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Comorbidity of Mild TBI and PTSD in OIF/OEF Veterans: A Review
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ABSTRACT: Technological advances in military protective gear have allowed soldiers who fought in Iraq and Afghanistan to survive head injuries that may have proved fatal in prior conflicts. These veterans often obtain traumatic brain injuries (TBIs), the majority of which are diagnosed as mild (mTBI). However, Post-Traumatic Stress Disorder (PTSD) has been found to often be comorbid with mTBI in veterans; the combination of these two diagnoses can prolong psychological and physical symptomology, which could have implications for treatment. This review aims to consolidate evidence pertaining to the comorbidity of mTBI and PTSD diagnoses in Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF) veterans. This evidence includes: the long-term impact these diagnoses have on veterans’ cognition, experience of post-concussive symptoms, overall levels of disability, and diagnosis of other mental health issues.

Background
In military conflicts, American soldiers face a unique set of obstacles not often faced by their civilian counterparts. Two key challenges experienced by military personnel during and post-deployment include diagnoses of traumatic brain injuries (TBIs) and Post-Traumatic Stress Disorder (PTSD). The symptoms resulting from these diagnoses have been experienced by soldiers throughout history, but have received increased attention from the scientific community in recent years.

According to the Department of Defense (2017), American soldiers obtained a total of 370,688 TBIs from 2000 to 2017. Of those TBIs, 82.3% of were diagnosed as mild traumatic brain injuries (mTBIs), which can include symptoms such as confusion, disorientation, memory loss for less than 24 hours, and loss of consciousness for up to 30 minutes (Department of Defense, 2017). Fortunately, symptoms from mTBIs tend to clear up on their own within three months of the injury (Terrio et al., 2009). However, this is not the case for everyone. In fact, Terrio and colleagues (2009) found that in one Army unit that fought in Iraq, 7.5% of soldiers who were diagnosed with a TBI reported experiencing symptoms after returning home from deployment. Another estimate claims that most military personnel with mTBIs experience residual symptoms for 18 to 24 months after the injury (National Center for PTSD, 2007).

In one study of a military unit deployed to Iraq, 22.8% of soldiers were diagnosed by a clinician as having a TBI during their year-long deployment, and most of these were diagnosed as mTBIs (Terrio et al., 2009). Of the TBIs sustained by the unit, 88% were caused by exposure to a blast explosion, while the rest involved head injury from impacts unrelated to blast exposure (Terrio et al., 2009). This evidence supports a common finding that of the TBIs sustained by military personnel in recent conflicts, most are caused by exposure to blasts.

There are four types of blast TBIs military populations may sustain in combat (Lawhorne & Cheryl, 2010; Gondusky & Reiter, 2005; Meyer, Maerion, Coronel, & Jaffee, 2010). These injuries include being exposed to a pressure wave (primary blast injury), brain penetration from an explosive projectile (secondary blast injury), flying into a solid surface due to the force of a blast (tertiary blast injury), and extreme loss of blood or exposure to toxic gases released in an explosion (quaternary blast injury) (Lawhorne & Cheryl, 2010; Gondusky & Reiter, 2005; Meyer et al., 2010). According to Lawhorne and Cheryl (2010), quaternary blast injuries are rare, and the
The number of secondary blast injuries has decreased in recent wars due to advances in technology in military protective gear. However, primary and tertiary blast injuries have increased in frequency during the recent conflicts in Iraq and Afghanistan (Lawhorne & Cheryl, 2010). Primary, secondary, tertiary, and quaternary blast injuries may occur individually when a soldier experiences blast exposure. However, it is more likely that military personnel experience multiple forms of blast injury in a given explosion, making it difficult to attribute post-concussive symptoms (PCSs) to a particular injury type.

Additionally, mTBI diagnoses are often further complicated by a diagnosis of PTSD. PTSD is a mental health disorder resulting from exposure to one or more traumas, including combat situations. This diagnosis is characterized by four symptom clusters. These symptom categories include re-experiencing symptoms, avoiding situations that remind one of the traumatic event, negative changes in beliefs and feelings, and hyperarousal (National Institute of Mental Health, 2016). Estimates of PTSD prevalence in OIF/OEF veterans range from 10-30% (Hoge et al., 2004; National Center for PTSD, 2007). The variability in these estimates is due to factors such as the number of firefights the sampled soldiers were in (Hoge et al., 2004), whether they were deployed to Iraq or Afghanistan (Hoge et al., 2004), and whether or not the soldier obtained an injury during deployment (Hoge et al., 2004; French, 2010). Additionally, many veterans may not seek help for PTSD symptoms, due to stigma or fear of appearing weak, making the prevalence difficult to solidify.

Far from being a new phenomenon, occurrences of PTSD and mTBIs have been recorded throughout U.S. military history (French, 2010). PTSD symptoms were referred to as “nostalgia” or “soldier’s heart” during the Civil War, “shell shock” in World War I, and “battle fatigue” or “Combat Stress Reaction” in World War II (National Center for PTSD, 2007). Additionally, the impact of TBIs were studied in World War I, World War II, and the Vietnam War (French, 2010). Penetrating brain injuries were the most studied in these conflicts due to their high prevalence and provided researchers with valuable information on brain function. In the aftermath of the recent conflicts in Afghanistan and Iraq, however, increased attention is being paid to closed brain injuries, especially mTBIs. This is because the technology of military gear has minimized the occurrence of penetrating TBIs, and has increased the likelihood of military personnel surviving head injuries (Gondusky & Reiter, 2005; Meyer et al., 2010). Despite this progress, there was a larger proportion of head injuries sustained in OIF/OEF veterans than in any previous wars (Gondusky & Reiter, 2005). The percentage of head wounds in military personnel was 21% in WWII, 21.4% in the Korean War, 16% in the Vietnam War, and 30% in OIF/OEF veterans (Owens et al., 2008). According to Owens and colleagues (2008), 79% of the head wounds in OIF/OEF soldiers were obtained from explosions, which is the highest prevalence in any large-scale combat effort.

Given the increase in head wounds in recent conflicts, and increasing use of explosive devices in combat, it is critical to analyze the impact these issues have on U.S. military personnel. Complicating the study of mTBIs and PTSD, however, is the overlap in symptomology in diagnoses; these symptoms include irritability, memory issues, fatigue, dizziness, headache, sensitivity to noise and light, difficulty concentrating, depression, and anxiety (Lawhorne & Cheryl, 2010; Bhattacharjee, 2008). These shared symptoms make PTSD and mTBI diagnoses highly comorbid. Stein and McAllister (2009) found that not only are mTBIs more likely to co-occur with PTSD than to be a singular diagnosis, but PTSD symptomology may be more severe in those who also have an mTBI compared to other forms of injury. In fact, having a combat-related mTBI could increase a soldier’s likelihood of developing PTSD by 300% (Lippa et al., 2015). Further illustrating this finding, Hoge and colleagues (2008) found that 43.9% of OIF/OEF veterans, who experienced loss of consciousness, and 27.3% of those who reported alterations in consciousness, from mTBIs sustained in combat, met criteria for PTSD.

PTSD and mTBI symptoms can be problematic for veterans even after returning from deployment. In OIF/OEF veterans, it’s
estimated that 20% have received a TBI diagnosis, and yet only 40% of those diagnosed patients are thought to have received medical care (Lawhorne & Cheryl, 2010). This discrepancy may be due to natural healing over time. However, Terrio et al. (2009) found that 7.5% of soldiers who experienced a mTBI during deployment reported struggling with three or more PCSs after returning home. This illustrates the need for medical care access for veterans experiencing mTBI symptoms post-deployment. Additionally, it’s been reported that despite the high prevalence of mental health diagnoses such as PTSD in OIF/OEF veterans, only 23-40% of them have sought mental health treatment (Hoge et al., 2004). It is critical to assess the impact PTSD and mTBI symptoms have on OIF/OEF veteran functioning in order to better address their medical and mental health care needs.

Impact on Veteran Functioning Attention and Cognition

Blast mTBIs

Research is beginning to be published on the impact of mTBIs on OIF/OEF veterans’ cognitive and attentional functioning. The focus has centered on blast mTBIs specifically due to their increasing prevalence in recent conflicts. For example, Trudeau and colleagues (1998) found that blast mTBIs resulted in problems with impulsivity, lowered attentional capacity, and increased hyperactivity in veterans. The military personnel in this study reported that these attentional deficits impeded their ability to function normally in daily tasks (Trudeau et al., 1998). Along with attentional capacity, cognitive functioning has also been shown to be damaged in military personnel who obtained blast mTBIs. For example, Mac Donald et al. (2015) found that during the week following acquisition of the blast mTBI, participants did worse on tasks involving mathematical processing, reaction time, code substitution learning, and sample matching tasks than they had done before deployment. These soldiers were followed-up with 6-12 months after returning from deployment, and it was found that cognitive and executive functions remained more impaired in subjects that had experienced a blast mTBI than in soldiers who had not obtained a mTBI (Mac Donald et al., 2015).

Comorbid mTBI and PTSD

Analyses have also been conducted on how the interaction of PTSD and mTBI may further impact attention and cognition in OIF/OEF veterans. For instance, Lange and colleagues (2016) found that one year after returning from deployment, veterans with comorbid PTSD and mTBI performed worse on measures of attention, short-term memory, long-term memory, verbal fluency, mental processing speed, and executive functioning than veterans with a mTBI but no PTSD diagnosis. Another study found that veterans with comorbid PTSD and mTBI performed worse on neuropsychological assessment tasks than veterans with a mTBI only, and attributed this difference to reduced processing speed and response inhibition in the group with both diagnoses (Nelson, Yoash-Gantz, Pickett, & Campbell, 2009). However, Nelson et al. (2009) did not find differences in cognitive flexibility between the tested groups. These findings illustrate the impact that mTBIs and comorbid PTSD have on the cognitive and attentional abilities of OIF/OEF veterans.

Post-Concussive Symptoms (PCSs)

Along with attentional and cognitive impairment, OIF/OEF veterans with a mTBI diagnosis may struggle with PCSs. Immediate symptoms following mTBI acquisition have been reported retrospectively by military personnel to include headache, dizziness, balance problems, irritability, and memory deficits (Terrio et al., 2009). Unfortunately, these symptoms have been found to linger in most veterans who’ve obtained a mTBI in combat (National Center for PTSD, 2007). In samples assessed 3-4 months (Hoge et al., 2008) and 6-12 months (Mac Donald et al., 2015) after deployment, it was found that soldiers who obtained a blast mTBI experienced increased severity, frequency, and overall severity in headaches compared to veterans without a mTBI. However, Lippa, Pastorek, Benge, and Thornton (2010) believe PCS severity may be better accounted for by PTSD symptomology than mTBI diagnosis alone. These researchers
discovered that in a sample of veterans with mTBIs, increased PTSD symptomology resulted in more PCSs being endorsed by the participant (Lippa et al., 2010). These findings illustrate how mTBI and PTSD comorbidity can impact aspects of OIF/OEF veteran well-being, including their experience of PCSs post-deployment.

Overall Disability
Along with attentional and cognitive deficits, and increased levels of PCSs, veterans with comorbid mTBI and PTSD experience higher rates of overall disability than veterans without these diagnoses (Hoge et al., 2008; Stojanovic, 2016; Mac Donald et al., 2015; Lange et al., 2016; Lippa et al., 2015). Addressing overall levels of disability, Mac Donald and colleagues (2015) found that 63% of participants who had experienced a blast mTBI had moderate overall disability a year after the injury, compared to 20% of veterans that hadn’t been diagnosed with PTSD or a mTBI (Mac Donald et al., 2015). Lippa et al. (2015) and Lange et al. (2016) took a more general approach to assessing overall disability in veterans, relying on self-reported quality of life. These researchers determined that veterans who have a mTBI with comorbid PTSD report having a lower quality of life than veterans without these diagnoses (Lippa et al., 2015; Lange et al., 2016). Although these researchers used a broad and subjective form of measurement, these findings are important to ascertain veteran perceptions on overall functioning. Hoge and colleagues (2008) took a more detailed approach, assessing specific factors related to veteran health. Through the study, it was found that veterans with comorbid mTBI and PTSD had more medical visits, missed work days, and experienced overall poorer health than veterans without these diagnoses (Hoge et al., 2008). Also addressing disability levels through health measures, Stojanovic et al. (2016) assert that veterans with PTSD and mTBIs self-report higher levels of overall pain intensity than veterans without one or both of these diagnoses. These studies reflect the severe effect comorbid mTBI and PTSD can have on veterans’ ability to function in their lives after serving in combat.

Interaction with Other Mental Health Issues

Alcohol Abuse
Findings for alcohol abuse in OIF/OEF veterans with mTBIs and PTSD has been mixed. Overall, it has been found that veterans tend to misuse alcohol more when they return from deployment than before they are deployed (Hoge et al., 2004). However, Meyer et al. (2010) claim that for veterans with mTBIs, alcohol use tends to decrease after injury. Additionally, alcohol use does not seem to be different in veterans with blast mTBIs and veterans without blast mTBIs (Meyer et al., 2010).

Contradicting the findings for mTBIs, PTSD has been found to be associated with alcohol abuse. According to the National Center for PTSD (2007), veterans with PTSD are more likely to abuse alcohol and binge drink than veterans without PTSD. It is critical that drinking habits be assessed when diagnosing PTSD, as veterans with this diagnosis who abuse alcohol are more likely to commit suicide than veterans with PTSD that do not abuse alcohol (National Center for PTSD, 2007). No information was found regarding alcohol misuse in veterans with both mTBIs and PTSD diagnoses. Given the negative impact alcohol can have on veteran health, it is critical that research be conducted on whether or not alcohol abuse exacerbat

Depressive Disorders
Overall, it has been found that depressive disorders are more prevalent in soldiers after deployment than before deployment (Hoge et al., 2004). Depressive disorders also tend to be highly comorbid with mTBIs and PTSD. According to Mac Donald et al. (2015), depressive symptomology tends to be higher in military personnel with mTBIs than in those without mTBIs in the week following injury as well as 6-12 months later. In fact, Lippa et al. (2015) found that depressive disorders were 140% more likely to be diagnosed in veterans with mTBIs than in veterans without mTBIs. As for PTSD, it is estimated that 3-25% of OIF/OEF veterans with this diagnosis are likely to have also developed
Major Depressive Disorder since deployment (National Center for PTSD, 2007). These findings indicate the need to assess for depressive symptomology when diagnosing mTBIs and PTSD in military personnel, as it may have important influence on veterans’ well-being.

Implications for Treatment
Due to the attentional and cognitive deficits, PCSs, overall disability, and additional mental health problems faced by veterans with mTBIs and PTSD, it is important for healthcare providers to take a multidisciplinary approach to treatment (Hoge et al., 2008). However, it can be difficult for the approximately 27.9% of OIF/OEF veterans with mental disorders (French, 2010) to seek care. One cause of this could be lack of awareness of mTBI and PTSD symptomology in veterans and their families (Meyer et al., 2010). Another barrier to treatment could be fear of stigma. According to Hoge and colleagues (2004), soldiers who reported struggling with mental health post-deployment were twice as likely to express concern over experiencing stigma if they were to get help than soldiers who reported no mental health issues. Due to these barriers to treatment, it is critical that open discussions are had with veterans and their families regarding mTBI and PTSD symptomology and available treatment options. This allows for greater identification of symptoms the veterans may struggle with, and reduces the stigma and fear surrounding getting help.

General Discussion
Despite the long history of mTBIs and PTSD obtained in combat, analyzing the impact the comorbidity of these diagnoses has on veterans is a relatively new field of study. Current scientific findings are also not without flaws. To begin with, participants in studies of military personnel are mostly white males, which limits generalizability to female and minority veteran populations. There can also be issues with diagnosing veterans in military studies. For example, most mTBI diagnoses are not often diagnosed in combat zones, making most diagnoses retrospective and based on self-report. This can be problematic due to poor recollection of the injuring event from loss or alteration of consciousness following a mTBI. Combat zones are often chaotic, making it unlikely that another person could accurately observe the injured soldier’s symptoms following injury and thus increase the accuracy of a diagnosis. Soldiers also may not seek treatment while in the field due to safety reasons or feeling as if their injuries are less severe than those sustained by their comrades. Another issue with recent studies of mTBI and PTSD in veterans is researchers compare those with a given diagnoses to those without, as there is little baseline data on the soldiers. Although attempts are made to control for differences in variables such as age and education between groups, it would be more accurate to compare veteran functioning to an established personal baseline. Finally, many studies only analyze the impact of mTBI and PTSD on veterans for up to a year after they return from combat. Neurodegeneration takes time, and one year may not be long enough for the resulting symptomology to appear. Therefore, these studies may not be capturing the long-term impacts of mTBI and PTSD as they so claim.

Although some flaws in current studies of mTBI and PTSD in military personnel may be difficult to overcome, there are steps that can be taken to minimize these issues and improve future studies. For example, baseline data could be collected on soldiers before they are deployed, allowing for utilization of a stronger within-subjects design. By comparing a veteran’s post-deployment and pre-deployment data, it would increase the likelihood that changes between time points would be due to experiences the veteran obtained in combat. Additionally, participants should include greater diversity for increased generalizability of findings. Longitudinal follow-ups with veterans diagnosed with mTBIs and PTSD are also important, as they allow for detection of future alterations in functioning that may indicate further neurodegeneration. Finally, it is critical that future studies utilize scientifically valid assessment measures for diagnosis in veterans. Currently, some researchers are developing their
own assessment tools, which have not been proven to be reliable or valid. In order to gather accurate data on mTBIs and PTSD, empirically based measurements must be used. By incorporating these improvements to future study designs, the impact of comorbid mTBI and PTSD on veteran functioning can be more accurately determined.

Throughout history, soldiers have endured symptoms that are now known to be related to diagnoses such as mTBI and PTSD. The recent conflicts in Iraq and Afghanistan have led to more American military personnel meeting criteria for these diagnoses due to the increased survival rate of those experiencing head trauma. Veterans with symptoms from these diagnoses can face extreme mental, emotional, and physical distress making it difficult for them to reintegrate into their civilian lives. Therefore, it is imperative that research continue on the impact mTBIs and comorbid PTSD have on OIF/OEF veterans’ cognition, experience of post-concussive symptoms, overall levels of disability, and diagnosis of other mental health issues. By studying these diagnoses, better treatment plans can be developed to assist U.S. veterans and improve their quality of life.

