in your mind as you make your decision. As you do this you will also circle the time you want to distract the other participant with. So while you record this, keep rehearsing the number. It is important that you rehearse the number in your head until I ask you to stop. Before I let you memorize the number, if you could just test the cold water with your hand for a few seconds so you can feel the temperature. (Give the participant a towel to dry their hand). Ok, now take a minute to read it and become familiar with it”. Give the participants 30 seconds to memorize it.

No Inhibition condition, say:

"Before you start, I will tell you that your information collected today is very important. To ensure confidentiality please make sure you have not written any identifying information on any of the sheets."

Then say:

"So when I say start, rehearse the number in your head while you decide on the time to distract your partner. When I say stop, you can stop rehearsing the number. We will ask for your recollection of the number later. If you then put your response in the envelope I will pass it to the experimenter dealing with the other participant's distraction to administer.

After 30 seconds, tell participant to stop rehearsing and ask if they have circled a number on the scale. Then collect the envelope and the bucket of cold water to take out the room and state you will give this to the second experimenter for the other participant.

Re-enter room with last exercise and state 'For the last exercise, you will complete this picture task while rehearsing the number, in order to test your mental performance once more. So when I say start please continue rehearsing the number while you categorize the pictures until I say stop. Ok, begin'.

Finally, re-enter with debrief, collect the last exercise and issue the participant with the final manipulation check that determines their suspicion measure. Then debrief participant verbally and hand them debrief sheet.

Appendix H

Condition 4 (low cognitive load, no inhibiting cues)

Experiment Protocol

Have all the forms and materials ready for the participant. On arrival, place participant in the study room, alone. Following this, experimenter **walks in holding the protocol, info page, 2 consent forms and information sheet**. They introduce them self and continues by reading the first paragraph clearly, maintaining some eye contact:

To the participant:

"Welcome to our study 'The effect of language and creativity on decision making and mental performance'. The purpose of this study is to understand the relationship between cognitive or mental performance related to creativity, language skills and decision making. We also want to study how these factors might be related to distant interactions between two people and the impression that they can form of their partner in such interactions. So, part of this study involves a second person who will be doing the same tasks as you, but in another room. You will interact with this person later in the study, but you will not meet face to face. We want to study distant social interactions because, as you may already know, many people meet and chat with others on the internet, without face to face social contact. The effects of this type of social interactions in not yet understood, so, we want to better understand the types of impressions that people can form of one another in distant interaction. Does all of this make sense? We also want to see if cognitive skills and decision making have an effect on the impression one can form of another person we have not met directly. I just needed to explain this to you before we continue. Do you have any questions? . I will remind you that

your participation in this research is completely voluntary. You can stop the study and your participation at any time and you will still receive credit. Any questions? Now please read through and fill out these forms, and I'll come back in a few minutes to start the study".

Hand the initial info sheet and consent form to participant and return four or five minutes later with exercise 1. Briefly check they have filled it out and collect forms. Then read:

"As I mentioned before, the aim of the study is to investigate how language and creativity may be related to decision making and impression formation. You and the other participant will interact to some degree during the experimental session as part of the decision making element of the study. I will give you instructions about that later on. The first and second exercises will assess some of your language and creativity skills. You and the second participant will also evaluate each other's work as part of an exercise on impression formation. The third task will involve decision-making while under different conditions of distraction. Finally, you will indicate the impression that you formed of the other participant"

Provocation induction:

Place the form face down on the desk and state: "This first exercise you will complete by yourself. This will help us assess individual cognitive performance by testing your language skills. I will give you 4 minutes to complete 15 anagrams or to rearrange the scrambled up letters to make an actual word. So your job is to complete all fifteen anagrams in the 4 minutes. Get ready and…you can start".

After 4 minutes, collect the anagram answer sheet, telling the participant to wait while it is marked in another room. Leave the room to 'mark' work, and then return to subject to induce the provocation:

Provocation: read in an agitated voice:

"You actually got a lot of these wrong! You only got 5 correct!" (Looking at the anagram sheet.) "Well, I suppose you are a first year and first years always seem to mess this up. I'm not sure this data is any good. To be honest I should start this again, but I don't want to waste time. So let's just move on to the next exercise."