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Music as a Reward: Implications for Music Therapy in Treating Major Depressive Disorder

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ABSTRACT: Music has the power to elicit intense feelings of pleasure, and these feelings are intimately tied to the neural system for processing reward. This review will (1) examine the brain regions in humans that are associated with reward processing in addition to areas that have altered activity while listening to pleasant music, (2) demonstrate that the symptom of anhedonia that characterizes major depressive disorder (MDD) is largely due to reward system dysfunction and abnormal dopamine activity, and (3) consider the field of music therapy as a potentially successful treatment for people with MDD due to the ability of music to activate the brain’s reward system. This review concludes that music therapy, specifically improvisational music therapy, is a promising complementary treatment method for those with MDD, though further research is needed to clearly explain its efficacy and demonstrate its potential to alleviate symptoms of MDD and other disorders that are associated with reward circuit malfunction and/or aberrant dopamine activity.

Introduction

Music, an art form which nearly every human society has developed, not only influences our emotions, but can also become an expression of the emotions which we consciously feel. One of the most important powers of music is its ability to elicit intense feelings of pleasure. In this sense, the term “emotion” refers to the relatively brief, often unconscious physiological and psychological responses to a particular external or internal event (Juslin, Barradas, & Erola, 2015). “Feelings of pleasure,” alternatively, correspond to the conscious subjective awareness of a number of components related to positive emotion, such as affect, mood, and various biological states, such as hunger. While most studies have focused on neural activation based on the acoustic and cognitive components of music, little is known about its basis as a rewarding stimulus (Menon & Levitin, 2005). Because it has long been acknowledged that music can evoke pleasurable feelings that are intimately tied to the brain system for processing reward, research in recent years has delved into the neural mechanisms underlying the relationship between music and activation of the so-called reward system. Though this mesocorticolimbic pathway and related structures are involved in processes other than reward, such as responses to aversive stimuli and both positive and negative reinforcement, for the purposes of this paper it will be referred to as the reward system (Volman et al., 2013). Given the involvement of the reward circuit in both music-evoked emotion and major depressive disorder (MDD), these findings must be integrated to better explain and advance the field of music therapy as an evidence-based treatment method.

Music as an Abstract Reward

Typically, the human reward system is activated by physical stimuli. This can be in the form of primary rewards, such as food and sex that are necessary for survival, or secondary rewards, like money or other tangible items (Salimpoor, Benovoy, Larcher, Dagher, & Zatorre, 2011). However, humans have developed a unique cognitive ability to derive pleasure from abstract stimuli. Music, considered by some as an example of one such abstract stimulus, is not a primary or secondary reward in the strict sense, but through generations and across cultures continues to provide a source of pleasure (Salimpoor et al., 2011). Because music is able to utilize the neural processing of reward through the same mechanisms as other more biologically-salient stimuli, this shows how human cognition has
evolved to accommodate more complex classifications of reward (Blood & Zatorre, 2001). When taken from an evolutionary standpoint, this seemingly odd capability of an abstract stimulus becomes clearer. Because music has often been experienced in a social setting, activation of the reward system encouraged interpersonal relationships and cooperative efforts through sharing pleasurable feelings with others. It is believed by some researchers that music then became a source of social cohesion and the neural circuitry underlying this adaptive mechanism was passed on from generation to generation (Brown, Martinez, & Parsons, 2004).

A major signal component required for normal reward processing is the neurotransmitter dopamine, which has been shown to be altered in people with MDD (see discussion below) (Tremblay et al., 2005). One of the main sources of reward-related dopamine signaling in the brain is the ventral tegmental area (VTA), and a major target for these cells is the nucleus accumbens (Menon & Levitin, 2005). Other main targets of the VTA are the prefrontal cortex, an area associated with decision making and planning, and the dorsal striatum, implicated in habit formation. The VTA also releases dopamine through projections to the amygdala and the anterior cingulate cortex (ACC), as both regions are centrally involved in emotion-related learning and subjective experience (Lepping et al., 2016). The ACC is typically divided into two subregions: ventral (vACC) and dorsal (dACC). Both areas receive input from the prefrontal cortex in addition to the VTA and are involved in positive and negative emotional processing. However, the vACC is mainly activated by emotional stimuli while the dACC is more active during cognitive tasks (Lepping et al., 2016). The ACC is not only involved with emotion generation, but emotion regulation as well. Along with other regions associated with emotion regulation, the ACC plays a role in appraising emotional stimuli and also producing emotions that are appropriate for a given context. People with MDD struggle with emotional regulation, likely as a result of abnormal ACC signaling and reduced ACC volume (Donofry, Rocklein, Wildes, Miller, & Erickson, 2016).

When a stimulus activates the VTA and causes dopamine release in its various target regions, the experience will be felt as rewarding. These reward-related experiences in humans, which are linked to dopamine activity, will be remembered by creating associations between specific stimuli and pleasure, which is useful for directing future behavior. This indicates that dopamine plays a central role in the motivational processes that lead humans to seek out a particular rewarding stimulus (Bressan & Crippa, 2005).

Dopamine release from the VTA is critically important for reward processing because the neurotransmitter is implicated in motivation, reward-seeking behaviors, and working memory (Stegemoller, 2014). All of these cognitive functions are necessary for potentially rewarding stimuli to effectively activate the reward circuit and for feelings of pleasure to be elicited. For example, some types of drugs, such as cocaine and amphetamines, are able to produce pleasurable feelings by disrupting the normal activity of dopamine and increasing extracellular dopamine concentrations throughout the brain. After dopamine is released, excess neurotransmitter usually is taken back up by the cell and re-packaged for later use. However, cocaine and amphetamines prevent this process from occurring, allowing dopamine to exert its effects on target neurons for a longer period of time. Amphetamines also bind to proteins that transport excess dopamine into the neuron and, once across the neuronal membrane, stimulate the release of dopamine back into the synapse. As a result, these drugs create highly intense, long-lasting feelings of pleasure (dela Pena, Gevorkiana, & Shi, 2015).

Evidence that music, specifically, activates reward-related circuitry in humans has been provided using neuroimaging methods. Utilizing functional magnetic resonance imaging (fMRI), which uses blood flow as a measure of brain activity, Menon and Levitin (2005) observed significant activation in the nucleus accumbens and VTA in response to self-reported pleasurable music listening. They also noted increased activity in the left and right inferior frontal cortex and the ACC. Because pleasant music was considered a rewarding stimulus, activation of these areas was expected, but still a
necessary first confirmation in humans. Moreover, there were significant correlations between ongoing activity in the nucleus accumbens and VTA, nucleus accumbens and hypothalamus, and VTA and hypothalamus while listening to pleasant music (Menon & Levitin, 2005). This indicates that the nucleus accumbens, the VTA, and the hypothalamus (a region that regulates autonomic responses), are highly interconnected during music processing. Because the nucleus accumbens and VTA are known to play crucial roles in the neural reward circuit, these findings suggest that music can also serve as a source of reward system activation and stimulate dopamine release.

Additional studies have also implicated the neural circuit for reward in response to music listening, both during anticipation of musically-elicited feelings of pleasure and during actual peak emotional responses. Salimpoor et al. (2011), based on the results of their fMRI study, reported increased activity of the caudate and nucleus accumbens during anticipation of pleasure while listening to pleasant music as compared to neutral music. While the caudate became less active during subjects’ peak feeling of pleasure, activity in the nucleus accumbens continued to increase. The caudate, a subregion of the striatum, has connections to the sensory and motor cortices and is important for establishing stimulus-response associations (Salimpoor et al., 2011). The dorsal striatum, also known as the caudate nucleus, plays a role in encoding a specific stimulus as one that elicited positive feelings so that in the future it will be remembered as a pleasurable experience, which helps guide future reward-seeking behaviors (Valentin & O’Doherty, 2009). As a result, this area may be crucial for creating the association between pleasant music and reward. Since the nucleus accumbens is a main target for dopamine, these results also suggest a mechanism by which dopamine can contribute to the subjective feelings of pleasure over time. Taken together, these results show that music can be perceived as a reward in humans and can activate the same dopaminergic pathways as other more tangible rewards do. If music can stimulate dopamine release, then this begins to explain why musical emotional experiences are sought out by many people today and have been throughout history (Salimpoor et al., 2011).

In addition to reporting brain regions which increased activity during pleasant music, Blood and Zatorre (2001) also noted several areas where activity levels decreased from baseline during music listening. Using positron emission tomography (PET) scans, which used blood flow as a measure of brain metabolism, they observed decreased blood flow to the left and right amygdala, left hippocampus, and ventromedial prefrontal cortex while listening to pleasant music. On the contrary, activity increased in the left ventral striatum, dorsomedial midbrain, and anterior cingulate cortex under the same conditions. Interestingly, these regions are known to be directly affected by dopaminergic neuronal projections and are also more active while listening to pleasant music. The authors also noted increased activity in the supplementary motor area and cerebellum, both areas involved in movement and motor control. As music often produces an inclination to move or dance, activation in these regions is unsurprising – though whether this activation is related to the experience of pleasure is as yet unclear. Overall, these results are consistent with the findings of Salimpoor et al. (2011) and Menon and Levitin (2005), further suggesting that pleasant music activates the reward circuit.

Due to the relatively poor spatial resolution of PET scans, it is unclear whether activity in the midbrain was localized to the VTA or also to the periaqueductal gray region (PAG) or the pedunculopontine tegmental nucleus (PPT) (Blood & Zatorre, 2001). However, both are also thought to be involved in reward processing. The PAG has many opioid receptors and thus is associated with reward derived from opioids, such as endorphins. Using the chemical naloxone, these opioid receptors can be blocked, which can decrease or inhibit subjects’ subjective feelings of pleasure in response to pleasant music. The PPT, on the other hand, is innervated by the nucleus accumbens and projects to areas including the VTA, thalamus, and amygdala. This region of the midbrain is hypothesized to be involved in creating associations between drugs and reward (Blood & Zatorre, 2001). This means that the PPT may be involved in learning that a certain
drug elicits pleasurable feelings, and thus may also be important for establishing the memory that pleasant music produces similar feelings. Even though it remains unclear whether one or both of these areas were activated by music (in addition to the VTA), both are involved in reward processing. As the PAG and PPT are not typically regarded as major parts of the reward system, this indicates that pleasurable music has the ability to activate a wide range of regions within the reward circuit to contribute to greater pleasurable feelings, and also raises questions about where the boundaries of the so-called reward system lie (though this discussion is beyond the scope of this paper) (Volman et al., 2013).

Another mechanism by which music may achieve maximum feelings of pleasure is by simultaneously activating the reward system and inhibiting areas that are associated with processing negative emotions (Blood & Zatorre, 2001). Both the amygdala and hippocampus have been shown to be active during emotions that are considered negative, such as fear, and tend to be overactive in people with major depressive disorder. While this is certainly not their only function, both regions do play a role in experiencing negative emotions. Blood and Zatorre (2001) showed that while subjects listened to pleasant music, activity in the right and left amygdala and left hippocampus decreased. Additionally, the amygdala and hippocampus receive direct inhibitory input from the nucleus accumbens. This suggests that when the nucleus accumbens and therefore the reward circuit are active, the amygdala and hippocampus, areas that are involved in processing negative emotions, are inhibited. As a result, music can both activate the reward system and inhibit pathways related to the processing of negative emotions, presumably leading to a maximal pleasure response signal. These findings are especially relevant to the discussion below of music as a potential treatment for people with MDD, as they have difficulty experiencing pleasure as well as hyperactivity in areas involved in processing negative emotions.

In addition to activating brain regions that mediate the subjective feeling of pleasure, music also causes changes in autonomic nervous system functioning that are associated with many other types of pleasurable experiences. Since feelings of pleasure can be difficult to measure quantitatively, physiological responses that occur are often used to judge emotional arousal (Salimpoor et al., 2011). This includes frequencies of “chills” or “goose bumps” experienced while listening to pleasurable music as well as measures of autonomic activity changes, such as heart rate, respiration rate, and skin conductance. These same autonomic reactions accompany pleasure responses to other rewarding stimuli, like a favorite food. Pleasurable music listening results in significantly higher autonomic nervous system activity. Increases in heart rate, respiration rate, and skin conductance and decreases in body temperature and blood volume pulse amplitude, or the amount of blood pumped by a single heartbeat, are typical. Intensity and frequency of chills has been shown to be significantly related to all five of these measures of autonomic nervous system arousal (Salimpoor et al., 2011). Since the hypothalamus is involved in monitoring autonomic responses, it makes sense that listening to pleasurable music would activate this specific region, as observed by Menon and Levitin (2005). These results show that pleasant music elicits the same physiological responses as many other typical primary and secondary rewards (such as the psychostimulant drugs discussed above), providing further evidence that music can itself act as a rewarding stimulus.

In summary, studies have clearly shown that music can elicit physiological responses and activate brain reward regions associated with the processing of primary and secondary rewards (Blood & Zatorre, 2001; Menon & Levitin, 2005; Salimpoor et al., 2011). As the VTA is the site of dopamine production and projects directly to the nucleus accumbens, these areas are typically considered as fundamental components of the neural basis of reward. Listening to pleasant music elicits feelings of pleasure, activates the reward circuit, and should be considered as a type of abstract reward. This is of critical importance because it illustrates that the reward system in humans does not need an explicit reward, such as food or money, to become activated (Menon & Levitin, 2005).
also suggests that pleasant music may have the potential to be an incredibly useful treatment option for disorders that are associated with an aberrant reward system and dopamine dysfunction, as in the case of MDD.

**Reward System Dysfunction in Major Depressive Disorder**

Research in recent years has begun to explore neural reward mechanisms as targets for treatment of certain neurological and psychiatric disorders. This is largely due to the ability of dopamine and the reward regions themselves to undergo synaptic and connective alterations in circuitry. Because drug use, environmental factors, and childhood development are known to induce changes in the brain’s reward circuit, it is hypothesized that this system can be artificially altered using medication or modified through naturally rewarding stimuli, particularly pleasant music (Tremblay et al., 2005).

One such illness that this approach may be particularly effective for is major depressive disorder (MDD), given the changes noted throughout the reward-related circuits. Although other disorders such as schizophrenia and generalized anxiety disorder may also benefit from music therapy for similar reasons, this is beyond the current scope of this paper. MDD is characterized by the symptom of anhedonia, a markedly reduced interest in activities or experiences that used to elicit pleasure, which can include music listening (Tremblay et al., 2005). Additionally, abnormal activity of some neurotransmitters and neuroendocrine systems, such as serotonin, dopamine, and norepinephrine, are common in those with MDD (Tremblay et al., 2005). Since dopamine malfunction and anhedonia are both associated with MDD, this implicates the neural reward system in the pathophysiology of MDD and also suggests that pleasant music may be able to selectively target this circuit in order to alleviate symptoms.

Normal dopamine activity is essential for a fully functioning reward circuit, but this is typically not the case for people with MDD. For example, a drug which is known to greatly stimulate dopamine release throughout the reward system in healthy people, dextroamphetamine, results in much greater feelings of pleasure in those with MDD (Tremblay et al., 2005). Those with MDD were hypersensitive to the drug, meaning they experienced heightened feelings of pleasure relative to the control group. Furthermore, the degree of hypersensitivity was associated with the severity of anhedonia reported. The fact that subjects with MDD experienced a hypersensitivity to dextroamphetamine indicates that dopamine release or activity is not functioning correctly in these people and supports the hypothesis that the reward system is implicated in the symptoms of MDD (Tremblay et al., 2005).

Additional evidence for the idea that reward system malfunctioning is involved in MDD lies in the brain regions that showed decreased activity compared to healthy subjects. These areas include the right ventrolateral prefrontal cortex, caudate, and orbitofrontal cortex (Tremblay et al., 2005). In terms of neuroimaging, often times the regions that are deactivated are just as important as those that become more active. The caudate, specifically, is important in that it is associated with reward processing and contains dopaminergic projections. The researchers believed that dextroamphetamine (which may have inhibited receptors for glutamate) results in the disinhibition of dopaminergic neurons, cells that are normally inhibited in people with MDD. This dextroamphetamine-induced disinhibition could explain the hypersensitivity they experienced (Tremblay et al., 2005). If exposure to pleasant music can result in the same process of dopamine disinhibition, then it would be an invaluable treatment for MDD patients, as it would more naturally produce intensely pleasurable feelings.

Another possible mechanism of irregular dopamine activity is through D2 and D3 dopamine receptors. These receptors are concentrated in the temporal cortex, providing an extrastriatal target for dopamine. However, if these receptors are abnormally blocked in people with MDD, dopamine cannot effectively bind and produce its cascade of effects. This decreased accessibility of D2 and D3 dopamine receptors has been associated with anhedonia, a key symptom of MDD (Tremblay et al., 2005). Because MDD is associated with altered brain
functioning in areas implicated in the neural basis of reward in addition to abnormal dopamine activity, it is clear that a key factor underlying anhedonia as a symptom for MDD is irregular reward circuit activity. Music has been shown to activate areas within the reward system, and thus it may be a method for correcting the malfunctioning reward circuit that underlies the anhedonia seen in MDD.

**Music Therapy: Integration of Music and Reward for MDD**

As has been previously discussed, music is an effective source of activation for the brain’s reward system and this circuit can induce changes in neuronal wiring. Because major depressive disorder is associated with a malfunctioning reward circuit, music could be a potential therapeutic tool. This approach could be applied to other neurological and psychiatric disorders as well, such as schizophrenia and bipolar disorder (Castillo-Perez, Gomez-Perez, Velasco, Perez-Campos, & Mayoral, 2010). In the case of MDD, listening to pleasant music could alter the reward pathways and thus alleviate symptoms, such as anhedonia, and contribute to more intense feelings of pleasure.

Research on the therapeutic use of pleasurable music for MDD has only recently gained traction. A review of current studies investigating the potential effects of pleasant music on symptoms of MDD was conducted by Chan, Yang Wong, and Thayala (2011). Of seventeen studies included, eleven showed clear evidence of reduced self-reported depressive scores after repeated sessions of music listening. These beneficial results continued even after the music listening sessions were stopped, indicating that the improvement in MDD symptoms in response to pleasant music could be long-term. An important component of this research is that all music listening periods did not involve the direct involvement of a music therapist (Chan et al., 2011). The reduced depressive symptoms were produced entirely by the music, which shows the power of pleasant music to alter cognitive functioning and also demonstrates that music is a treatment available to anyone with MDD.

Additionally, this form of music therapy may even be more effective than more traditional forms of psychotherapy in treating symptoms of major depressive disorder. In a study by Castillo-Perez et al. (2010), participants with MDD were either exposed to pleasant classical music as music therapy or underwent typical psychotherapy treatments. After eight weeks, the music therapy group displayed more improvement in depressive symptoms than the subjects who participated in psychotherapy (Castillo-Perez et al., 2010). This demonstrates that, not only is music an effective tool in decreasing levels of depression, but it may also be more successful than psychotherapy under at least some conditions. As this is the most common form of therapy currently used to treat depression, these results suggest that incorporating music into existing therapeutic methods may have significant benefits for treatment outcomes. With the recent development of music as a formal method of therapy, some therapists have begun to do exactly this.

While simply listening to pleasant music is considered one form of music therapy for depression, others more directly involve the patient in the musical experience. One example of this is improvisational music therapy, in which both the patient and the therapist use musical instruments, oftentimes drums, to interact. The therapist carefully listens to the patient’s improvised rhythms and actively encourages the patient to express their emotions through a form of nonverbal communication. This can lead to a process of self-discovery, allowing the patient to gain insight into their feelings that cannot necessarily be achieved using words alone (Erkkila et al., 2011). The therapist can then utilize these realizations in later reflective discussions to better explore the patient’s depressive thoughts and emotions. Another important component of improvisational music therapy is that it can allow for a deeper, more meaningful relationship to develop between the patient and therapist. Through music-making, both the patient and the therapist are encouraged to experience each other differently than in traditional psychotherapy sessions. This allows them to relate to each other in a way that simply talking may not achieve, building a stronger patient-therapist bond (Maratos, Crawford, & Procter,
Given these characteristics of improvisational music therapy, it may be able to help break down barriers that prevent patients from discussing their feelings, which is often the case for those with MDD, and lead to more successful therapy sessions.

Additionally, Erkkila et al. (2011) demonstrated that this form of therapy is more effective in improving symptoms of depression, as well as anxiety and overall brain functioning, than standard therapy alone. Based on results from various psychiatric tests (i.e. Montgomery-Asberg Depression Rating Scale, Hospital Anxiety and Depression Scale, and Global Assessment of Functioning), subjects who participated in improvisational music therapy had significantly greater decreases in depression and anxiety levels and increases in overall functioning compared to those who engaged in traditional psychotherapy. These findings demonstrate that integrating improvisational music-making with more traditional psychotherapy adds another dimension to the therapeutic approach that can significantly improve the symptoms of those with MDD. However, a similar study should be performed using fMRI to assess symptoms of depression, anxiety, and general brain functioning to corroborate the results obtained by Erkkila et al. (2011).

Improvisational music therapy is successful in reducing levels of depression, but there are several factors which are thought to contribute to this phenomenon. One aspect is that, through active music-making, the patient must partake in physical movement. The benefits of physical exercise for preventing depression and reducing its symptoms have been well documented, but in this case the active participation in music-making encourages physical experiences with others (Maratos et al., 2011). This dimension of music therapy seems to be important to MDD patients, and thus is thought to play a role in the effectiveness of improvisational music therapy (Erkkila et al., 2011; Maratos et al., 2011). Additionally, producing music is both a mentally and physically engaging task and becomes inherently social as the patient must interact with the therapist on an intimate, emotional level. For people with MDD, activities that incorporate both of these elements are incredibly important due to their general lack of motivation to seek out social encounters that also involve emotional expression. This form of therapy may be a particularly useful strategy for MDD patients or those affected by other disorders, such as generalized anxiety disorder or schizophrenia, who can be unusually difficult to engage (Maratos et al., 2011).

Most importantly for this argument, it is hypothesized that a major contributor to the success of all forms of music therapy in reducing the severity of depression is its ability to activate the neural reward system. As previously discussed, MDD involves a malfunctioning reward system and abnormal dopaminergic activity, typically associated with low levels of both dopamine and its receptors (Castillo-Perez et al., 2010). By activation of many of the brain regions associated with reward processing, music can also elicit pleasurable feelings and therefore increase positive affect in patients with MDD (Castillo-Perez et al., 2010). Given these findings, it seems plausible that the music component of music therapy can increase dopamine release and its transmission throughout the brain in patients with MDD, just as listening to pleasant music does in those without the disorder. Up-regulation of dopamine release due to music can then, to some extent, combat the dopamine dysfunction that is associated with MDD and lead to reduced symptoms. Even though MDD is characterized by anhedonia, a lack of interest in previously pleasurable experiences, music therapy provides a means by which this symptom can directly be targeted through activation of the reward circuit.

Music as a therapeutic tool has many additional benefits outside of possibly being an effective method for alleviating MDD symptoms. However, few studies have been conducted that clearly demonstrate the success of music therapy. Initial research suggests that it is a promising therapeutic method for reducing symptoms of MDD, but further investigation is needed to clarify its potential efficacy. As opposed to many of the oftentimes costly medications currently available to treat MDD that can cause unwanted side effects, tolerance, and withdrawal, music is inexpensive and carries
no unforeseen health risks. Additionally, even without the assistance of a therapist, music has been shown to decrease levels of depression in people with MDD. In this form of music therapy, there is no added cost of the therapist because the treatment can be self-administered (Castillo-Perez et al., 2010). This makes it incredibly easy for people with MDD to increase their positive affect through music, so long as music listening sessions are frequent and consistent. Though a therapist is needed in the case of improvisational music therapy, this provides an altogether different set of benefits.

Improvisational music therapy possesses distinct characteristics that may ultimately reveal it to be the most effective method of music therapy – although much research is needed in this area to confirm such a claim. As previously discussed, this therapeutic program is unique in that it incorporates physical movement. The depression-reducing effects of physical activity in combination with those produced by musically-activating the reward system may lead to a more significant decrease in MDD symptoms than either one can achieve alone. Additionally, incorporating more traditional psychotherapy measures into music therapy adds another dimension of beneficial effects. Psychotherapy has proven successful in encouraging patients with MDD to verbally communicate their thoughts and feelings so as to more adequately deal with them. Using improvisational music therapy integrates the verbal conversation aspect of psychotherapy with the nonverbal emotional expression through music-making into a single therapeutic process (Maratos et al., 2011). In so doing, the power of improvisational music therapy to alleviate symptoms of MDD becomes greater than either music therapy or psychotherapy individually because the beneficial effects of each method can add upon each other. Using these criteria, improvisational music therapy can be seen as the most successful treatment method for reducing symptoms of MDD.

While there are many forms of music therapy available today, all succeed in alleviating symptoms of MDD by activating the neural reward circuit. However, most music therapists and researchers who investigate the field do not approach music therapy from a reward circuit point of view. Knowledge about the effectiveness of music in alleviating symptoms of MDD is becoming widespread, but oftentimes those who practice music therapy are unaware of the neural mechanisms underlying these benefits, mainly that music activates the reward system and increases dopamine levels throughout the brain. One way to utilize this information might be to tailor the music to the preferences of individual patients, for example using the patient’s choice of musical instruments during improvisational music therapy sessions. This may be an effective way to develop subjective, nonconscious connections between patient and therapist that often underlie successful relationships. Additionally, promoting positive affect and reducing cognitive decline through music that creates constructive, personal associations is currently being used as a complementary treatment for Alzheimer’s patients (Fang, Ye, Huangfu, & Calimag, 2017). People with MDD also exhibit decreased cognitive abilities, which might be another connection between MDD and music therapy as an effective treatment. The main aim of improvisational music therapy for MDD, and all forms for that matter, is to produce the greatest decrease in depressive symptoms. Because this is likely achieved mainly through activation of the brain’s reward system, approaching music therapy from this standpoint will result in improved methodology, organization, and outcomes for a field that has initially proven remarkably successful in alleviating symptoms of MDD.

Conclusion

In conclusion, this paper has demonstrated that the concepts of music, reward, and depression are highly integrated. Listening to pleasant music has been shown to activate many of the same brain regions that are associated with other types of reward processing, mainly the VTA, nucleus accumbens, prefrontal cortex, and ACC (Blood & Zatorre, 2001; Menon & Levitin, 2005; Salimpoor et al., 2011). Because MDD is a disorder associated with reward system dysfunction and abnormal dopamine activity, music has begun to be explored as a treatment which specifically targets this circuit to reduce
symptoms. The field of music therapy, and improvisational music therapy in particular, initially seems to be effective in alleviating depressive symptoms. This is not to say that music therapy can completely replace more traditional forms of psychotherapy or medication, but it should perhaps be used as a complement to these other treatment methods in order to produce the greatest reduction in MDD symptoms possible. While research has not yet explored specifically whether music-making activates the neural reward system, if such an fMRI study was conducted then it would likely find increased activation of the VTA, nucleus accumbens, ACC, and medial prefrontal cortex. These regions are all considered to be major components of reward processing in the brain. Based on the fact that listening to pleasant music activates these same areas and that improvisational music therapy reduces the symptom of anhedonia that characterizes MDD, the inference is that music-making also has the ability to act as a reward and may contribute to long-term changes if used in a therapeutic manner – although the parameters for such a successful treatment are currently entirely unexplored. If improvisational music therapy results in reward system activation, this largely explains why it is so successful in reducing symptoms of MDD and increasing positive affect. While music therapy certainly can be beneficial for people with MDD, it may also prove effective for other psychiatric disorders including bipolar disorder, schizophrenia, generalized anxiety disorder, and even Parkinson’s disease – all of which, for instance, involve periods of low mood and anhedonia in addition to reward system malfunction and/or abnormal dopamine activity. As music and music-making begin to be viewed as effective tools for alleviating symptoms directly as a result of their ability to activate the brain’s reward system, music therapy will have the potential to become a mainstream treatment method not only for MDD, but for other psychiatric and neurological disorders as well.

REFERENCES


Teachers’ Impact on the Wellbeing and Achievement of Students with Special Needs in the General Education Classroom

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ABSTRACT: Although it is well established that students with disabilities underperform academically relative to their nondisabled peers, the mechanism by which this gap emerges is unclear. Using the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), and a sample size of N = 6,170, the present study assessed how reading, math, and science scores along with reading competence, math competence, and internalizing problems were impacted by teacher experience, support, and efficacy. Analyses were completed using longitudinal multilevel modeling from 3rd to 8th grade. The results demonstrated that students with an Individualized Education Plan (IEP) typically perform closer to their general education peers in both 3rd grade science and math than 3rd grade reading, but the gap between general and special education students widens more over time for reading and science than for math. In addition, students with an IEP were found to be less confident in their reading abilities than in math. Overall, teachers, do not mitigate the achievement gap between students with and without disabilities. These results provide a unique contribution to the field of special education and demonstrate that more research needs to be conducted in order to pinpoint the mechanisms in which children with special needs are lagging behind their nondisabled peers. Keywords: Special Education; Secondary Data Analysis; Teacher Experience; Teacher Support; Teacher Efficacy.

Introduction

Inclusive education is a model of classroom participation in which all children, regardless of disability status, participate and learn together while promoting academic and social-emotional growth. This model has been a goal of the U.S. educational system since the passing of the Individuals with Disabilities Education Act in 1997, and its reauthorization in 2004. Theoretically, by using the inclusive model of education, students with special needs would perform as similarly as possible to otherwise-comparable, nondisabled peers on academic tasks. Yet, this is not the case. Research has long demonstrated deficits in this area for students with special needs, even though it is unclear how or why these deficits occur and persist. To further explore these deficits, I investigated how academic outcomes for students with special needs are impacted by teacher experience, support, and efficacy.

Academic Performance

It is well established that students with disabilities underperform academically relative to their nondisabled peers. For instance, the Center on Education Policy noted a large difference in test scores between students with and without disabilities (Chudowsky & Chudowsky, 2009). Nationwide, the median percentage of 4th-grade students with disabilities scoring at proficiency was 41% for reading and 49% for mathematics. In contrast, 79% of students without disabilities scored at proficiency for both reading and mathematics. This achievement gap also seems to widen through middle school and
high school. The National Center for Education Statistics (2010) reported that only 10% of 12th-grade students with disabilities scored at or above proficiency in reading compared to 39% of students without disabilities, and 6% of students with disabilities scored at or above proficiency in math compared to 26% of students without disabilities. Overall, the data clearly show that special needs children increasingly lag behind their nondisabled peers in reading and math achievement.

Science achievement is a particularly important area of interest and has received nationwide attention with the growth of Science, Technology, Engineering, and Mathematics (STEM) fields. With the nation’s commitment to improving science education, it is particularly important to ensure that students with disabilities also make appropriate growth in this area. Yet, students with disabilities underperform on science assessments relative to nondisabled peers. The National Center for Education Statistics (2011) conducted a science assessment graded on a scale of 0-300, with a score of 150 demonstrating average performance. While nondisabled students in 4th and 8th grade scored right around 150, students with disabilities in these grades had average scores of approximately 20-30 points lower than their nondisabled peers.

Though there is a plethora of research describing how students in the special education system have a long history of underperformance, it is equally important to consider students’ own perceptions of their academic performance. Self-efficacy is defined as people’s judgments about their ability to succeed, which is a critical component to academic success (Bandura, 1986). When a student has a high sense of self-efficacy, they tend to be more confident in their abilities and are therefore more likely to have positive learning outcomes. Jinks and Morgan (1996) found a positive correlation between students’ grades and their sense of academic self-efficacy. Yet, students in special education have a low sense of self-efficacy, often attributing their underperformance to a stable, uncontrollable, and internal lack of ability that they are unable to improve no matter how hard they try (Linnenbrink & Pintrich, 2010). Similarly, Morgan, Farkas, and Wu (2012) found that poor readers are at greater risk of socio-emotional maladjustment. Their inability to meet the demands of the classroom leads to feelings of frustration, withdrawal, and social isolation. This is further emphasized in a study by Tur-Kaspa, Weisel, & Segev (1998) who found that students with disabilities experience significantly higher levels of loneliness. Because students receiving special education services are also more likely to be poor readers, they are at an increased risk of encountering socio-emotional difficulties.

On a more positive note, research has revealed several ways in which teachers can promote student efficacy and socio-emotional adjustment. For example, teachers can provide emotional support and ask students about their lives to make children feel more comfortable and supported at school (Pianta, Hamre, & Stuhlman, 2003). They can also have other students model how to successfully complete a learning task (Artino, 2012). In all, self-efficacy clearly plays a vital role in academic success, and there are multiple ways in which teachers influence self-efficacy and socio-emotional adjustment.

**Teacher Characteristics**

Although the inclusive movement has made incredible gains over the past decade, the persistent gap between disabled and nondisabled students indicates that there is still room for improvement. Many factors contribute to a student's wellbeing and achievement, but research suggests that
teachers have the most influence (RAND Corporation, 2012). Therefore, it is extremely important to examine teachers’ impact on students’ academic outcomes. In particular, three areas to target are 1) teacher experience, 2) teacher efficacy, and 3) teacher support. First, a teacher’s previous experience working with children with special needs can greatly impact learning. The National Council for Accreditation of Teacher Education (NCATE) requires that all teachers meet standards for teaching children with special needs (Turner, 2003). The coursework requirements and standards vary by state, however, and often only mandate that teachers take one introductory special education course. Although this one course is better than nothing, it is simply not enough. A study by deBettencourt (1999) found that 39.6% of the teachers surveyed had taken only one course outlining instructional strategies for teaching students with special needs, and 41.5% had not taken any courses. Due to the lack of special education courses, these teachers reported that they were left with little to no information regarding methods to teach students with disabilities. Another study found that 78% of general education teachers reported needing but not receiving any type of in-service training. Reports concluded that teachers lacked confidence in adapting materials and curriculum, writing behavioral objectives, managing behavioral problems, using assistive technology, giving individual assistance to students, and developing Individualized Education Plans (IEPs, or legal documents that outline a specialized education program to meet the unique needs of children with disabilities) (Buell, Hallam, Gamel-McCormick, & Scheer, 1999).

Second, teacher’s perceptions of their ability to teach students with disabilities represent another important avenue to target. Teacher efficacy is defined as the teacher’s belief in his or her ability to effectively teach and promote student engagement and learning (Tschannen-Moran & Hoy, 2001). Teacher efficacy is important because it can affect the effort teachers put into teaching, their persistence in face of difficulties, and their ability to adapt to each individual child’s needs. When a teacher has a high sense of efficacy, they tend to be more confident in their abilities, which increases student achievement, motivation, and student self-efficacy (Tschannen-Moran & Hoy, 2001). Yet, research suggests that many general educators do not feel confident in their abilities to teach students with disabilities, and thus have a low sense of efficacy in this domain. A qualitative interview study by Lohrmann and Bambara (2006) outlined some of the major uncertainties teachers have regarding their ability to educate and understand students with special needs. The teachers described feelings of fear, anxiety, and worry due to the fact that they did not feel confident in their abilities. More specifically, these teachers worried about whether or not inclusion would be successful, whether they would be able to meet the child’s needs, if the child would disrupt the rest of the classroom, and how they would balance the students’ needs while still paying attention to the class as a whole. A different study by Leyser, Zeiger, and Romi (2011) found that teachers who received adequate training scored significantly higher in regards to self-efficacy than those who had little to no training. Training builds self-efficacy by offering experiential situations where teachers can master new techniques before implementing them in the classroom. Teachers also reported higher self-efficacy when they had prior experience working with special needs children (Bray-Clark & Bates, 2003).

Third, the support that teachers have in meeting the needs of students with
disabilities might have important implications for student learning. Research has demonstrated that teachers report having less support than they need to appropriately teach students with disabilities in the general education classroom. In one study by Wolery, Werts, Lisowski, Caldwell, and Snyder (1995), support was defined as having aides in the classroom and the ability to meet regularly with specialists. This study found that over half of teachers reported needing part-or full-time aides, but less than a third received them. In addition, over two-thirds of teachers reported needing regular meetings with specialists, yet only about half received them. Another study by Bunch, Lupart, and Brown (1997) found that teachers believed supports such as a lower student-to-pupil ratio and higher availability of educational assistants to be very pertinent to their teaching success. Teachers feared that having a child with special needs in their classroom could endanger the education of their other students, and this could be resolved by instituting smaller class sizes. Teachers also reported that education assistants were imperative and would help children thrive. Ultimately, every student is unique in his or her strengths and weaknesses, and could benefit from a teacher who is prepared to teach students with special needs. Improving teacher efficacy, support, and experience could therefore benefit all students, not just those in special education.

Thus, although research clearly shows that special needs students are lagging behind their peers in several domains, the mechanism by which this gap emerges remains unclear. Teachers could be an important contributor to this academic gap due to the vast influence they have on their students. In the present study, I examine whether the academic achievement, academic competence, and the presence of internalizing problems in children with special needs are related to 1) teacher experience, 2) teacher efficacy, and 3) teacher support. Given available research, it remains empirically unclear why children with special needs are lagging behind their non-disabled peers. This study should offer further insight into potential mechanisms that may influence this divide.

Research Questions and Hypotheses

In this study I addressed the following questions:

1) To what extent does the academic achievement and self-efficacy of students with special needs differ from that of their non-disabled peers?

2) To what extent do teachers mitigate this achievement gap?