Trigger, part 1

State:

"The next exercise also investigates your creativity skills. After finishing this exercise, you and the other participant will evaluate each other's work as part of the decision making aspect of the study. Inside this envelope are the second exercise and its instructions. Read the instructions carefully first, then finish the exercise. I'll be back in a few minutes to collect the paper."

Return to the participant after 3 minutes to collect the exercise and state:

"Thank you, I'll go and get the other participant's finished exercise and give it to you to assess and evaluate. I'll also give them your work to do the same."

Leave the participant and re-enter a minute later with the other participants 'work', saying:

"Here's the other participants exercise. Please use the sheet I've attached to evaluate their work as much as you can and I will come back in a few minutes to collect it."

(task and evaluation sheets should be in an envelope)**.**

Trigger Part 2

Return to the room after 3 minutes to collect the evaluation and swap it with the subject's evaluation (triggering evaluation form). State "This is your work, alongside the other participant's evaluation of it. I will leave you to read the evaluation for a few minutes then I will come back to carry on the experiment".

Return to room to collect evaluation, holding **the cup with condition numbers in it**. Then, continue with the aggression measure, involving cognitive/no cognitive load and inhibiting cue salience/no inhibiting cue salience.

State: "The last task investigates decision making while being distracted. Some research suggests that being distracted makes it harder to perform to your highest cognitive ability. So being distracted may mean it is harder to make decisions. You and the other participant will have to count a series of numbers in your head. For the decision-making part, you and the other participant will decide how long each other is distracted, and you will decide this at the same time. The length of time you decide your partner should be distracted won't influence their decision on how long you should be distracted."

"We also want to see if the stimulation of senses alters the effects of the distraction. For instance, someone can be distracted visually or audibly, or through the taste and touch senses. We'll now determine the distraction condition you will be in by choosing one of these pieces of paper. In condition 1, you would be distracted through your sense of touch. Condition 2 involves smell, condition 3 involves visual sense and condition 4 is no distraction.

Let the subject take a paper from the cup. Each participant however receives condition 4. Let them read the paper then see the condition they have picked.

Memorize and state: "You got condition four so it has been randomly determined that you are in the no distraction group. So you won't be distracted. So I will go and tell the other experimenter your condition'.

Leave the room and return with distraction materials and decision form in an envelope and say: 'So you will not be distracted, however the other experimenter has told me the other participant picked condition 1 and will be distracted by their sense of touch. So their touch distraction will involve putting their hand in very cold water while completing the next exercise.'

Low Cognitive load condition:

Re-enter room and put the low cognitive load number series on the desk in front of the participant, as well as the cold water in the bucket and the form to circle the number of seconds.

State: "While you are deciding how long your partner should be distracted, we want to assess your cognitive capacity by asking you to memorize this number. Don't start to do that until I have told you the rest of the instructions. You will rehearse the number in your mind as you make your decision. As you do this you will also circle the time you want to distract the other participant with. So while you record this, keep rehearsing the number. It is important that you rehearse the number in your head until I ask you to stop. Before I let you memorize the number, if you could just test the cold water with your hand for a few seconds so you can feel the temperature. (Give the participant a

towel to dry their hand). Ok, now take a minute to read it and become familiar with it". Give the participants 30 seconds to memorize it.

No Inhibition condition, say:

"Before you start, I will tell you that your information collected today is very important. To ensure confidentiality please make sure you have not written any identifying information on any of the sheets."

Then say:

"So when I say start, rehearse the number in your head while you decide on the time to distract your partner. When I say stop, you can stop rehearsing the number. We will ask for your recollection of the number later. If you then put your response in the envelope I will pass it to the experimenter dealing with the other participant's distraction to administer.

After 30 seconds, tell participant to stop rehearsing and ask if they have circled a number on the scale. Then collect the envelope and the bucket of cold water to take out the room and state you will give this to the second experimenter for the other participant.

Re-enter room with last exercise and state 'For the last exercise, you will complete this picture task while rehearsing the number, in order to test your mental performance once more. So when I say start please continue rehearsing the number while you categorize the pictures until I say stop. Ok, begin'.

Finally, re-enter with debrief, collect the last exercise and issue the participant with the final manipulation check that determines their suspicion measure. Then debrief participant verbally and hand them debrief sheet.