In line with previous research, I hypothesized that children with special needs would exhibit poorer academic outcomes, lower perceived academic self-efficacy, and higher internalizing problem behaviors than their typical peers. I believed that this would be compounded by teacher experience, support, and efficacy, such that special education students with less experienced, supported, and efficacious teachers will display even poorer outcomes. Furthermore, based on the plethora of research describing the persistent achievement gap between students with and without disabilities, I hypothesized that general education peers would also be influenced by teacher experience, support, and efficacy in the same manner, but would continue to outperform their special education peers.

Method

Participants

This study utilized the restricted-use file of the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99
(ECLS-K), sponsored by the National Center for Educational Statistics (NCES). The ECLS-K is a nationally representative study that followed approximately 21,000 students from kindergarten through eighth grade to examine child development, school readiness, and early school experiences. Data from the ECLS-K was collected using direct child assessments, parent interviews, teacher and school administrator questionnaires, student records, and school facility checklists. The dataset provides a diverse sample of socioeconomic and racial/ethnic backgrounds, and allows access to information on children’s home environment, home educational activities, school environment, classroom curriculum, and teacher qualifications. Per stipulations required by the Institute of Education Sciences when using restricted-use data, all reported sample and group sizes were rounded to the nearest 10.

The analytical sample was restricted to both general and special education students attending public schools and primarily placed in general education classrooms ($N = 6,170$). Of these students, 50.4% were female, 60.2% were White/Caucasian, 12.8% were Black/African American, 20.7% were Hispanic, and 6.22% were Asian, 18.5% from the Northeast, 25.2% from the Midwest, 35.3% from the South, and 21.1% from the West. The median income level at third grade ranged from $40,000-$50,000. Sample descriptive statistics are included in Table 1; all continuous variables were standardized to have a mean of zero.

**Research Design**

I used longitudinal multilevel modeling to assess how reading, math, and science scores, along with reading competence, math competence, and internalizing problems, were impacted by teacher experience, support, and efficacy. For each academic subject, I analyzed a two-level model, where level one corresponded to grade level (third, fifth, and eighth) and level two corresponded to student level demographics, teacher experience, support, and efficacy, and whether or not the child had an IEP. Model equations at each level are as follows:

**Level 1:**

$$Y_{ij} = \beta_{0j} + \beta_{1j}(\text{GRADE}_{ij}) + \eta_{ij}$$

Where $Y_{ij}$ = outcome variable of interest for each level-1 unit $i$ nested within level-2 unit $j$; $\beta_{0j} =$ intercept for the $j$th level-2 unit; $\text{GRADE}$ corresponds to third, fifth, and eighth grade timepoints nested within each $j$th level-2 unit; and $\eta_{ij} =$ random error associated with the $i$th level-1 unit nested within the $j$th level-2 unit;

**Level 2:**

$$\begin{align*}
\beta_{0j} &= \gamma_{00} + \\
-10.01^{DEMO}_j + \\
&11.00^{IEP}_j + \\
&7.00^{TEACHER_j} + \\
&9.00^{IEP \times \text{TEACHER}_j} + U_{0j} \\
\beta_{1j} &= \gamma_{10} + \\
&1.00^{DEMO}_j + \\
&3.00^{IEP}_j + \\
&5.00^{TEACHER_j} + \\
&7.00^{IEP \times \text{TEACHER}_j} + U_{1j}
\end{align*}$$

Where $\beta_{0j} =$ intercept for the $j$th level-2 unit; $\beta_{1j} =$ slope for the $j$th level-2 unit; $\gamma_{00} =$ overall mean intercept adjusted for predictors; $\gamma_{10} =$ overall mean intercept for the slope adjusted for predictors; $DEMO =$ a vector capturing covariate adjustments made for sex, race/ethnicity, maternal education, family income, and school climate; $IEP =$ an indicator of whether the student was in
general or special education; $TEACHER =$ a vector capturing teacher experience, support, and efficacy; $IEP*TEACHER =$ the interaction between each teacher variable and special education status; $U_{0j} =$ random effects of the $j$th level-2 unit adjusted for predictors on the intercept; and $U_{1j} =$ random effects of the $j$th level-2 unit adjusted for predictors on the slope.

**Dependent Variables**

**Achievement.** Reading, math, and science scores were measured in spring of third grade, spring of fifth grade, and spring of eighth grade using the Item Response Theory (IRT). IRT estimates performance by using patterns of correct and incorrect answers to measure proficiencies relative to grade level and tailor the test to the child’s ability. This evaluation technique allows for the measurement of achievement over time, even though the assessments administered are not identical at each grade level. Each score is a non-integer probability of correct answers representing the number of items a child would have answered correctly if they completed all of the questions.

The third and fifth grade reading assessments measured phonemic awareness, single word decoding, vocabulary, and passage comprehension. Additionally, the 5th grade assessment included the ability to evaluate nonfiction texts. The 8th grade assessment tested advanced comprehension skills, including the ability to make connections with the text and evaluate literary devices. There were 154 questions in third grade with a possible score range of 42.42-148.95, 186 questions in fifth grade with a possible score range of 62.25-180.86, and 212 questions in eighth grade with a possible score range of 85.62-208.90.

The third and fifth grade mathematics assessments measured number sense, operations, and measurement. The eighth grade assessment included more difficult mathematical items such as spatial sense, geometry, algebra, probability, patterns, functions, data analysis, and statistics. In our sample, there were 123 questions in third grade with a possible score range of 31.21-120.42, 153 questions in fifth grade with a possible score range of 46.97-150.94, and 174 questions in eighth grade with a possible score range of 67.42-172.20.

The science assessment in third, fifth, and eighth grade tested two categories: 1) conceptual understanding of scientific facts, and 2) the ability to ask questions about the natural world, collect evidence, and explain the answers obtained. Children needed to understand the physical world, draw inferences, comprehend relationships, and engage with the scientific method. In our sample, there were 62 questions in third grade with a possible score range of 10.56-58.46, 92 questions in fifth grade with a possible score range of 17.91-87.58, and 111 questions in eighth grade with a possible score range of 30.02-107.90.

**Perceived academic competence.** I examined students’ perceived competence in reading and math through questions used with permission from the Self-Description Questionnaire 1 (SDQ; Marsh, 1992), which was administered in third, fifth, and eighth grade. The SDQ assessed how children felt about their academic work, and included questions about grades, difficulty of work, and their interest and enjoyment in the subject. Two SDQ variables (one for reading, one for math) were graded on a 1 to 4 response scale (1 = not at all true, 2 = a little bit true, 3 = mostly true, 4 = very true).

**Internalizing problems.** Lastly, I utilized the SDQ Sad/Lonely/Anxious scale, found in third, fifth, and eighth grade. The scale included items about internalizing problem behaviors such as feeling sad, lonely, ashamed of mistakes, feeling frustrated, and being worried about school
and friendships. This variable was graded on a Likert-type scale with 1 being “not at all true” and 4 being “very true.”

**Predictors of Interest**

First, school office staff were asked to indicate whether each child had an IEP on record at school. If the child did not have an IEP on file, I considered them to be in general education. Next, using the Spring 3rd-Grade Teacher Questionnaire, I examined general education teachers’ experience, perceptions of support, and self-efficacy in teaching a student with special needs. First, I created a teacher experience variable that included 1) highest level of education received (ranging from a high school diploma/GED to a doctorate); 2) number of college special education courses completed (ranging from zero to more than six); 3) number of years teaching (ranging from zero to 49); and 4) number of years taught at grade level (ranging from zero to 39). All variables were z-scored (which constrains the variable to have a mean of zero and standard deviation of one), summed, and then z-scored again.

Second, I formulated the Teacher Support variable by z-scoring and summing 1) number of paid aides in the classroom; 2) how often teachers meet with the special education teacher to discuss a plan for children with disabilities in the class (ranging from 1=never to 6=daily); 3) number of students in the class; and 4) whether the school administration encourages and supports their staff (ranging from 1=strongly disagree to 5=strongly agree). After these four variables were summed, they were z-scored again.

Third, I looked at two variables defining efficacy found in the Teacher Questionnaire, which had Likert-type responses ranging from strongly disagree to strongly agree. The first statement, “I am adequately trained to teach the children with disabilities who are in my class” was z-scored and included to measure teacher efficacy, because it assesses an individual teacher’s internal beliefs about teaching students with special needs. The second statement, “inclusion of children with disabilities in my class has worked well,” was z-scored and included to measure inclusion efficacy, which arguably represents a broader belief about the overall efficacy of inclusion.

**Covariate Adjustment**

In order to obtain unbiased estimates, it is important to statistically control for factors that may influence our outcome variables and/or predictors of interest. To this end, several covariates were included in the analytical model. First, data from the Special Education Teacher Questionnaire B included time-varying information on whether primary placement was in a general education classroom in third, fifth, and eighth grade. If students were not primarily placed in general education at each of these timepoints, they were excluded from analysis. Time-invariant variables (i.e. variables that remain the same over all time points) were measured at kindergarten, and included sex and race (White, Black, Hispanic, and Asian). I also captured socioeconomic status with the use of two time-invariant variables measured at third grade. The first was maternal level of education (ranging from less than high school to a doctoral or professional degree), and the second was family income (ranging from less than $25,000 to above $200,000). Both of these variables were z-scored.

Lastly, to capture information about children's schools that could influence teachers' reports of efficacy or support, I created a composite variable measuring school climate from 7 Likert-type questions found in the spring third, fifth, and eighth grade Teacher Questionnaire B. Questions
assessed to what extent 1) staff members demonstrate school spirit; 2) the level of child misbehavior interferes with teaching (reverse-coded); 3) students are not capable of learning the material (reverse-coded); 4) teachers feel accepted and respected by colleagues; 5) teachers are continually learning and seeking new ideas; 6) paperwork interferes with teaching (reverse-coded); and 7) parents of schoolchildren are supportive of school staff. All seven variables were summed and then z-scored.

Missing Data

Proportions of missing data for each variable are represented in Table 1. Most variables were found to be missing at random (MAR). Missing data were imputed in Stata/SE 14.0 using multivariate chained-equations (MICE), which replaces missing values with multiple sets of stimulated values in order to complete the data (Rubin, 1978; Schenker & Taylor, 1996; Van Buuren & Groothuis-Oudshoorn, 2011). Historically, imputations in the realm of social sciences have been conducted with \( m = 3 \) to 5 imputed datasets (Spratt et al., 2010), but current research has shown that decreasing \( m \) imputed datasets can reduce power and increase errors (Graham, Olchowski, & Gilreath, 2007). In addition, some researchers have suggested imputing at least as many datasets as the highest fraction of missing information (FMI) (Allison, 2012; White, Royston, Wood, 2011; Graham, Olchowski, & Gilreath, 2007). Following these recommendations, I imputed \( m = 60 \) datasets. The dependent variables reading, math, and science were not imputed.

Normality and Weighting

The ECLS-K dataset is designed to be nationally representative with the application of weights to adjust for disproportionate sampling and survey nonresponse. There were no issues with normality per Flora and Curran’s (2004) rules for significant departures from normality in large samples (e.g., skew > 3, kurtosis > 8).

Results

Data were analyzed using a multilevel mixed-effects linear regression in Stata/SE 14.0. Analyses occurred in four steps: 1) empty two-level model with random intercepts and fixed slopes; 2) two-level model with demographic predictors at level 2; 3) two-level model with demographic predictors and IEP at level 2; and 4) two-level model with demographic predictors, IEP, and teacher characteristics at Level 2. The addition of teacher variables at Level 2 did not appear to significantly explain variance from the prior models (Table 2 and 3). Much of the variability within children was described by the addition of covariates. Full results for the final models (4) for each outcome variable are displayed in Tables 2 and 3.

Academic Achievement. In 3\textsuperscript{rd} grade, students with an IEP scored 0.32 standard deviations (which translates to a difference of about 5.60 points) lower on the reading assessment than students without an IEP (SE = 0.04), but there was no significant difference in growth over time between students with and without disabilities (Std. B = 0.01, SE = 0.01). Students with more supported teachers had significantly lower reading scores in 3\textsuperscript{rd} grade than students with less supported teachers, but this effect was small in magnitude (Std. B = -0.00, SE = 0.02). In addition, teacher support did not impact reading performance over time (Std. B = -0.00, SE = 0.00), nor did it differentially impact students receiving special education compared to nondisabled peers. Furthermore, teacher experience and efficacy had no impact on student reading scores (regardless of special education
status), either initially or over time. Results controlling for teacher characteristics are graphically represented in Figure 1.

Regarding math achievement, in 3rd grade students with an IEP scored 0.14 standard deviations (which translates to a difference of about 1.51 points) lower than students without an IEP (SE = 0.03). In addition, students with an IEP had slower math growth (-1.16 points) between 3rd and 8th grade, but again, this had a very small effect size (Std. B = -0.02, SE = 0.01) (Figure 2). Teacher experience, support, and efficacy had no impact on students' math scores initially or over time, regardless of special education status.

Finally, in 3rd grade students with an IEP scored approximately 0.14 standard deviations (which translates to a difference of about 0.27 points, SE = 0.03), less on the science assessment than students without an IEP, and had slower growth over time (Std. B = -0.04, SE = 0.01) (Figure 3). Teacher support and efficacy did not differentially predict science achievement for students with or without an IEP, and did not affect growth over time. However, students with more experienced teachers had slightly slower growth over time, though this effect size was remarkably close to zero (Std. B = -0.01, SE = 0.00) relative to students with less experienced teachers, but there was no differential effect of teacher experience on students with an IEP.

Academic Competency. Students with an IEP reported feeling less interested and competent in reading at 3rd grade, scoring 0.13 standard deviations less (which translates to a difference of about 0.08 points, SE = 0.06), but their growth over time was no different than those without an IEP. In contrast, students with an IEP were no more or less confident in their math abilities than general education students at any time point. Teacher experience, support, and efficacy did not make a difference in either reading or math competence for students with or without an IEP, and did not affect their growth over time. Results are graphically displayed in Figures 4 and 5.

Internalizing Problems. Students with an IEP reported more internalizing problems in 3rd grade (Std. B = 0.27, SE= 0.05), but these problems decreased more over time than they did for students in general education (a finding that could potentially showcase a positive effect of special education services) (Figure 6). Moreover, teacher experience, support, and efficacy did not impact internalizing problems for students with or without an IEP, and did not affect growth over time.

Discussion

The purpose of this study was to assess how reading, math, and science scores, along with reading competence, math competence, and internalizing problems, were impacted by teacher experience, support, and efficacy. Overall, students with an IEP typically perform closer to their general education peers in both 3rd grade science and math than 3rd grade reading, but the gap between general and special education students widens more over time for reading and science than for math. In addition, students with an IEP were found to be less confident in their reading abilities than their math abilities, relative to their general education peers.

I expected to find that children with special needs would exhibit poorer academic outcomes than their typical peers, and that this gap would be at least partially explained by teacher characteristics such as perceptions of classroom support, efficacy, and experience working with special needs students. Consistent with prior research, the results of this study demonstrated that students with an IEP initially scored lower on academic assessments and grew less over time. Interestingly, however, it does not
appear that this gap is explained by teacher experience, support, or efficacy. While students with more supported teachers had significantly lower reading scores in 3rd grade than students with less supported teachers, the effect was small in magnitude. It is possible that students who are already reading lower at third grade are selected into classes that offer more support. In addition, self-reported reading and math competence and internalizing behaviors were not impacted by these teacher variables.

Limitations and Future Directions

These findings should be robust due to the nature of the ECLS-K dataset, which is a large and nationally representative sample. Nevertheless, this study still has several limitations. First, the ECLS-K dataset is over 19 years old and therefore could be considered outdated. Future research should consider replicating these analyses with the ECLS-K:2011 dataset, which is currently undergoing data collection. Second, researchers have a plethora of variables at their disposal when conducting secondary data analysis, but they are unable to tailor data collection to suit their particular research questions and precisely capture certain constructs of interest. It is quite possible that the teacher variables used here are insufficient to answer these specific research questions. Some variables were also unavailable in the 8th grade wave, in part due to students having more than one primary teacher in middle school. Future research should carefully design and select measures that are more appropriate to research questions such as these as well as consider using the value-added model (e.g., see Hanushek & Rivkin, 2010). The value-added model could be used with more success because measuring these teacher characteristics at one timepoint may not be sufficient to capture the true impact that teachers have on their students. Since the ECLS-K dataset was not collected yearly, this approach was not utilized. In addition, data collection for the ECLS-K ended at 8th grade. It would be beneficial to analyze whether differences in academic achievement, academic competence, and presence of internalizing behaviors arise throughout high school when material gets increasingly difficult. Finally, it would have been ideal to analyze a three-level model of time nested within students, nested within teachers. Because students were randomly sampled from all kindergartners attending each ECLS-K school and then followed longitudinally, the study design did not sample classrooms. Therefore, there was no teacher weight, and students were not equally distributed among teachers by the third-grade year. Though I first attempted to analyze a three-level model, I encountered convergence problems due to these issues, and so I reverted to a two-level model to obtain the most robust estimates possible.

Other potential mechanisms for this achievement gap include the amount of time a child physically spends in the general education classroom, academic and/or behavioral expectations for children with special needs, inadequate funding for highly individualized special education resources and services, and/or overall school quality and composition. Future research should assess these constructs in order to assess their impact on student achievement and efficacy.

Conclusion

In this study, I hoped to offer fresh insight into why children with special needs underperform relative to general education students, given that it remains empirically unclear why this occurs and how it might be remediated. The results of this study suggest that certain teacher characteristics, although integral to the education system, do not
appear to mitigate the achievement gap between students with and without disabilities when measured at the third-grade year. These results provide a unique contribution to the field of special education and demonstrate that more research needs to be conducted in order to pinpoint the mechanisms causing children with special needs to lag behind their nondisabled peers.

REFERENCES


Chudowsky, N., & Chudowsky, V. (2009). State test score trends through 2007-08, part 4: Has progress been made in raising achievement for students with disabilities?. Center on Education Policy. doi:10.1080/10349129092868632


doi:10.1111/j.1469-7610.2010.02289.x


Table 1

Descriptive Information for Variables of Interest

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Yale Review of Undergraduate Research in Psychology
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**Effects on Slope**

| Grade*Gender         | 0.00(0.00) | 0.00 | 0.0   | 0.00  | 0.00  | 0.00  |
|                      | 0.00(0.00) | 0.00 | 0.0   | 0.00  | 0.00  | 0.00  |
| Grade*Race/Ethnic    | 0.02(0.01) | 0.02 | 0.0   | 0.00  | 0.00  | 0.00  |
|                      | 0.02(0.01) | 0.02 | 0.0   | 0.00  | 0.00  | 0.00  |
| Grade*Maternal Ed.   | 0.00(0.00) | 0.00 | 0.0   | 0.00  | 0.00  | 0.00  |
|                      | 0.00(0.00) | 0.00 | 0.0   | 0.00  | 0.00  | 0.00  |
| Grade*Income         | 0.00(0.00) | 0.00 | 0.0   | 0.00  | 0.00  | 0.00  |
|                      | 0.00(0.00) | 0.00 | 0.0   | 0.00  | 0.00  | 0.00  |
| Grade*School Clim.   | 0.00(0.00) | 0.00 | 0.0   | 0.00  | 0.00  | 0.00  |
|                      | 0.00(0.00) | 0.00 | 0.0   | 0.00  | 0.00  | 0.00  |
| Grade*IEP            | 0.01(0.01) | 0.01 | 0.0   | 0.00  | 0.00  | 0.00  |
|                      | 0.01(0.01) | 0.01 | 0.0   | 0.00  | 0.00  | 0.00  |
| Grade*Experience     | 0.00(0.00) | 0.00 | 0.0   | 0.00  | 0.00  | 0.00  |
|                      | 0.00(0.00) | 0.00 | 0.0   | 0.00  | 0.00  | 0.00  |
| Grade*Support        | 0.00(0.00) | 0.00 | 0.0   | 0.00  | 0.00  | 0.00  |
|                      | 0.00(0.00) | 0.00 | 0.0   | 0.00  | 0.00  | 0.00  |
| Grade*Tch.Effic.     | 0.00(0.00) | 0.00 | 0.0   | 0.00  | 0.00  | 0.00  |
|                      | 0.00(0.00) | 0.00 | 0.0   | 0.00  | 0.00  | 0.00  |
| Grade*Inc. Effic.    | 0.00(0.00) | 0.00 | 0.0   | 0.00  | 0.00  | 0.00  |
|                      | 0.00(0.00) | 0.00 | 0.0   | 0.00  | 0.00  | 0.00  |
| IEP*Grade*Ex.        | 0.01(0.00) | 0.01 | 0.0   | 0.01  | 0.01  | 0.01  |
|                      | 0.01(0.00) | 0.01 | 0.0   | 0.01  | 0.01  | 0.01  |
| IEP*Grade*Supp.      | 0.01(0.01) | 0.01 | 0.0   | 0.01  | 0.01  | 0.01  |
|                      | 0.01(0.01) | 0.01 | 0.0   | 0.01  | 0.01  | 0.01  |
| IEP*Grade*T.Eff      | 0.00(0.00) | 0.00 | 0.0   | 0.00  | 0.00  | 0.00  |
|                      | 0.00(0.00) | 0.00 | 0.0   | 0.00  | 0.00  | 0.00  |
| IEP*Grade*I.         | 0.01(0.01) | 0.01 | 0.0   | 0.01  | 0.01  | 0.01  |
|                      | 0.01(0.01) | 0.01 | 0.0   | 0.01  | 0.01  | 0.01  |

Yale Review of Undergraduate Research in Psychology
### Yale Review of Undergraduate Research in Psychology

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| Table 3 |

#### Influence of Teacher Characteristics on Competencies and Internalizing Behaviors

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#### Effects on Intercept

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Figure 1: Reading Growth by Special Education Status

Figure 2: Math Growth by Special Education Status
Figure 3: Science Growth by Special Education Status

Figure 4: Reading Competence by Special Education Status
Figure 5: Math Competence by Special Education Status

Figure 6: Internalizing Problems by Special Education Status
The Influence of Moral Values and Victim Typicality on Victim Blame in Intimate Partner Violence Cases

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ABSTRACT. The aim of this study was to investigate how both, victim typicality and binding moral values, impact an observer’s attributions of blame for a victim in cases of intimate partner violence. A total of 112 participants were included in the final sample; with 33 men and 79 women who had been recruited either online through social media, or through the University of Queensland’s first year psychology student participation scheme. Participants read a vignette depicting a hypothetical case of intimate partner violence between a husband (perpetrator) and wife (victim), which involved incidences of psychological and physical abuse. Participants were then asked to respond to a series of questions, which measured their attribution of blame to the victim, levels of binding moral values (Moral Foundations Questionnaire), acceptance of domestic violence myths (Domestic Violence Myth Acceptance Scale), and demographic information. The results of the study showed no significant effect for victim typicality or binding moral values. There was no significant interaction between victim typicality and binding moral values. Domestic violence myth acceptance was positively correlated with binding moral values, and found to be a significant predictor of victim blame. These findings suggest that the concept of victim typicality may be changing with societal attitudes, and the sample was too homogenous to find significant variance in moral values. These findings also reinforce the considerable influence of domestic violence myth acceptance on attributions of victim blame.

Many researchers have proposed the concept that victim blaming occurs due to a just world belief; the idea that everything happens for a reason and people get what they deserve (Bègue, Charmoillaux, Cochet, Cory, & De Suremain, 2008; Dalbert, 1999; Lerner, 1980). However, current scientific literature tells a more complex story. Recent research shows that factors pertaining to both victims and observers influence the level of blame that observers attribute to victims in cases of intimate partner violence. Some researchers argue that the victim must fit into a stereotype (an ideal or typical victim) to warrant sympathy, and if they do not, they will be held responsible for some or all the abuse that occurs (Blackman, 1990; Capezza and Arriaga, 2008; Christie, 1986). Other research, however, has focused on the observers attributing the blame. In fact, studies have shown individual differences such as moral values, may play a key role in determining if, and when, an observer will blame a victim (Alicke, 1992, 2000, Brewer, 2007; Niemi and Young, 2016). There is no research to date that investigates how these two factors combine to affect victim blame. With compelling evidence for both victim typicality and moral values being important contributors to judgements of victim blame, it can be suggested that this decision-making process may be a combination of the two. It is important to consider these influences in conjunction so the scientific community may begin to resolve the current conflict in the literature and develop a better understanding of the multiple factors contributing to instances of victim blame. The current study will investigate how both victim typicality and moral values impact an observer’s attribution of blame for a victim of intimate partner violence.
**Intimate Partner Violence and Victim Blaming**

A victim is most commonly defined as a person who is physically, mentally or financially harmed by the actions of another person (World Health Organisation, 2012). Victim blaming happens when people hold the victim responsible for their own suffering (Lerner & Goldberg, 1999; Ryan, 2010). Victim blaming is a common, often automatic, process that occurs in court trials, the media and even casual discussions. The outcome of this process ultimately shapes society’s perception of what constitutes satisfactory repercussions for criminal offences. This can result in victims of crime abstaining from reporting incidences due to a fear of backlash against their character, or lack of trust in the criminal justice system to provide assistance. This reluctance to report incidents is particularly common amongst victims of intimate partner violence (NSW Bureau of Crime Statistics and Research, 2013). Defined by the World Health Organisation (2012) as “any behaviour within an intimate relationship that causes psychological, physical or sexual harm to those in the relationship”, intimate partner violence is often not disclosed to family, friends or police by the victim, for fear of being blamed for the abuse (Patterson, Gresson, and Campbell, 2009). This is with good reason, as social attitudes often direct blame toward the victim by implying they incited the abuse, or suggesting they should have left the abuser sooner (Kristiansen & Guilietti, 1990; Pierce & Harris, 1993). The attribution of blame to the victim is commonly reinforced within the relationship too. Perpetrators often attribute their violence to external causes, such as the victim provoking them (Vecina, 2014), and the victim attributes the abuse to dispositional factors within themselves (Overholser & Moll, 1990).

Around the world there have been many instances of intimate partner violence where members of the public have attributed blame to the victim of that violence. This was seen in May 2017, when 22-year-old Lesvy Berlin Osorio was strangled with a telephone cord at a university campus in Mexico City, after a night of drinking with her boyfriend. In response to this incident, the Mexico City Prosecutor’s office released a post on the social media platform, Twitter. They attributed blame to Ms Osorio when releasing the following statement; “She was an alcoholic and a bad student” (Rannard, 2017). Just one month earlier, in April 2017, New Jersey police commissioner, William Regan, had all domestic violence charges against him dropped. Family Court Judge, Roy McCready, determined that Regan’s wife could not have been too distressed by his actions as she continued to live with Regan after the assaults (Attrino, 2017). In Australia, during May 2017, a court heard audio recording of the violent assault against Kelly Landry by her husband, Anthony Bell. Even after this recording, which Magistrate Robert Williams described as ‘chilling’, the family’s nanny, Gordana Karoglan, claimed in her witness testimony that Landry “was complaining every day…. if she really didn’t want to be with him, she shouldn’t be with him.” (Crawford, 2017). The victims in these situations were judged on the choices they made leading up to, and after, the assaults rather than the crime itself.

These case studies lead to the question: Why do so many cases of violence result in blame being primarily attributed to the victim? One popular theory for this phenomenon is the just world hypothesis (Lerner & Simmons, 1966); the belief that everything happens for a reason and people get what they deserve. If everything falls into the same pattern of cause and effect, then people should take the necessary steps to prevent adverse consequences, and enhance good outcomes. This hypothesis has been cited as an explanation for victim blaming in many contexts, as the concept of a just world protects people from feeling out of control due to random life events (Kaplan, 2012; Stromwall, Alfredsson, & Landstrom, 2012, 2013; Van Den Bos & Maas, 2009). Similarly, people also tend to blame victims in an effort to reduce their sense of accountability to provide victim services, and eliminate adverse social conditions (Mancini & Pickett, 2015). Consequently, people tend to avoid accepting acts of violence as random and begin looking for reasons as to what the victim may have done to warrant the violence. While the belief in a just world has been shown to predict victim blame in some instances, it does not explain the phenomenon completely, as other factors relating to both the victim and the observer have also been shown to change this effect.

**Factors Relating to the Victim**
Recent studies have found that a submissive or vulnerable victim warrants less blame than a victim who defends themselves from their abuser. (Capezza & Arriaga, 2008; Witte, Schroeder, & Lohr, 2006; Yamawaki, Ochoa-Shipp, Pulsipher, Harlos, & Swindler, 2012). Christie (1986) defined this submissive character as an ideal victim; someone who “generates the most sympathy from society” (p. 19). In his original work, Christie (1986) described three factors as being necessary for someone to be considered the ideal, or typical victim. They are firstly, someone who is weak, secondly, someone who is in a place where they cannot be blamed for being at the time of the crime, and lastly, someone who is attacked by an unknown and evil individual. While victims of intimate partner violence often fall into the categories of being weaker than their abuser (Devries et al., 2013) and being in the home, which is considered a reasonable environment (Mouzos and Makkai, 2004), unlike random attacks, these victims know the offender. This leaves room for observers to pass judgement since these victims often continue to remain in an environment where revictimization is likely to occur (Meyer, 2015). Although victims of intimate partner violence may not have the benefit of being considered perfectly ideal, the victim’s response to abuse may influence how ideal an observer perceives them to be. The intimate partner violence version of the ideal, or typical victim, is the battered woman. The term, battered woman syndrome refers to a psychological paralysis, or learned helplessness, in which victims of long term abuse become so defeated and depressed that they believe they are incapable of leaving the abusive relationship. When victims respond to abuse in a way that is incompatible with the weak and passive construct of the battered woman (i.e. fighting back by pushing, yelling, insulting) they are less likely to be perceived as defenceless, and as such, ascribed more responsibility for the abuse. This can be seen in legal cases of intimate partner violence, where victims of abuse have reacted to the abuse with anger or aggression. Their claims of battered woman syndrome are often challenged, and awarded much less consideration (Blackman, 1988; Schneider, 1992). This effect of victim blame may be interpreted in terms of Kelley’s (1987) principle of discounting. The principle claims that an observer will discount causality attributed to a single cause, if multiple plausible causes are present. It may be suggested that an aggressive response to violence implies something about the victim’s character, and an observer could conclude that the victim provoked the incident by being an aggressive person.

It is also important to note that the characteristics of a “typical victim” could be interpreted by some as a gender stereotype. More specifically, as a stereotypically feminine individual. Women are often considered physically weaker and less assertive than men, and are therefore considered less able to protect themselves (Buzawa & Buzawa, 1993; Peters, 2008). When women respond to abuse in a more aggressive or masculine manner, they are perceived as not behaving in a way that society deems appropriate for their gender, and they are then more likely to be blamed for their actions.

A study by Capezza and Arriaga (2008) investigated the effect of passive or aggressive responses in a case of intimate partner abuse, with 118 university students from the Midwestern United States. Participants were randomly assigned to read a scenario depicting a case of marital conflict, in which the wife was shown as either traditional (homemaker), non-traditional (lawyer) or a control (no occupation). When the wife was depicted as traditional, she managed the household chores alone and her husband was entirely responsible for the finances. When the wife was depicted as non-traditional, she worked in a career that led her to earn more money than her husband, and the household chores were shared equally amongst them. In the control condition, participants read how both the husband and wife keep busy at home doing various household chores and tasks, with no mention of any occupation. In all cases, the husband engaged in repeated acts of psychological abuse. This was demonstrated verbally with yelling and name calling. What the researchers were primarily interested in was how participants perceived the victim after she responded to the abuse, and whether stereotypes of certain females would influence attributions of victim blame. In the traditional condition, the wife responded passively and calmly, while in the non-traditional condition, the wife yelled back and became mildly
aggressive. In line with their hypothesised effect, participants rated the traditional wife’s passive response as less blameworthy and less negative than the control and the non-traditional wife’s aggressive response. Given that the manipulation check for gender role perceptions was significant as well (traditional women were perceived as warmer, more positive, less competent and less blameworthy than non-traditional women), the authors concluded that a victim who responds to violence in a manner which is not aligned with their stereotypical gender roles would be blamed more and liked less. While past research has focused on the victim provoking the abuser, this study has instead investigated the effects of victim response to abuse, with noteworthy results. This is important as it provides evidence that even when the victim does not show any indication of inciting abuse, how they respond also plays a vital role in attributions of victim blame.

Factors Relating to the Observer

Individual differences of the observer, such as gender, sexism, endorsement of domestic violence myths and moral values, have also been shown to mitigate the strength of blame attribution. Studies have shown that men are more likely to blame victims than women (Bryant & Spencer, 2003; Flood & Pease, 2009), and stronger benevolent sexist beliefs also predict more victim blame, even when the effects of a just world belief are controlled (Pedersen & Stromwall, 2013). Several studies have also identified that participants’ attributions of blame are influenced by domestic violence myths. Peters, (2008) who developed the now widely used Domestic Violence Myths Acceptance Scale (DVMAS) defined domestic violence myths as: “stereotypical beliefs about domestic violence that are generally false but are widely and persistently held, and which serve to minimize, deny, or justify physical aggression against intimate partner” (p. 17). The content of the DVMAS incorporates questions pertaining to myths about the perpetrator, the victim, and society, along with concepts from published literature, including the belief that women have an unconscious desire to be abused (Saul, 1972) and have a desire to be beaten (Walker, 1979). In research investigating victim blame, strong beliefs in domestic violence myths predict more victim blame, excusing the perpetrator and

minimising the seriousness of the abuse (Peters, 2008; Policastro & Payne, 2013; Yamawaki et al., 2012)

More recently, researchers have explored how other individual differences, such as moral values, affect victim blame. Moral values may be defined in simple terms as the standards of good and bad that direct the behaviours and choices of a person. Research has identified the key role these underlying beliefs play in our evaluations of everyday life, in contexts from work or study to friendships and intimate relationships. Some research has even identified the role our moral values play in seemingly non-moral features of people and circumstances, such as causal responsibility (Alicke, 1992, 2000). For example, individuals who violate moral norms are considered more causally responsible for negative outcomes than those who adhere to norms for identical acts (Alicke, 1992). In cases of intimate partner violence, observers may consider a female victim retaliating to violence with aggression, as a norm violation of their gender stereotype. She is therefore considered more blameworthy than a male acting in a dominant or controlling manner, who may be perceived as more in line with his gender norms.

However, how morally wrong people perceive an act to be depends greatly on how they believe individuals in that context should behave. Moral violations in intimate relationships vary widely between cultures around the world, therefore research on what defines a relationship norm is limited. This variation makes it difficult to come to a consensus on unethical relationship behaviours. Some research has begun to generalise the relational behaviours which are considered taboo; with the act of adultery being generally considered unethical in many western societies. However, even adultery is difficult to define as taboo, because what constitutes betrayal differs greatly amongst individuals (Tsapelas, Fisher, & Aron, 2011). Other relational behaviours are even less clearly defined as morally right or wrong.

In the aim to explain and categorise the wide variety of moral beliefs people hold, Haidt and Joseph (2007) developed Moral Foundations Theory, which is now a widely-used framework for evaluating moral values. According to Moral Foundations Theory, there are five primary foundations for which people
are guided. An individual will, to some extent, hold values of: (a) care/harm, (b) fairness/cheating, (c) loyalty/betrayal, (d) authority/disrespect, and (e) purity/degradation. Strongly held care values enhance concerns about minimising pain and suffering in others, and valuing fairness suggests an individual promotes justice and equality. A strong belief in loyalty often results in devotion to social groups, and authority values predict an agreement with respecting authority figures and fulfilling duties. Lastly, valuing purity often suggests a strong endorsement of sanctity, and a sensitivity towards degradation and disgusting acts. When someone opposes a strongly held moral value, it may be seen as an attack on something an individual deems sacred, and this can quickly lead to defensiveness and conflict (Vecina, Marzana & Czachura, 2015).

Research using Moral Foundations Theory (Haidt & Joseph, 2007) as a framework has been able to demonstrate patterns in moral values, with the factors often falling into two groups of values: binding and individualising. Binding values include loyalty, authority and purity, while individualising values are care and fairness. Studies suggest that people who strongly adhere to binding values are often politically conservative, patriotic, and have a strong sense of family and community (Franks & Scherr, 2015; Graham & Haidt, 2010; Graham, Haidt & Nosek, 2009). These beliefs have also been portrayed negatively however, with research linking binding values to prejudice, out group derogation and even genocide (Brewer, 2007; Dovidio & Gaertner, 2010; Smith, Aquino, Koleva, & Graham, 2014).

In relation to intimate partner violence, research using Graham, Haidt and Nosek (2008) Moral Foundations Questionnaire shows that the binding moral values can be strong predictors of blame. A stigmatize victims, but also assign more blame, the researchers conducted study two. Participants in this study completed the Moral Foundations Questionnaire along with the same measures for stigmatisation used in study one, however study two included an item pertaining to responsibility for the incident along with an opportunity to suggest how the outcome of the situation could have been different. The results showed a replication of study one, in that, binding moral values were a study by Vecina (2014) found that surveyed men who had committed and been charged with acts of violence towards their intimate partners, often viewed values of authority and purity as more sacred than others, and viewed their victims as having violated those values. The author concluded that strong values of authority predict violence in men, while strong values of purity predict pro-violent beliefs and a high probability of future fighting. Another study, conducted by Selterm and Koleva (2015), identified that when participants were presented with a series of hypothetical cases of potential norm violations in relationships (e.g., keeping romantic memorabilia from past relationships, or looking through a partner’s belongings), strong values of purity predicted harsher moral judgements for most types of perceived violations.