Appendix I

Duration of partner's distraction

By using the scale, indicate how long partner your partner should be distracted as he/she completes the next task by circling the desired number:

1 = 0 seconds (no distraction)
2 = 10 seconds
3 = 20 seconds (small distraction)
4 = 30 seconds
5 = 40 seconds (moderate distraction)
6 = 50 seconds
7 = 60 seconds (strong distraction)
8 = 70 seconds
9 = 80 seconds (extremely strong distraction)

1	2	3	4	5	6	7	8	9
(0 sec)	(10 sec)	(20 sec)	(30 sec)	(40 sec)	(50 sec)	(60 sec)	(70 sec)	(80sec)
No Distraction		slight distraction		moderate distraction		strong distraction		very strong distraction

1) Please, indicate if people other than the experimenter will learn about the decisions you made at the end of the study:

Yes:_____ Don't recall:_____

No:_____

2) Please write down the number you were asked to memorize:

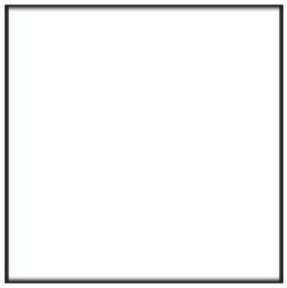
_____

Appendix J

Picture category task

Is this a form of:
Amphibian
Mammal
Reptile

Is this a form of:
Vegetable
Fruit
Dessert

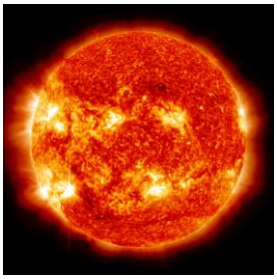


Is this a form of
Box
Shape
Furniture

Is this a form of:
Star
Planet
Comet

Is this a form of:
Plant
Flower
Tree

Is this a form of:
Hammer
Drill,
Mallet



Is this a form of:
Sun
Star
Moon

Is this a form of
Savory
Sour
Sweet

Is this a form of:
Teenager
Child
Adult

Is this used to:
Write
Read
Sing

Are these used to:
Sleep
Run
Sit

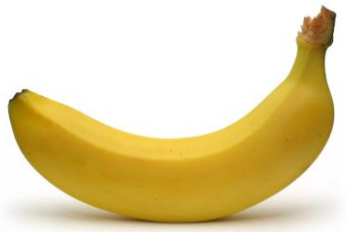
Is this a form of:
Fruit
Vegetable
Rice

Is this a form of:
Television
Computer
Laptop

Is this a form of:
Vegetable
Fruit
Dairy

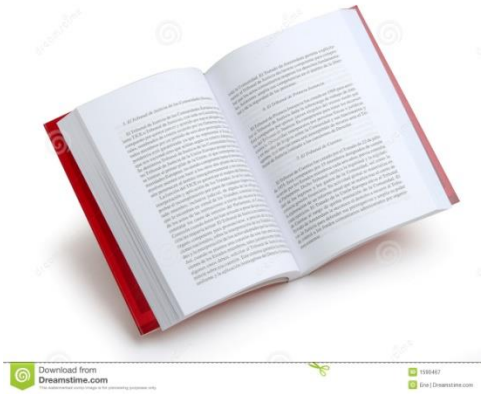
Is this a form of:
Outdoor wear
Night wear
Indoor wear

Is this a form of:
Computer
Laptop
Television



Is this a form of:
Vegetable
Dairy
Fruit

Is this a form of:
Coach
Bus
Car



Is this a form of:
Reading material
Writing material
Listening material

Is this a form of
Squash ball
Rugby ball
Football

Is this a form of:
Mug
Teacup
Coffee cup

Is this a form of:
Winter sport
Water sport
Racket sport

Is this a form of:
Racket sport
Ball sport
Water sport

Is this a form of:
Dress
Shorts
Skirt

Is this a form of:
Fruit
Meat
Vegetable

Is this a form of:
Jumper
Shirt
Cardigan

Is this a form of:
Dessert,
Ice lolly
Fruit

Is this a form of:
Snack
Breakfast
Dinner

Is this a form of:
Dolphin
Fish
Whale

Is this a form of:
Child
Adult
Male

Is this a form of:
Furniture
Decoration
Creature

Is this a form of:
Motor vehicle
Motorbike
Motor Boat

Is this a form of:
Head wear
Eye wear
Hand wear

Appendix K

Response to NASA evaluation

1) Please, indicate the degree to which you felt **happy** as a result of your partner's evaluation of your work on the NASA task:

1	2	3	4	5	6	7
Not at all			Moderately so			Extremely so

2) Please, indicate the degree to which you felt **annoyed** as a result of your partner's evaluation of your work on the NASA task:

1	2	3	4	5	6	7
Not at all			Moderately so			Extremely so

3) Please, indicate the degree to which you felt **complimented** as a result of your partner's evaluation of your work on the NASA task:

1	2	3	4	5	6	7
Not at all			Moderately so			Extremely so

4) Please, indicate the degree to which you felt **irritated** as a result of your partner's evaluation of your work on the NASA task:

1	2	3	4	5	6	7
Not at all			Moderately so			Extremely so

5) Please, indicate the degree to which you felt **pleased** as a result of your partner's evaluation of your work on the NASA task:

1	2	3	4	5	6	7
Not at all			Moderately so			Extremely so

6) Please, indicate the degree to which you felt **angry** as a result of your partner's evaluation of your work on the NASA task:

1	2	3	4	5	6	7
Not at all			Moderately so			Extremely so

7) Please, indicate the degree to which you felt **offended** as a result of your partner's evaluation of your work on the NASA task:

1	2	3	4	5	6	7
Not at all			Moderately so			Extremely so

Please, indicate the degree to which you agree with the following statements:

1) My partner provided a **good** evaluation of my work on the NASA task:

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

2) My partner provided an **unfair** evaluation of my work on the NASA task:

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

3) My partner provided **unbiased** evaluation of my work on the NASA task:

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

5) My partner **meant** to provide a **negative** evaluation of my work on the NASA task:

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

6) My partner **meant** to provide **valuable** evaluation of my work on the NASA task:

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

7) The evaluation of my work on the NASA task was **easy** to read:

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

Each of the following words describes feelings or moods. Using the following scale please, indicate the degree to which you felt the following as a result of the anagram task you completed earlier in the study:

1	2	3	4	5	6	7
Not at all			Moderately so			Extremely so

Angry _____ Avoidant _____

Down _____ Confused _____

Cheerful _____ Curious _____

Concentrating _____ Annoyed _____

Distressed _____ Pleased _____

Uncertain _____ Disgusted _____

Fearful _____ Vigorous _____

Playful _____ Upset _____

Hostile _____ Offended _____

Sad _____ Happy _____

Scornful _____ Competent _____

Grouchy _____ Irritable _____

Frustrated _____

Each of the following words describes feelings or moods. Using the following scale please, indicate the degree to which you felt the following as a result of the NASA task evaluation earlier in the study:

1	2	3	4	5	6	7
Not at all			Moderately so			Extremely so

Angry _____ Avoidant _____
Down _____ Confused _____
Cheerful _____ Curious _____
Concentrating _____ Annoyed _____
Distressed _____ Pleased _____
Uncertain _____ Disgusted _____
Fearful _____ Vigorous _____
Playful _____ Upset _____
Hostile _____ Offended _____
Sad _____ Happy _____
Scornful _____ Competent _____
Grouchy _____ Irritable _____
Frustrated _____

Appendix L

This is the partner task evaluation completed by the ostensible partner. It was written in ink when it was given to the participant. However, for the purpose of providing a copy in the appendix, the evaluation has been typed.

Partner Task Evaluation

Please, use the following scale to rate the NASA task and your partner's performance on the Astronaut-Traits task you just completed along the areas described below:

1 = Not at all (Not good at all)

2 = slightly

3 = moderately

4 = average

5 = quite

6 = very

7 = extremely (extremely good)

1) How challenging was the NASA task? ___3__

2) How important was the task? ____3_

3) Was the NASA task interesting to you? __3___

4) The quality of your partner's answers: ___4_

5) The degree to which your partner's answers (traits listed) made sense: ___3__

6) Your overall evaluation of your partner's performance: ___4__

Please, make any additional comments you feel are relevant to evaluating the NASA task you just completed and evaluating your partner's performance on this task:

Average answers, not very thoughtful.