Niemi and Young (2016), aimed to investigate how individual moral values affected attributions of victim blame using the moral foundations. Their research was completed through four studies. In all studies, participants were recruited online for payment. The first study investigated whether binding moral values were linked with victim stigmatisation. Participants read a vignette about a victim of sexual (molestation, rape) or nonsexual (strangling, stabbing) violence. To measure the participants’ moral values, they were presented with the Moral Foundations Questionnaire (Graham et al, 2008), and to measure stigmatisation the participants rated the victim as ‘contaminated’ or ‘wounded’. Results of this study supported the authors’ hypothesis that binding values would significantly predict victim stigmatisation, with high scores on measures of binding values predicting more victim stigmatisation rather than sympathy, regardless of the nature of the crime. To investigate whether participants scoring high on binding moral values would not only significant predictor of victim stigmatisation. Study two also identified that when participants scored high on binding moral values, they were more likely to judge the victims as more responsible for the outcome, rather than perpetrators. Study three built upon these findings to confirm how focus is the causal factor which leads participants who score high on binding moral values to blame the victim more than the perpetrator. Participants in this study again completed the
Moral Foundations Questionnaire and the measure for stigmatisation, however to manipulate focus, the researchers reworded the vignette so that either the victim or the perpetrator would be the subject of the majority of sentences. Results of this study replicated the findings of both study one and study two, however the manipulation of vignette language only had a small effect. When the language was focused on the perpetrator, less blame was attributed to victims, however, to a lesser extent for participants who scored high on binding values. The fourth and final study replicated the methodology of study one, however also aimed to identify whether a Just World Belief (JWB) and Right-Wing Authoritarianism (RWA) were moderating factors between binding moral values and victim blame. After running a regression analysis, JWB and RWA were no longer significant predictors once moral values were included. Due to their findings, the authors concluded that participants who scored high on binding values were more inclined to focus on the actions of the victim, and therefore assigned them more responsibility and blame for the outcomes of violent incidents. The results of this four-part investigation are robust due to repeated testing and add significant insight to the literature. 

**Is victim blaming a result of both victim and observer?**

The existing literature shows that numerous factors, relating to both the victim and observer, affect victim blame in the context of intimate partner violence. Studies have identified that the typicality of the victim plays a significant role in the level of blame attributed to them for incidences of abuse. Victims who are *atypical* (aggressive, retaliative or non-conforming to stereotypes) are blamed to a greater extent than victims who are *typical* (submissive or conforming) (Capezza and Arriaga, 2008). In addition, the results of research on binding moral values suggest that people who strongly adhere to this value set perceive betrayal, rebellion and/or self-indulgence as threats to their innate beliefs (Vecina, Marzana & Czachura, 2015). They are likely to blame victims more than perpetrators, as they attend more to the potential morally violating actions of the victim that caused the perpetrator to respond with violence (Niemi and Young, 2016). However, no research has investigated how factors relating to the victim’s stereotype and factors relating to the observer’s moral values together, influence victim blame. Given the research to date, it is possible that when observers of intimate partner violence cases have stronger, compared to weaker, binding values, they may be more influenced by the typicality of the victim. It is important to scientifically test this theoretical connection between victim typicality and moral values before conclusions can be drawn. The practical implications for such a conclusion may help alleviate current conflict in the scientific literature on causes of victim blame, while simultaneously supporting further development of resources for domestic violence victims.

**The present study**

This study examined the effect of victim typicality and the observers’ moral values on victim blame in a case of intimate partner violence. Participants read a vignette depicting a case of intimate partner violence, between a husband (perpetrator) and wife (victim), in which the wife responded to her husband’s abuse in a way that was either typical (submitting) or atypical (aggressive). The participants then answered a series of questions designed to assess the level of blame they attributed to the victim, whether they personally held strong or weak binding moral values, and their acceptance of domestic violence myths. Based on the research of Capezza and Arriaga (2008), it was predicted that participants would blame the victim more when they read about a victim who responded to the abuse in an atypical, compared to typical way, after controlling for domestic violence myths (*Hypothesis 1*). In addition to this, and consistent with the work of Niemi and Young (2016), it was predicted that participants would blame the victim more when they scored higher, compared to lower, on measures of binding moral values, after controlling for participants’ endorsement of domestic violence myths (*Hypothesis 2*). However, it was predicted that the relationship between victim typicality and victim blame would be moderated by participants’ binding moral values. Specifically, participants would blame victims more when they read about a victim who responded to the abuse in an atypical, compared to typical way; however, this would occur to a greater extent at higher,
compared to lower, levels of binding moral values after controlling for participants’ endorsement of domestic violence myths (Hypothesis 3).

Method

Participants
Participants included 66 acquaintances of the experimenter and 105 first-year psychology students (N = 171). The experimenter’s acquaintances were offered the opportunity to enter the draw to win a $20 voucher for participating, while the first-year psychology students took part in the study for course credit. Participants were excluded from the study for either not answering the manipulation checks (N = 30), failing manipulation checks if answered (N = 17), or not answering at least 50% of key measures (N = 1). In addition to this, participants were also excluded if they took 12 seconds or less to read the vignette (N = 11). The final sample consisted of 112 participants, 33 men and 79 women, aged between 18 and 85 years of age (M = 22.98, SD = 11.00). An a priori power analysis was conducted with the program G*Power (Erdfelder, Faul, & Buchner, 1996). The analysis showed that a minimum of 77 people would be needed to detect a medium effect (f^2 = .15) with 80% power, using a t test multiple regression with alpha at .05.

Design
This study forms part of a larger research project, with six experimental conditions (N = 494), which was conducted with five other honours students. In this study, participants were randomly assigned to one of two victim typicality conditions in a 2-level between-subjects design: typical (N = 66) and atypical (N = 46). The design included a measured moderator, moral values: high binding values or low binding values. Endorsement of domestic violence myths was included as a control variable, and the dependant variable was victim blame.

Materials

Hypothetical vignette. A short hypothetical vignette as written for this study, depicting a case of ongoing intimate partner violence. The vignette described a number of instances of psychological and physical abuse escalating in severity, which occurred within an Australian married couple’s relationship. All instances of abuse were directed at the wife (Rebecca) by her husband (Neil). The couple had been married for three years, and the abuse began three months into their marriage. Neil was described as displaying controlling behaviours (e.g., he monitored Rebecca’s text messages and phone conversations, told her who she could or could not see and did not allow her to commute anywhere unless he drove). Neil’s behaviour then started to become verbally abusive (e.g., he yelled at Rebecca, or told her she was useless or had no respect for him). Eventually, the abuse escalated to physical violence (e.g., Neil hit Rebecca when she moved his car keys). This physical abuse, along with the controlling behaviour and verbal abuse, continued over a period of six months (where Neil hit Rebecca on three more occasions). Then, one day the physical abuse escalated; Neil pushed Rebecca into the wall with such force that it punctured the wall, causing her head to bleed and her to fall on the floor. When she tried to stand up, he strangled her until she temporarily lost consciousness.

Manipulation of victim typicality. Victim typicality was manipulated by altering Rebecca’s responses to Neil’s behaviours in the vignette (Appendix A, B). When Rebecca responded typically, she was portrayed as acting submissively. For instance, she never questioned Neil’s decisions when he displayed controlling behaviours, and she never yelled back at him when he became verbally abusive. When Neil hit Rebecca, she never fought back. When Rebecca responded atypically, she was portrayed as acting dominantly. She always protested against Neil’s decisions when he displayed controlling behaviours (e.g., she stated that she would do whatever she wanted). When Neil became verbally abusive toward Rebecca, she always yelled back and retorted with an identical put-down (e.g. telling him he is a worthless husband). After each instance of physical abuse, Rebecca fought back (e.g., she pushed Neil).

Procedure
Participants were recruited by the experimenter for a study on public perceptions about intimate partner violence. Community members were recruited through social media, and first year psychology students were recruited through the University of Queensland’s SONA participation scheme. Participants were provided with a link to the study, in order to access the study online using their own computers. Once participants opened the link online, read the information...
briefing and agreed to participate, they were asked for demographic information. This included their enrolment status in first year psychology courses at the University of Queensland, their gender, and their age. Following this, they were randomly assigned to one of the two victim typicality conditions (typical or atypical). At the end of the vignette, participants were asked to answer one question to measure their level of victim blame.

Responses were rated on a 7-point Likert scale ranging from 1 (not at all) to 7 (completely). The question asked: “To what extent do you think the wife should be blamed for the situation?” After responding to this item, participants were asked to complete single item manipulation checks for victim typicality and gender typicality. Finally, participants complete two pre-existing measures. The first was the full 30 item Moral Foundations Questionnaire, which aimed to assess their level of adherence to binding moral values. The second was the full 18 item Domestic Violence Myth Acceptance Scale, which aimed to measure participant's acceptance of domestic violence myths. At the very end of the questionnaire, participants were presented with debrief information.

Moral Foundations Questionnaire.
To measure participants’ binding moral values, the Moral Foundations Questionnaire (MFQ) developed by Graham, Haidt and Nosek (2008) was used. The complete 30-item questionnaire was included, and was divided into two parts (15 items in each) as per the original format. Part one asked participants, “When you decide whether something is right or wrong, to what extent are the following considerations relevant to your thinking?” For instance, some of these considerations related to love for country (loyalty), conformity to societal traditions (authority) and standards of decency (sanctity). Part two stated, “Please read the following sentences and indicate your agreement or disagreement”. For instance, some statements related to being a team player (loyalty), adherence to gender roles (authority) and importance of chastity (sanctity). All participants’ responses to both parts were provided on 6-point Likert scales. In part one, the scales ranged from 1 (not at all relevant) to 6 (extremely relevant). In part two, the scales ranged from 1 (strongly disagree) to 6 (strongly agree). A Cronbach’s Alpha test was conducted, and the result showed high internal consistency (.855). For the purpose of this study, participants’ average scores were taken for each loyalty, authority and sanctity. These averages were then condensed into a single composite variable for binding moral values, with high scores on these factors representing strong binding values, and low scores representing weak binding values.

Domestic Violence Myths Acceptance Scale.
The Domestic Violence Myths Acceptance Scale (DVMAS) (Peters, 2008) was included in this study to control for participant’s endorsement of domestic violence myths when assessing victim blame given the research showing that domestic violence myths strongly predict victim blame (Peters 2008; Yamawaki et al, 2012; Policastro & Payne, 2013). The scale asked participants to rate their agreeability with 18 statements about domestic violence, with responses ranging from 1 (strongly disagree) to 7 (strongly agree) in a Likert style. Items on the scale asked questions such as, “if a woman doesn’t like it, she can leave” and “women can avoid physical abuse if they give it occasionally”. The scale was tested for internal consistency using a Cronbach’s Alpha test, and the result was high (.910). Scores were then averaged to create one variable for endorsement of domestic violence myths, with high scores representing strong acceptance of domestic violence myths, and low scores representing weak acceptance of domestic violence myths.

Manipulation Checks. Participants answered one attention question to check the manipulation of victim typicality in the vignette. Participants were asked to answer, “Which of the following statements is correct about the wife?” The three possible responses included, “she did verbally and physically resist the abuse”, “she did verbally and physically resist the abuse” and “do not know”. Participants were also asked to answer two perception questions related to the vignette. The two items included, “How similar is the wife to a typical victim of intimate partner abuse?” These were rated on a 7-point Likert scale ranging from 1 (not at all) to 7 (completely). These items were analysed separately, and gender typicality was only included as it has been found to covary with the independent variable of victim typicality.

Contributions
The concept of my study was initially broadly proposed by my supervisor, but was designed jointly by my supervisor and myself, as a part of a larger research project with five other psychology honours students. My supervisor provided direction about theories that may be relevant, the full hypothetical vignettes, guidance in statistical analysis and verbal feedback on the discussion section. The information sheet, SONA study description and social media advertisement were written by fellow researchers in my group. I researched the literature for further theories and empirical studies, wrote the debrief sheet for participants, contributed to recruiting participants, developing and editing the online survey in Qualtrics and conducted the statistical analyses for this study.

Results

Overview of Analyses

The data was first analysed to check for violations of the assumptions of multiple regression. The manipulation checks were then analysed using a cross-tabulation to ensure that participants attended to the manipulation of victim typicality, and perceived the manipulation of victim typicality in the intended manner. After this, preliminary analyses, including independent groups t tests and a Pearson’s product-moment correlation, were conducted on the independent variable (victim typicality), the moderator (binding moral values) and the dependant variable (victim blame). Lastly, the main analysis was a hierarchical multiple regression, in which an alpha level of .05 was used.

Data Checking

The data was analysed using SPSS to ensure that the multiple regression assumptions were met. Firstly, a normal P-Plot was visually inspected for normality. This plot did not appear normally distributed, and to reduce the severity of the skew, bootstrapping with 1000 samples was used during preliminary and main data analysis. Victim blame was then inspected for multivariate outliers using Mahalanobis distance and Cooks distance. Then Mahalanobis distance score (7.49) was checked for significance using a Chi-Squared table with an alpha of .05, which identified that multivariate outliers were present. The Cooks distance score (0.21) was then inspected to reveal that the outliers present were not problematic. The outliers were kept in analyses as they were deemed to not be influencing the data. The residuals scatterplot was then inspected to check for violations of the assumptions of linearity as well as homoscedasticity. A visual inspection of the plot found no violation to linearity or homoscedasticity. To check for violations of the assumption of multicollinearity between victim typicality and binding moral values, the variance inflation factor was inspected. It was identified that victim typicality and binding moral values were not correlated highly, which means that the assumption of multicollinearity was not violated (VIF = 1.02 for typicality, 1.05 for binding moral values). Lastly, to check for independence of errors, the Durbin Watson statistic was noted. A score of 2.10 was obtained, which suggested that the errors were suitably independent, and no alterations to the data were necessary.

Manipulation Checks

Attention manipulation. To check that participants attended to the manipulation of victim typicality, and whether this attention differed as a function of typicality condition, a chi-squared analysis was conducted. Overall, a high proportion of participants attended to the manipulation. A total of 83% of participants who answered the attention manipulation question correctly identified that the victim did or did not verbally and physically abuse the perpetrator. There was, however, a significant association between the content of the victim typicality manipulation and typicality condition, \( \chi^2 (2, N = 138) = 78.44, p < .001, \Phi .75 \). Even though in both the typical and atypical conditions a greater proportion of participants correctly identified, than incorrectly identified, that the victim did or did not verbally and physically abuse the perpetrator, the differences in these proportions was greater in the typical condition. For participants in the typical condition, 88% correctly identified, and 12% of participants incorrectly identified, that the victim did not verbally or physically resist the abuse. For participants in the atypical condition, 76% of participants correctly identified, and 24% of participants incorrectly identified, that the victim did verbally and physically resist the abuse. In the final analyses, only those participants who answered and passed the attention manipulation were included.

Perceptual manipulation. To check that the manipulation of typicality affected
participants’ perceptions in the intended manner, two between subjects t-tests were performed. The first t-test checked the perception of victim typicality (e.g. the extent to which the participant believed the victim was typical). There was no significant main effect of victim typicality, \( t(110) = .72, p = .472, 95\% \text{ CI } [-.26, .56], \eta^2 = .14 \). Participants in the typical condition \((M = 6.11, SD = 0.96)\) did not perceive the victim as more typical than participants in the atypical condition \((M = 5.96 SD = 1.23)\). The second t-test checked whether participants in the typical condition perceived the victim to be a more typical woman than participants in the atypical condition, because it has been found to covary with the independent variable of victim typicality. There was also no significant main effect of gender typicality, \( t(110) = -1.69, p = .095, 95\% \text{ CI } [-1.01, 0.82], \eta^2 = .32 \). Participants in the typical condition \((M = 4.17, SD = 1.47)\) did not perceive the victim as behaving typically for their gender more so than participants in the atypical condition \((M = 4.63, SD = 1.37)\). Overall, this pattern of means suggests that the manipulations were not successful in affecting participants’ perceptions in the intended manner.

**Preliminary Analyses**

Preliminary analyses were conducted to examine the relationship between victim typicality, binding moral values, domestic violence myth acceptance and victim blame. First, the bivariate relationship between the variables was analysed. As can be seen in table 1, binding moral values and domestic violence myths were weakly positively correlated. The table also shows that domestic violence myths was moderately positively correlated with victim blame. Next, an independent groups t-test with bootstrapping was conducted with victim typicality and victim blame. It was identified that there was no significant difference in the extent to which participants in the typical condition \((M = 1.30 SD = .84)\) blamed the victim than the participants in the atypical condition \((M = 1.50, SD = 1.03)\), \( t(110) = 1.07, p = .288, \text{ CI } [-0.17, 0.56], \eta^2 = .21 \). After this, an independent groups t-test was conducted with victim typicality and binding moral values. The results of this test showed no significant difference in participants’ levels of binding values for participants in the typical condition \((M = 3.79 SD = 0.69)\) and participants in the atypical condition \((M = 3.74, SD = 0.78)\), \( t(110) = 0.34, p = .736, \text{ CI } [-0.23, 0.33], \eta^2 = .06 \). Lastly, a Pearson’s product-moment correlation was used to examine the relationships between binding moral values and victim blame. There was no significant correlation between levels of binding moral values and levels of victim blame unique variance to the model, with higher scores on the Domestic Violence Myths Acceptance Scale associated with higher levels of victim blame. Binding moral values and victim typical did not significantly explain any unique variance.