_____

_____

_____

NASA ctd. Indicate the degree to which you agree with the following statements:

7) Your partner is an intelligent person

1	2	3	(4)	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

8) Your partner is **not** a capable person

1	2	3	(4)	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

9) Your partner has lots of potential

1	2	3	(4)	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

4) Your partner is a competent individual

1	2	3	4	(5)	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

10) Your partner is **not** a likeable person

1	2	3	(4)	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

6) Your partner is a friendly individual

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

7) You like your partner

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Don't know	Somewhat agree	Agree	Strongly agree

Appendix M

Suspicion measure

Do you have any comments about the study?

Did anything seem suspicious to you? If so, what in particular?

1	2	3	4
Not at all suspicious	Some	Moderately	Very suspicious

What did you think of the other participant?

1	2	3	4
Not at all suspicious	Some	Moderately	Very suspicious

Did you think there was more to the study than I told you?

1	2	3	4
Not at all suspicious	Some	Moderately	Very suspicious

Did you think we were testing your creativity and decision making on your mental performance?

1	2	3	4
Not at all suspicious	Some	Moderately	Very suspicious

Appendix N

The effect of language and creativity on decision making and mental performance

Who is Organising This Study?

This research is organised by the Psychology Department of the University of Kent. The researcher is Joanna Howard-Field, a MSc Student.

What Are the Aims of the Study?

The purpose of this study is to understand the relationship between mental performance related to creativity, language skills and decision making. We also want to study how these factors may relate to distant interactions between two people and the impressions they make of each other during this. So, part of this study involves a second person who will be doing the same tasks as you, but in another room. You will interact with this person later in the study, but you will not meet face to face. We want to study this type of interaction because many people meet and chat with others on the internet, without face to face social contact. The effects of this is not yet understood, so, we want to better understand the types of impressions that people can form of one another without meeting face to face. We also want to see if mental performance and decision making effect our impressions of others.

Who Can Take Part?

Students at the University of Kent

What Happens to the Information I Provide?

Participation in this study guarantees confidentiality of the information you provide in line with the UK Data Protection Act 1998. Only researchers involved in the study and, if required, the body funding this research will be authorised to access the data. We will not ask you to write your name on the study materials. Instead we will ask you to create a unique participant identification number. Questionnaires will be stored in a securely locked room for as long as is required by the Data Protection Act. The data collected for this study will be used for a student project. Once the data is analysed a report of the findings may be submitted for publication. Only broad trends will be reported and it will not be possible to identify any individuals. A summary of the results will be available from the researcher on request.

Contact for Further Information

If you require any further information or have any queries about this study please contact the researcher:

Joanna Howard-Field, email: jh716@kent.ac.uk,

Laura Roscoe: lr291@kent.ac.uk

Vilte Baltramonaityte: vb204@kent.ac.uk

Deborah Yetunde Ogunyemi: do205@kent.ac.uk

If you wish to withdraw your data from this study, please contact the Psychology Department Office on:

Tel: 01227 823699

If you have any serious concerns about the ethical conduct of this study, please inform the Chair of the Psychology Research Ethics Panel (via the Psychology Department Office) in writing, providing a detailed account of your concern.

Appendix O

Consent Form - copy 1 (for participant)

Title of project: The effect of language and creativity on decision making and mental performance

Name of Researcher: Joanna Howard-Field

1. I Confirm that I have read and understand the information sheet for the above study and have the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected. ☐

3. I agree to take part in the above study ☐

Name of the Participant: _____

Signature: _____ Date: _____

Please retain this copy for your records

Consent Form - copy 2 (for experimenter)

Title of project: The effect of language and creativity on decision making and mental performance

Name of Researcher: Joanna Howard-Field

1. I Confirm that I have read and understand the information sheet for the above study and have the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected. ☐

3. I agree to take part in the above study ☐

Name of the Participant: _____

Signature: _____ Date: _____

Appendix P

Information Page

Directions: Please fill out the following:

Age = _____

Political affiliation = _____

Gender = _____

Year in University = _____

Subject = _____

What is your ethnic background (tick one)

___ Caucasian ___ Hispanic/Latino(a)

___ Asian ___ American Indian

___ African American ___ Other _____

What is your native language? _____

Appendix Q

Debrief

The effect of language and creativity on decision making and mental performance

Thank you very much for your participation in this research. We would like to provide some further information about the purpose of the study and what we expect to find.

The study that you participated in tested your language, creativity and decision making skills upon your cognitive performance. It also tested your impression formation skills. However we hid the true aim of the study so we could observe your true behaviour. So, the actual purpose of the study was to see if rehearsing numbers in your mind distracted you from thinking about other people seeing your decision of cold water time. Being told others are studying your response may influence you to choose time as you may not want others to see if you had chosen a large time in response to your partners negative evaluation of your work. So we thought by distracting you and making you rehearse the number, you were less likely to think about the others who may study your answer. Hopefully you then circled the number that reflected your true decision in response to your partner's negative evaluation of you. Therefore we were measuring your response to the negative evaluation of the NASA exercise. This is called triggered displaced aggression. This is when someone is provoked, and then a second, smaller, negative event causes them to respond in a negative way due to frustration. The provocation of the study was when the experimenter was frustrated about your anagram performance. Following this was your partners negative evaluation of the NASA task. You then rehearsed a number while deciding how many seconds to distract your partner. This increased your concentration on the numbers, and decreased your awareness of other people studying your work. Therefore, we would expect to see that you gave your partner a higher time. Those who counted less had more capacity to be aware that others may study their answers. Therefore we expect this group to choose a shorter time. However, all of the responses are kept confidential and will not be studied by anyone other than the researchers named in the information and debrief sheets. Lastly, one of the researchers names was withheld from the information sheet Eduardo Vasquez. Knowledge of his work may have led to knowledge of the true nature of the study or bias the results. However, if you have any questions or you wish to withdraw your data you may use the contact details in order to do this.

If you have any queries about this research or would like to ask any further questions, please contact the researcher or research supervisor using the contact details below.

If you would like to withdraw your data at any point, please contact the Psychology departmental office on **01227 823961**. If you have been given a participant code you need to cite this. You do not have to give a reason for your withdrawal.

Once again, we would like to thank you for your valuable contribution to this research. Your participation is greatly appreciated.

Yours sincerely,

Joanna Howard-Field

Researcher contact details:

Joanna Howard-Field

jh716@kent.ac.uk, lr291@kent.ac.uk vb204@kent.ac.uk do205@kent.ac.uk

Supervisor contact details:

Dr Eduardo Vasquez

Tel: 01227 827611

e-mail: E.Vasquez@kent.ac.uk

Address: Psychology Department, Keynes College, University of Kent, CT2 7NP

If you have any serious concerns about the ethical conduct of this study, please inform the Chair of the Psychology Research Ethics Panel (via the Psychology Department Office) in writing, providing a detailed account of your concern

Appendix R

APPROVAL BY PSYCHOLOGY RESEARCH ETHICS COMMITTEE

The following research project has been approved by

The Psychology Research Ethics Committee

Date: 2013/11/27

Code: 20133089

Applicant details:

Name: Joanna Howard-Field

Status: MSc Student

Email address: jh716@kent.ac.uk

Title of the research:

The effect of language and creativity on decision making and mental performance

When carrying out this research you are reminded to

* follow the School Guidelines for Conducting Research with Human Participants

* comply with the Data Protection Act 1998

* refer any amendments to the protocol to the Panel

Please keep this form in a safe place. You may be asked to present it at a later stage of your study for monitoring purposes. Final year project students and MSc students will need to submit a copy of this form with their project.

You can log in at http://www.kent.ac.uk/psychology/technical/ethics/index.php to copy or print regenerated handouts for this study. Eduardo Vasquez

Appendix S

Spss Output

2 (cognitive load high/low) x 2 (inhibiting cues yes/no) between-subjects analysis of variance (ANOVA)

Between-Subjects Factors

		N
cognitive load (1=high, 2=low)	1.00	40
	2.00	40
did participants get inhibiting info (1=no, 2 = yes)	1.00	40
	2.00	40

Descriptive Statistics

Dependent Variable: aggression

cognitive load (1=high, 2=low)	did participants get inhibiting info (1=no, 2 = yes)	Mean	Std. Deviation	N
1.00	1.00	5.4000	1.50088	20
	2.00	5.6000	1.75919	20
	Total	5.5000	1.61722	40
2.00	1.00	4.6500	1.66307	20
	2.00	3.0000	1.25656	20
	Total	3.8250	1.67772	40
Total	1.00	5.0250	1.60907	40
	2.00	4.3000	2.00256	40
	Total	4.6625	1.84146	80