At step 2, the interaction between typicality and binding moral values did not significantly increase the amount of variance explained in victim blame, \( R^2_{\text{change}} = .00, F_{\text{change}} (1, 107) = 0.03, p = .863 \). This result does not show statistical support for binding moral values moderating the relationship between victim typicality and victim blame. The inclusion of the interaction term in the model resulted in the total model still significantly explaining 15% of the variance in victim blame, \( F(4, 107) = 4.72 \). As can be seen in table 2, domestic violence myths still significantly contributed 13% of unique variance to the model, however typicality and binding moral values did not explain any more significant variance.
Discussion

This study examined the effect of victim typicality and the observers’ moral values on victim blame in a case of intimate partner violence. Participants read a vignette depicting a case of intimate partner violence, between a husband (perpetrator) and wife (victim), in which the wife responded to her husband’s abuse in a way that was either typical (submissive) or atypical (aggressive). The participants then answered a series of questions designed to assess the level of blame they attributed to the victim, whether they held strong or weak binding moral values, and their acceptance of domestic violence myths. Based on the research of Capezza and Arriaga (2008), it was firstly predicted that participants would blame the victim more when they read about a victim who responded to the abuse in an atypical, compared to typical way, after controlling for domestic violence myths (Hypothesis 1). In addition to this, it was predicted that participants would blame the victim more when they scored higher, compared to lower, on measures of binding moral values, after controlling for participants’ endorsement of domestic violence myths (Hypothesis 2), consistent with the work of Niemi and Young (2016). However, it was predicted that the relationship between victim typicality and victim blame would be moderated by participants’ binding moral values. Specifically, participants would blame victims more when they read about a victim who responded to the abuse in an atypical, compared to typical way; however, this would occur to a greater extent at higher, compared to lower, levels of binding moral values after controlling for participants’ endorsement of domestic violence myths (Hypothesis 3). The results of the current study will be interpreted and discussed according to these hypotheses. The implications of the findings, strengths, limitations of the study will then be explored. Lastly, recommendations for future research will be discussed.

Interpretation

Victim Typicality. The published literature on victim behaviour shows that a submissive, or vulnerable victim of intimate partner violence, often garners less blame than a victim that actively defends themselves from their abuser. (Capezza & Arriaga, 2008; Witte, Schroeder, & Lohr, 2006; Yamawaki et al., 2012). This effect has been attributed to behaviours of the victim being inconsistent with Christie’s (1986) definition of an ideal victim, as a defensive victim portrays a sense of competence, suggesting they deserve equal responsibility for the outcome (Meyer, 2016). This has also been interpreted in terms of gender stereotypes, as women who exhibit aggressive behaviours do not tend to align with society’s concept of a typical female (Buzawa & Buzawa, 1993; Peters, 2008). Due to the prior research, the first hypothesis from the current study suggested that participants would blame the victim more when they exhibited atypical, versus typical, behaviours for a victim.

After conducting the analyses, it was found that the results did not support hypothesis 1. The results showed that participants in the atypical and typical conditions did not differ significantly on their attributions of blame to the hypothetical victim, with both attributing overall low levels of blame. Interestingly, the perceptual manipulation check for typicality revealed that participants did not even perceive the victim differently in the typical and atypical conditions. This result could provide explanations for why participants responded in the way they did. Firstly, this could be attributed to the language used in the hypothetical vignette. The vignettes written specifically for this study may have portrayed the victim as too much of a victim in both conditions. As can be seen in previous studies measuring the influence of language emphasis, when the focus of the text is primarily directed towards the perpetrator’s actions, observers are less likely to attribute blame to the victim (Niemi and Young, 2016, Young and Phillips, 2011). The hypothetical vignette used in this study was consistent in describing the perpetrator’s violent behaviours towards the victim, while mention of the victim focused primarily on their response, which was manipulated based on the condition. This focus on the perpetrator could have been enough to alter participants’ attributions of blame, and the victim response may not have been extreme enough to match the perpetrator’s in severity.

Another explanation for this result could be due to a change in societal attitudes towards victimisation since most of the research on victim typicality was conducted. While some depictions of victim (Christie,
1986) and even gender (Buzawa and Buzawa, 1993) typicality were originally published more than twenty years ago, others were more recent (Capezza and Arriaga, 2008; Witte et al., 2006). However, in recent years, domestic violence campaigns such as White Ribbon Australia, and the Australian Government’s ‘Violence Against Women’ have grown in awareness. More people may be changing their attitudes towards victim blame. Participants in this study could have been more inclined to believe the victim was less blameworthy in both conditions as education on domestic violence myths becomes more prevalent, and a wider range of victim responses are considered acceptable. It is important to note that this could also be linked to changing attitudes in gender stereotypes. As the perceptual manipulation also found that participants did not consider the victims in both conditions significantly different in gender typicality, this may suggest that the stereotype of a typical woman’s behaviour is still changing, and more participants believe the victim’s response to abuse was considered typical of a woman, regardless of how traditionally feminine her behaviour was.

**Binding Moral Values.** The existing literature on moral values has shown that individuals who identify more with binding values (loyalty, authority, sanctity) tend to blame victims of violence more than those who do not hold these values as strongly (Brewer, 2007; Capezza and Arriaga, 2008; Selterman and Koleva, 2015). It has been suggested that this effect could be due to focus. Individuals who value binding morals highly, are more accepting of retributive acts towards others who have violated these values (Brewer, 2007; Dovidio & Gaertner, 2010; Smith, Aquino, Koleva, & Graham, 2014), and focus on the behaviours of the victim that could have merited retaliation. In line with the prior research, the second hypothesis for the current study suggested that participants would blame the victim more when they scored high on measures of binding moral values, compared to when they scored low.

Analysis of the data revealed that the results did not support hypothesis 2. The standard deviation of responses revealed very little variation in scores beyond the mean, which around the midpoint of the scale, showed no trend of high or low binding moral values. This indicates that the obtained result may be primarily due to a lack of heterogeneity in the sample. The sample of participants recruited for the study heavily consisted of young first year psychology students, along with friends and family of the researchers. It is possible that due to similar fields of study, education level, age and geographical location, the moral values of participants were also alike. In some of the previous studies on moral values, participants were primarily recruited from the community, and paid to engage in the study (Niemi and Young, 2016; Selterman and Koleva, 2015). This may have provided the researchers with a sample consisting of a wider variation in moral values.

While binding moral values were unable to predict victim blame in the current study, it is interesting to note that binding moral values and domestic violence myth scores were significantly positively correlated. It is not difficult to recognize how the two variables may be positively correlated. Prior research has determined that individually, high scores on both of these variables can predict more victim blame, excusing the perpetrator and minimising the seriousness of the abuse (Peters, 2008; Policastro & Payne, 2013; Yamawaki et al., 2012). Although this correlation was weak, the significance may point to a potentially valuable relationship that would warrant further research.

**Strengths and Limitations**

**Strengths.** This study has some important strengths to note. Firstly, the use of domestic violence myths acceptance as a control variable was valuable. Domestic violence myth acceptance was the only significant predictor of victim blame in this study, and this reinforces the strong role these myths play when observers attribute blame in cases of intimate partner violence. Even though the sample of participants in this study was not very heterogeneous, domestic violence myths still proved to be a better predictor of blame than both victim typicality and binding moral values. This suggests that domestic violence myth acceptance is a crucial influence to consider when measuring levels of blame and may be a confounding variable if not controlled for.

Secondly, this study examined the effect of both victim and observer factors, which are important to investigate, particularly as societal attitudes change. Research over the
last thirty years has shown that both, factors relating to the victim and factors relating to the observer, are key influences in the formulation of a blame attribution. However, the results of this study suggest that what we thought, particularly about the ideal victim, may be shifting as our society evolves. Since the perceptual manipulation check from the current study found that participants viewed the victim in both conditions as typical, it could be suggested that society’s view of what constitutes an ideal victim may be broadening. It is important to continue studying characteristics of a victim that are more or less likely to attract attributions of blame, so that we may further unravel the causal factors involved in intimate partner violence blame.

Lastly, this study used pre-existing measures, which have been found to be both highly reliable and valid. Pre-existing scales were used to measure both binding moral values, and domestic violence myth acceptance, which made up a sizeable proportion of items in the questionnaire. This prevented many possible errors in designing the items specifically for the study, which could have negatively impacted on the results.

Limitations. While the study design did show some strength, there were also some important limitations. Firstly, the existing literature on victim typicality was heavily based in theory and there were only a limited number of experimental designs aimed to test the effects of victim typicality on attributions of blame. Many of the studies on factors pertaining to the victim were also closely linked with gender stereotypes. Although gender stereotypes can be closely linked to the concept of an ideal victim, it is difficult to pinpoint the exact cause of the results on victim blame when the two concepts are studied in conjunction. To overcome this limitation, more research needs to focus on experimentally manipulating the typicality of the victim, as opposed to their gender stereotypes. This would involve creating manipulations, which have no gender determining language. Instead of terms such as husband or wife, the hypothetical individuals may be described with other words, such as a defendant and plaintiff if the study were court focused, or by using gender neutral names such as Sam or Alex.

Secondly, the wording of the vignette used in this study may have limited the results that could be found due to other reasons, as well as gender determinants. Due to recognised influences of language use in the text (Niemi and Young, 2016, Young and Phillips, 2011), the format of the vignette may have put too much emphasis on the actions of the perpetrator and directed the focus away from the victim. This may have impacted the possible effects of manipulating victim response. The responses may not have been significant enough to draw attention back to the victim’s behaviour, and depict the atypical victim as relatively equal to the perpetrator in terms of competence and assertiveness. If this study were to be replicated the vignette would need to be restructured to increase the severity of the victim’s response in the atypical condition to match that of the perpetrator’s.

Lastly, it is important to note that this study may have needed more power to detect an effect. The recruited sample was only large enough to detect a medium effect of victim blame, and any effect that this study may have found could have been small. It may be useful to reconduct the experiment with a larger sample in an attempt to identify any smaller effects that may have gone unnoticed.

Implications

If this research were to be redone with the methodology improved to minimise the limiting effects, and the hypothesised effects were found, there would be multiple important implications for society. Firstly, finding an interaction between victim typicality and moral values would further advance the scientific literature on intimate partner violence so that we may have a better understanding of the influential factors contributing to victim blame in these circumstances. While a lot of the research on victim blame is focused around random sexual assaults, there is less published work on how blame is attributed in physical and psychological assault cases of intimate partner violence. Physical and psychological assaults, particularly in the home environment, may be less clearly defined in terms of victim and perpetrator. When instances of abuse occur in the privacy of a home, judgements of causality may be left up to an observer’s personal bias or belief in domestic violence myths. By experimentally evaluating the factors involved in attributions of blame, we may begin to identify the significant role that personal beliefs play. This may become particularly
influential for court cases of intimate partner violence, as legal professionals may begin to identify traits of a victim in these cases that may lead to juror bias.

Another important implication for significant findings would be more focus on providing access to domestic violence resources. By furthering the literature on attributions of blame in these cases, public knowledge of blame biases may increase, with changes to be seen at both the corporate and individual levels. Domestic violence foundations and the Australian government may use this extended knowledge to promote awareness of blame bias, and begin to make changes towards the discussion of domestic abuse. This would in turn, influence the perceptions of the general population who have the ability to make changes by themselves. People may begin to question other’s judgements on victims, and perhaps even be motivated to extend a helping hand to friends or acquaintances who are involved in abusive relationships.

**Future Research**

While the concept of victim typicality and moral values in combination is a new and interesting way to research attributions of victim blame, there are diverse ways for future research to investigate it, which may provide some clearer answers. One important direction for future research is to disentangle gender from victim typicality. The perceptual manipulation results of the current study reinforced how these variables may be interpreted in similar ways. This makes it important to design research which may investigate victim typicality while controlling for the effect of gender stereotypes if we are to truly understand the key characteristics that our society considers a victim to hold, if they are to be given the label of a victim. Another avenue for future research would be to investigate the flip side of binding values; individualising moral values. While prior research has shown that binding moral values can predict higher levels of blame, there has not been sufficient investigation into the effect of individualising values on blame. If binding values are significant predictors of blame, then it would be expected that individualising values would also be significant predictors, but predicting less, rather than more, blame. If significant evidence were to be found for both value sets as predictors of blame, then it would reinforce the existing literature on the effects of moral values on blame attributions. While focusing on the influence of moral values, it would also be valuable to further investigate the positive correlation found between binding moral values and domestic violence myth acceptance in the current study. If this positive correlation can be replicated in future research, it may provide further insight into the mechanisms behind binding moral value adherence and victim blame. Lastly, when investigating the influences of victim typicality and moral values it may also be interesting to examine the effects among different cultures around the world. While the sample in this current study were primarily young psychology students residing in Australia, it may be interesting to replicate the design with a different sample from a more liberal or alternatively, a more conservative culture. Investigating the effects of victim typicality and moral values in various cultures may produce significantly different results depending on their level of education on, and acceptance of, intimate partner violence in their societies. Regardless of the study design, it is important to continue studying the factors that influence attributions of victim blame in cases of intimate partner violence. By doing so, the scientific community may begin to resolve the current conflict in the literature, and as a society, we may begin to increase the awareness of bias and myths, along with providing more support and resources for victims to escape abusive environments.

**References**


Blackman, J. (1990). Emerging images of severely battered women and the criminal justice


Appendix A.
Vignette for Typical Condition.
Rebecca and Neil are an Australian woman and man who are currently living in Australia. They chose to get married, and they got married on 20th January, 2013. Three months into their marriage, Neil started to display controlling behaviours. He would read Rebecca’s text messages from her friends, and always ask her who she was talking to on the phone. He would often listen to her telephone conversations. He then told her that he didn’t want her to spend time with her friends, because he didn’t like them. Eventually, he told her she wasn’t allowed to talk on the phone with anyone or visit anyone, unless they were family. A year into their marriage, Neil told Rebecca she was no longer allowed to take the bus for transport and that she was only allowed to leave the house if he drove her. Rebecca never questioned Neil’s decisions.

From that point on, Neil would get angry with her most days for something she did or didn’t do. It was always over small things. If she served his dinner a few minutes late, he would yell at her, telling her how useless she was as a wife. If she entered the room when he had friends over, he would yell at her for her lack of manners, telling her she had no respect for him or his friends. Rebecca never yelled back at Neil.

Then one day, Rebecca moved Neil’s car keys, from the table in the lounge room, to hang them on the wall with the house keys. When Neil couldn’t find his keys, he got so angry that he hit Rebecca across the face. Rebecca did not fight back.

Over the next six months, Neil’s controlling behaviour and verbal abuse continued, and he hit Rebecca another three times. Rebecca never protested against Neil’s decisions, yelled at him, or fought back. Even though Neil’s abuse continued during this time, it did not escalate.

But then one day, at the end of this six-month period, Neil’s abuse intensified. Rebecca was tidying Neil’s clothes and belongings in the bedroom. Neil came into the bedroom and saw her touching his belongings. He got so angry that he pushed her into the wall so hard that her head punctured the wall. She fell to the floor and her head was bleeding. When she tried to stand up, he put his hands around her throat and tried to strangle her. She eventually lost consciousness. When she regained consciousness, she walked downstairs to clean the wound on her head.

Appendix B.
Vignette for Atypical Condition
Rebecca and Neil are an Australian woman and man who are currently living in Australia. They chose to get married, and they got married on 20th January, 2013. Three months into their marriage, Neil started to display controlling behaviours. He would read Rebecca’s text messages from her friends, and always ask her who she was talking to on the phone. He would often listen to her telephone conversations. He then told her that he didn’t want her to spend time with her friends, because he didn’t like them. Eventually, he told her she wasn’t allowed to talk on the phone with anyone or visit anyone, unless they were family. A year into their marriage, Neil told Rebecca she was no longer allowed to take the bus for transport and that she was only allowed to leave the house if he drove her. Rebecca always protested against Neil’s decisions, telling him that she would do whatever she wanted.

From that point on, Neil would get angry with her most days for something she did or didn’t do. It was always over small things. If she served his dinner a few minutes late, he would yell at her, telling her how useless she was as a wife. If she entered the room when he had friends over, he would yell at her for her lack of manners, telling her she had no respect for him or his friends. Rebecca always yelled back at Neil, telling him that he’s a worthless husband.

Then one day, Rebecca moved Neil’s car keys, from the table in the lounge room, to hang them on the wall with the house keys. When Neil couldn’t find his keys, he got so angry that he hit Rebecca across the face. Rebecca fought back by pushing Neil against a wall.

Over the next six months, Neil’s controlling behaviour and verbal abuse continued, and he hit Rebecca another three times. Rebecca continued to protest against Neil’s decisions, yell at him and fight back. Even though Neil’s abuse continued during this time, it did not escalate.
But then one day, at the end of this six-month period, Neil’s abuse intensified. Rebecca was tidying Neil’s clothes and belongings in the bedroom. Neil came into the bedroom and saw her touching his belongings. He got so angry that he pushed her into the wall so hard that her head punctured the wall. She fell to the floor and her head was bleeding. When she tried to stand up, he put his hands around her throat and tried to strangle her. She eventually lost consciousness. When she regained consciousness, she walked downstairs to clean the wound on her head.

Table 1.
Means, Standard Deviations and Bivariate Correlations between the independent variable, moderator, control and dependant measure.

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<td>2. BMV</td>
<td>3.77 (.73)</td>
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<td>-</td>
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<td>3. DVM</td>
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<td>4. Blame</td>
<td>1.42 (.96)</td>
<td>-.12</td>
<td>.02</td>
<td>.38**</td>
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*Note: DVM = Domestic Violence Myths. BMV = Binding Moral Values. DMV was measured on the Domestic Violence Myths Acceptance Scale with higher scores representing more domestic violence myth acceptance. BMV was measured on the Moral Values Questionnaire with higher scores on binding measures representing higher binding moral values. Victim typicality was coded as 0 = typical, 1 = atypical. *p < .05, **p < .001.

Table 2
Coefficients for B and β, SE and t, p and sr², values for victim typicality, domestic violence myths and binding moral values when predicting victim blame.

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<th>b</th>
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**Step 2**

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*Note. DVM = Domestic Violence Myths. BMV = Binding Moral Values. DMV was measured on the Domestic Violence Myths Acceptance Scale with higher scores representing more domestic violence myth acceptance. BMV was measured on the Moral Values Questionnaire with higher scores on binding measures representing higher binding moral values. Victim typicality was coded as 0 = typical, 1 = atypical. *p < .001.*
The Relationship Between Attention and the Negativity Bias in Memory
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ABSTRACT. Humans are more likely to attend to and recall emotionally salient events. Among emotional events, people are more likely to remember negative over positive or neutral events. They are also more likely to attend to a stimulus with a negative or threatening valence. This tendency is advantageous as it can alter the way in which people recognize and avoid threatening situations. Individuals are better at attending to and recalling negative feedback; this is reflective of their desire to be accepted socially. Negative stimuli are less common in everyday; the negativity bias in attention and memory is partially explained by the distinctiveness of negative events. In this review, I propose that negativity biases in memory are the result of negativity biases in attention.
Key Words: Attention, Memory, Negativity Bias

When we remember events from our past, each memory is remembered with varying amounts of detail. For some memories, we can recall vivid details about where we were, who we were with, what was said, how we felt, or even what color shirt a person might have been wearing. For other memories, our recollection is hazy, we may remember that we attended an event but not be able to recall who was there or what was discussed. You may not remember what you had for breakfast today but you may be able to recall what you ate at a dinner party one month ago.