Tests of Between-Subjects Effects

Dependent Variable: aggression

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	83.738[a]	3	27.913	11.520	.000	.313
Intercept	1739.113	1	1739.113	717.744	.000	.904
load	56.113	1	56.113	23.158	.000	.234
inhibitingcue	10.513	1	10.513	4.339	.041	.054

load * inhibitingcue	17.113	1	17.113	7.062	.010	.085
Error	184.150	76	2.423			
Total	2007.000	80				
Corrected Total	267.888	79				

a. R Squared = .313 (Adjusted R Squared = .285)

Estimated Marginal Means

1. Grand Mean

Dependent Variable: aggression

Mean	Std. Error	95% Confidence Interval	
		Lower Bound	Upper Bound
4.663	.174	4.316	5.009

2. cognitive load (1=high, 2=low)

Estimates

Dependent Variable: aggression

cognitive load (1=high, 2=low)	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1.00	5.500	.246	5.010	5.990
2.00	3.825	.246	3.335	4.315

Pairwise Comparisons

Dependent Variable: aggression

(I) cognitive load (1=high, 2=low)	(J) cognitive load (1=high, 2=low)	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1.00	2.00	1.675*	.348	.000	.982	2.368

2.00	1.00	-1.675*	.348	.000	-2.368	-.982

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests

Dependent Variable: aggression

	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Contrast	56.113	1	56.113	23.158	.000	.234
Error	184.150	76	2.423			

The F tests the effect of cognitive load (1=high, 2=low). This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

Pairwise Comparisons

Dependent Variable: aggression

(I) did participants get inhibiting info (1=no, 2 = yes)	(J) did participants get inhibiting info (1=no, 2 = yes)	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1.00	2.00	.725*	.348	.041	.032	1.418
2.00	1.00	-.725*	.348	.041	-1.418	-.032

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests

Dependent Variable: aggression

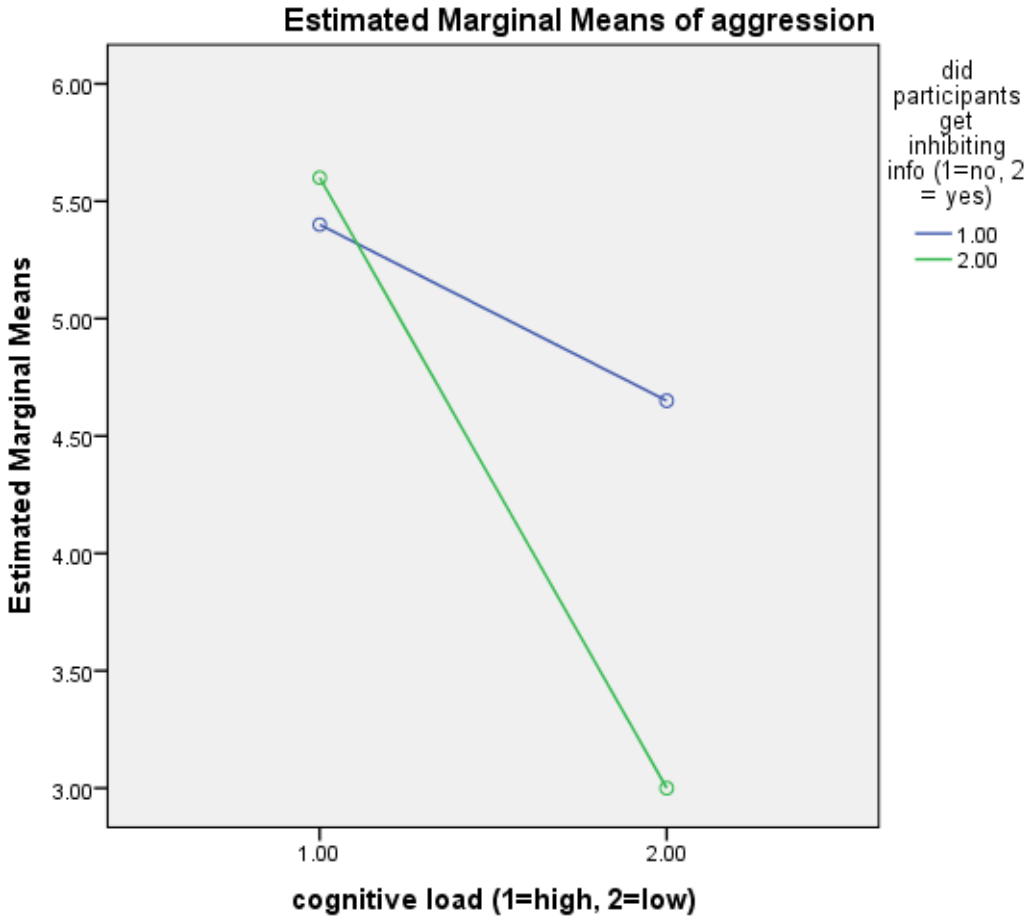
	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Contrast	10.513	1	10.513	4.339	.041	.054
Error	184.150	76	2.423			

The F tests the effect of did participants get inhibiting info (1=no, 2 = yes). This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

4. cognitive load (1=high, 2=low) * did participants get inhibiting info (1=no, 2 = yes)

Dependent Variable: aggression

cognitive load (1=high, 2=low)	did participants get inhibiting info (1=no, 2 = yes)	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
1.00	1.00	5.400	.348	4.707	6.093
	2.00	5.600	.348	4.907	6.293
2.00	1.00	4.650	.348	3.957	5.343
	2.00	3.000	.348	2.307	3.693



Independent samples t-test comparing condition 2 (low load/inhibiting cues) and condition 4 (low load/no inhibiting cues).

Group Statistics

	C	N	Mean	Std. Deviation	Std. Error Mean
distractiontimeinwater	low load/ inhib	20	3.0000	1.25656	.28098
	low load/ no inhib	20	4.6500	1.66307	.37187

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
distractiontimeinwater	Equal variances assumed	.796	.378	-3.540	38	.001	-1.65000	.46609	-2.59354	-.70646
	Equal variances not assumed			-3.540	35.361	.001	-1.65000	.46609	-2.59586	-.70414

Independent sample t-test comparing condition 1 (high load/inhibiting cues) and 3 (high load/no inhibiting cues).

Group Statistics

	C	N	Mean	Std. Deviation	Std. Error Mean
distractiontimeinwater	high load/ inhib	20	5.6000	1.75919	.39337
	high load/ no inhib	20	5.4000	1.50088	.33561

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
distractiontimeinwater	Equal variances assumed	.109	.743	.387	38	.701	.20000	.51708	-.84677	1.24677
	Equal variances not assumed			.387	37.080	.701	.20000	.51708	-.84762	1.24762

Independent t-test comparing condition 1 (high load/inhibiting cues) and 2 (low load/inhibiting cues).

Group Statistics

	C	N	Mean	Std. Deviation	Std. Error Mean

distractiontimeinwater	high load/ inhib	20	5.6000	1.75919	.39337
	low load/ inhib	20	3.0000	1.25656	.28098

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
distractiontimeinwater	Equal variances assumed	1.336	.255	5.378	38	.000	2.60000	.48341	1.62139	3.57861
	Equal variances not assumed			5.378	34.383	.000	2.60000	.48341	1.61800	3.58200

Independent samples t-test comparing mental capacity with load (high/low)

Group Statistics

	cognitive load (1=high, 2=low)	N	Mean	Std. Deviation	Std. Error Mean
cognitive manipulation	1.00	40	8.8500	2.92250	.46209
	2.00	40	11.8500	3.37069	.53295

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
cognitive manipulation	Equal variances assumed	.556	.458	-4.253	78	.000	-3.00000	.70538	-4.40431	-1.59569
	Equal variances not assumed			-4.253	76.464	.000	-3.00000	.70538	-4.40475	-1.59525

Pearson product-moment correlation between mental capacity and aggression.

Correlations

		cognitive manipulation	aggression
cognitive manipulation	Pearson Correlation	1	-.201
	Sig. (2-tailed)		.074

	N	80	80
	Pearson Correlation	-.201	1
aggression	Sig. (2-tailed)	.074	
	N	80	80