Emotionally based events are recalled easier and with more detail than events without any emotional significance. The same is true for emotional stimuli, as emotional words are recalled more accurately than neutral ones (Mickley & Kensinger, 2008). Emotional information and memories are processed in a way that is distinct from how neutral information is processed. This is exemplified by an increased activation of the amygdala, an area of the brain associated with the processing of threatening and emotional stimuli and fear as well as in the encoding and retrieval of memories of emotional stimuli (Phelps & LeDoux, 2005). Furthermore, individuals with damage to the amygdala are likely to forget emotional and neutral stimuli equally.

In addition to emotionality itself, the valence of an emotional memory has an impact on the likelihood that the memory will be encoded and recalled. Researchers have noted a negativity bias in people’s recollection of events. When it comes to specific circumstances and details, studies have shown that people are better at recalling negative events rather than positive ones (Boals et al., 2014). For example, we may be better at remembering the details surrounding an occasion when we were insulted than when we were complimented. The process of both encoding and retrieval of memories of negative events involves more activity in sensory areas of the brain than positive events (Mickley & Kensinger, 2008). It is more likely that an individual will remember negative feedback as opposed to positive feedback. This negativity bias can be beneficial. People are more likely to recognize and remember threatening stimuli than neutral stimuli in addition to being more likely to remember the negative behaviors of others. Being able to quickly recognize threatening situations allows an individual to promptly avoid the situation; therefore, increasing their chance of survival. The ability to expedite our acknowledgement of a threatening situation is reinforced by our memories of similar threatening events in our past. Understanding this negativity bias is particularly important as people are being more frequently exposed to negative events and images through television.
and social media. When a negative event such as a terrorist attack or major scandal occurs, details and images of the event are presented repetitively throughout media. It is necessary that we are able to understand the mechanisms behind the negativity bias, in order to mitigate any detrimental effects of the increase in exposure to negative events.

The negativity bias in emotion has been speculated to be the result of a tendency to attend to negative/threatening emotional stimuli. Attention is a cognitive resource which involves prioritizing the processing of certain stimuli while ignoring other information in a person’s environment (Anderson, 1990). Attention has a limited capacity, meaning that we are unable to perceive every stimulus in our environment simultaneously. For example, if we are performing two demanding tasks concurrently, it is more difficult to perform as well on both tasks than if we were to perform each task individually. The reason it becomes difficult to attend to multiple tasks is that each task requires the use of additional attentional resources which reflect the amount of our limited attentional capacity used in the completion of a task and the perception of an environmental stimulus. When we become more accustomed to performing a task or recognizing a stimulus through practice, it can become automatic. When a task becomes automatic, it can be performed without the use of attentional resources; tasks that require the active use of attentional resources are considered to be controlled, requiring conscious awareness (Shiffrin & Schneider, 1977). Encoding is the process by which we learn information perceived through attention so that it can be stored in our long-term memories. Retrieval is the process in which we access these memories. In short, attention plays a significant role in the memory processes.

People have an innate desire for social inclusion and wish to gain acceptance within their community. Despite their relative infrequency, negative interactions shape the way in which people behave as they are an indicator that something they had done did not result in the desired outcome. For this reason, people spend more time looking at negative feedback over positive feedback, they are more likely to attend to faces expressing negative emotion, and they are more likely to pay attention to threatening situations (Huang et al., 2017). Individuals prioritize emotional stimuli, with a particular focus on negative stimuli, yet researchers have yet to come to a consensus on whether attention is required for emotional processing (Pessoa et al., 2002b). Some argue that certain emotional stimuli can be processed automatically while others argue that attentional resources are required to process emotional stimuli (Vuilleumier et al., 2001; Pessoa et al., 2002a). In this paper, I will argue that individuals are better at remembering the details of negative events over positive events as a result of a negativity bias in attention.

**Emotion and Attentional Resources**

Emotional stimuli are processed faster than neutral stimuli and among emotional stimuli, negative emotional stimuli are processed fastest. Emotional processing refers to a person’s ability to recognize and comprehend the magnitude of the valence of an emotionally salient stimulus. Vuilleumier et al. (2001), found that the sight of emotional faces activates the amygdala regardless of whether participants intended to focus on them or was consciously aware of their presence. Because emotional stimuli are processed before non-emotional stimuli, an argument can be made that emotional stimuli are processed preattentively (Vuilleumier et al., 2001). This concept of a preattentive priority in the processing of emotional stimuli has led to much debate over the relationship between attentional mechanisms and the processing of emotional stimuli.

A consensus has yet to emerge among researchers regarding whether or not emotional processing even requires attentional resources. In one camp, researchers argue that the processing of emotional stimuli is independent of attentional awareness. In the other camp, researchers argue that the processing of emotional stimuli is dependent on the availability of attentional resources. Past research has not been able to clarify whether or not attentional resources are required for emotional processing as research on emotion and attention can be interpreted as providing evidence for both arguments.

In the process of attention, stimuli compete for use of attentional resources; 


person is unable to pay attention to every stimulus in their environment as once all attentional resources are being used, additional stimuli cannot be processed. Thus, a person’s ability to focus on an object is dependent on their perceptual load, which refers to the amount of attentional resources currently being used by an individual (Lavie, 1995). Since emotional stimuli are preferentially processed, the relationship between attentional mechanisms and emotional processing is difficult to determine. Pessoa et al. (2002) attempted to elucidate the connection between attentional resources and emotional processing. They presented the image of faces either expressing happy, fearful or neutral emotions with bars of varying orientations at the top corners of the screen. Participants were separated into either an attentive condition where they were asked to look at the facial expression and identify if the face was male or female, or the inattentive condition where they were asked to look at and describe the orientation of the bars. They measured participants’ neural functioning using fMRI while they observed the visual stimuli. What they found was that emotional faces were only attended to when enough attentional resources were available as areas involved with emotional processing were significantly more active for participants in the attentive condition. This corresponded to a decrease in the amygdala activity associated with emotional stimuli, particularly the difference in activity corresponding to the valence of the emotional face. Thus the valence and impact of emotional stimuli is not processed when there is not a sufficient amount of attentional I resources available. The processing of emotional stimuli at least to some degree depends on the availability of attentional resources.

Processing Negative Emotional Events

The process of memory formation and recall is dependent on attention. When humans are less focused on a stimulus during encoding, they are less likely to be able to recall it later on, than if they were fully focused on the stimulus during encoding (Craik et al., 1996). The initial stage of forming an episodic memory is encoding, where information is initially learned. Following encoding, information will be stored so that it can be accessed during retrieval when the information is needed. The processes involved in the formation of episodic memories are impacted by the emotionality of an event (Phelps, 2006). Emotional memories are recalled more readily and with more accuracy than events with no emotional significance. Phelps and LeDoux (2005) found that emotional processing is characterized by an increase in amygdalar activity, providing evidence that emotional memories are encoded and recalled differently than neutral memories.

Among emotional memories, events surrounding negative emotions and moods are processed differently from positive or neutral events. The affect of an individual during an event can be induced by the valence of the stimuli around them and their emotion can shape what information they process from their environment. People are more likely to recall emotional words than neutral ones; this effect is even more significant for negative emotional words than positive ones (Dewhurst & Parry, 2000).

Visual stimuli can be processed both locally, based on their specific details, and globally, based on their holistic structure. Gasper and Clore (2002) proposed that individuals in sad moods were more likely to process information locally and individuals in positive moods were more likely to process information globally. In order to test this, participants were assigned to one of three groups where they were asked to write about an experience that was either negative, positive, or neutral. Participants in the negative condition reported that they experienced greater levels of sadness after completing the writing task and participants in the positive condition reported a happy mood after completing the writing task. Following the writing task, participants were asked to rate whether a target object was more like an object that had the same global features but different local features or one that has the same local features but different global features. Participants in the negative condition were more likely to match the objects based on local features than participants in the positive condition. Their results indicated that when processing stimuli, individuals in a negative emotional state are more attentive to specific details while individuals in positive emotional.
state focus on more general details which can impact the information they are able to remember.

The impact of valence on the type of information that is attended to and processed can explain why there is a difference between how well people can recall positive and negative events. This difference in processing is not only behaviorally apparent as negative emotional events are processed differently in the brain. In some areas of the brain, neural activity is correlated to the processing of various emotions, the processing of positive, negative and neutral stimuli are also correlated to activity in differing regions of the brain. Mickley and Kensinger (2008) explored the neural correlates of encoding and remembering negative vs. positive emotional stimuli. They showed participants images and words that were associated with either a negative, positive, or neutral emotional valence. Then participants were scanned using functional magnetic resonance imaging (fMRI) as they were shown these images and words. Lastly, 30-minutes after being exposed to the stimuli, participants completed a surprise recognition task and were asked whether they remember the stimuli vividly or familiarly. Negative stimuli were remembered more vividly than positive or neutral stimuli. Furthermore, they found that increased activity in certain temporo-occipital sensory processing regions occurred when negative stimuli were remembered, suggesting that negative experiences are remembered differently. Thus, negative information is remembered more vividly because sensory information is processed and attended to, to a greater extent during negative events.

**Survival and Recognition of Threat**

Though the experience of focusing on and remembering negative emotional stimuli is unpleasant, a negativity bias in attention and memory is advantageous in certain situations. This is because having a negativity bias in attention and memory may be evolutionarily beneficial. The increased likelihood of remembering negative events is useful as it can encourage the recognition of threats in order to avoid them and therefore improve survivability. Attending to and recognizing a potentially threatening stimulus is necessary for survival as one a threatening stimulus has been detected, it can be avoided. Therefore, it is important that humans are able to prioritize threatening stimuli. People are faster and more efficient at detecting angry faces in a crowd over faces with neutral expressions or other emotions (Hansen & Hansen, 2012). Thus our brains naturally prioritize the processing of angry faces, and this is beneficial because irate individuals are more likely to behave in a threatening way toward others.

Since we prioritize the processing of angry faces, we are more likely to encode the specific attributes indicative of the threatening emotion. When people are more attentive to negative events, they are more likely to be able to recall them at a later time. The ability to remember a threatening event allows people to utilize that memory in order to recognize the warning signs, when a future event has the potential to become dangerous.

Age contributes to the way in which negative memories are attended to, reflected on and recalled. Older adults are better at regulating their emotions (St. Jacques, 2009. When examining the difference between how younger adults view their negative memories in comparison with older adults, Boals et al. (2014) found a discrepancy between the two age categories. They asked participants to recollect negative memories and to subsequently complete a questionnaire. When comparing the responses of the two groups, they found that, when reflecting on negative autobiographical events, older adults experienced less of an emotional response, and significantly less negative emotions associated with the event. Their results support the idea that older adults develop more emotionally adaptive ways of handling negative emotions. Results from functional neuroimaging studies suggest that older adults process and remember negative emotional events differently from younger individuals. Older adults are less likely to remember negative stimuli. St. Jacques et al. (2009) found that when viewing and recalling negative pictures, older adults showed more activity in the right amygdala and young adults showed more activity in the left amygdala. When compared with young adults, older adults showed differing activity in areas of the brain.
associated with memory. The age difference in neural activity can explain why older adults are better at regulating emotions and worse at remembering negative stimuli.

The diminished effect of the negativity bias seen in older adults may be emotionally adaptive, just as a negativity bias in younger individuals may also be adaptive as they are developing the knowledge required for survival and threat avoidance. The ability to attend to and respond to threat may become more automatic with practice and therefore there is less of a need for the negativity bias. Balthazar et al. (2012) explored whether children have a better memory for threatening social interactions. They showed young children pictures of people described as mean or nice; nice individuals were described as doing something helpful while mean individuals were described as behaving in a threatening manner. Their results indicated that children are more likely to remember the faces of threatening individuals and the specific details of their threatening actions. Children may have a more significant tendency toward the negativity bias as they are still acquiring knowledge that will be useful for detecting threats. This could explain why the negativity bias in attention is more prominent in children than older adults as this bias can be important in shaping their capacity to detect and respond to unexpected threatening stimuli. This ability becomes more automatic, requiring less attentional resources and awareness as people age.

The way in which one processes and remembers past events can shape how they respond to events in the future. With regard to negative emotional events, this means that they have a memory of how a potentially dangerous negative event was dealt with and what actions either helped or not. Being able to recall beneficial actions or avoid other actions will shape how an individual respond to similar events in the future. Therefore, it is advantageous to have a better memory for how negative events are handled, as a memory for how neutral or positive emotional events were dealt with is less likely to have the same impact on survivability. Additionally, the amount of attention paid to a threatening stimulus improves the likelihood that it will be remembered. Thus, the increased priority of attentional resources on threatening stimuli is evolutionarily beneficial.

Social Belongingness

A desire to be socially accepted can be evolutionarily beneficial. If a person is able to form more lasting emotional bonds with others, they are more likely to secure a mate, obtain communal resources, and receive assistance when threats are present (Baumeister and Leary, 1995). An individual’s responses to another person’s affective state can impact how they are viewed by others. For example, if you were to insult someone who was already distressed, that person and the people around you will not want to accept you into their social group. In contrast, if you were to comfort that person, others would be more likely to include you and offer resources to you (Rofe, 1985).

Not only can a negativity bias in attention and memory improve a person’s physical survivability, it can also improve their likelihood of achieving social acceptance. Having a better memory for negative events can influence an individual’s relationship to others and their perception of their social environment. Attending to the negative expressions and actions of others can alter how they act in response to negative facial expressions in order to improve the situation. By responding to the negative emotions of others, individuals are able to develop more positive relationships and increase their sense of belongingness within their social environment (Baumeister & Leary, 1995).

Social belongingness refers to the extent to which a person feels that they are accepted by other individuals and the quality and depth of their interpersonal relationships. Proponents of the belongingness hypothesis argue that in social situations, human beings act in response to a fundamental need for belongingness (Baumeister & Leary, 1995). In the absence of social acceptance, an individual may face many emotional consequences. When a person experiences a perceived sense of social exclusion corresponds to increased feelings of jealousy, depression, social anxiety and loneliness (Leary, 1990). Thus it is important for an individual to obtain a sense of belongingness in order to thrive socially.
An individual’s response to someone’s negative emotions can have an impact on the way others view them. Responding in an appropriate and supportive way to an individual’s negative emotions can deepen the quality of their interpersonal relationships. If someone were sad, then we could strengthen our relationship with them by comforting them and if someone’s negative emotion was rage, we could recognize this and know to avoid them so that we do not damage the relationship with them. Thus, people may be more likely to recognize the emotions of others in order to respond to them when the emotion is negative as opposed to when it is positive or neutral.

The negativity bias for emotional stimuli is particularly salient with facial stimuli. Lagattuta and Hansen (2017), explored whether children and/or adults prioritize attending to negative faces. In their experiment, participants were asked in the first task to look at the faces on a screen; on the screen were multiple faces expressing either positive, negative, or neutral emotions. In the second task, participants were instructed to focus on the happy face. During each of the tasks, they used eye-tracking to monitor which faces participants were attending to. They found that both adults and children are most likely to attend to faces expressing negative emotion first. Both adults and children are more likely to first attend to emotional faces before neutral faces. These results suggest that people are more attentive to the negative emotions of others. This additional focus and prioritization of negative facial stimuli increases the likelihood that people will have a better memory for the negative emotions of others.

Much of the tendency to focus on the negative emotions of others may be attributed to an innate desire to please others. People are motivated by the experience of being liked and they find it rewarding to be socially included (Davey et al., 2010). The idea of disappointing or being viewed negatively by someone else is notably unpleasant. For this reason, Huang et al., (2017) investigated the relationship between attention, memory, and negative vs. positive feedback. They used eye-tracking technology to measure how long people looked at positive and negative feedback, when feedback was provided for task performance. Additionally, they had participants recall the feedback they received. Their results showed that participants spent more time focusing on negative feedback and less time focusing on positive feedback. They also found that participants were able to recall more specific details about negative feedback than specific details about positive feedback. Participants were likely able to remember more details about negative feedback because they spent more time attending to negative feedback.

It makes sense that we would attend to and remember negative feedback more than positive feedback as negative feedback is more constructive on shaping how we go about tasks or activities in the future. For example, if I was walking down the street and one person compliments my shirt and another person insults my shirt because they feel that the style is not flattering, I would be more inclined to view the shirt as unflattering and might choose not to wear it in the future. When something about a person or something they do is not well-received, they are more inclined to change their behavior as people tend to prefer to be viewed positively by others in order to obtain a sense of belongingness in within their community. Therefore, the memory of that negative feedback is more detailed than memories of positive feedback as it can impact how people view themselves in relation to their social environment along with their sense of social inclusion.

The desire for social inclusion can explain why we are more likely to attend to and therefore remember negative events. We are more likely to attend to the faces of others if they are expressing negative emotions. If we see someone in distress we can improve our interpersonal relationship with them by comforting them and if they are angry we can avoid damaging our interpersonal relationship with them by avoiding them. Much of our attention is driven towards emotional stimuli as our response to these stimuli can shape our feelings of belongingness in a social environment. This is why people are more attentive to negative feedback in comparison with positive feedback, as we strive to be liked by others.

Positive is Common
An individual’s increased ability to recall specific details of negative social events may be associated with the theory that positive social interactions may tend to be much more commonplace than negative social interactions (Graf et al., 2014). Negative social interactions and negative stimuli are infrequent in the lives of most people, because of this, they are able to attract our attention and stand out when people experience them. An example of this is Graf et al.’s (2014) study of the relationship between intergroup contact and outgroup attitudes in relation to the frequency of positive and negative interactions. They administered a questionnaire to individuals of various nationalities in Central Europe asking about their interactions with people from other countries. They found that participants reported positive intergroup interactions as occurring three times more than negative intergroup interactions. Additionally, they found that the less frequent negative interactions were more instrumental in shaping outgroup attitudes. These results indicate that although positive interactions are more commonplace, it is negative interactions that are more likely to alter how an individual may perceive their environment and act based on that perception.

Individuals are better at remembering stimuli that are distinct. Over time we are more likely to remember events that are unusual rather than events that occur frequently in our daily lives. Schacter et al. (1998) explored whether memory accuracy was improved or hindered by the similarity of stimuli and if the effect could be altered by encoding similar stimuli through distinct features. They instructed participants to familiarize themselves with a set of either word or picture stimuli. After a delay, they asked participants to state whether they were exposed to a word or picture using a list of stimuli that combined those which they were originally shown along with a set of lure stimuli that were either related or unrelated to the original set. They found that participants were more likely to falsely recognize a lure stimulus if it was semantically related to stimuli they had previously been exposed to than lure stimulus that was distinct from the original stimuli. Therefore, the distinctiveness of a stimuli can improve the accuracy of recall and therefore the memory of an experience is strengthened by the distinctiveness of the event in relation to everyday experiences. As negative experiences are distinct from everyday events, they capture our attention and are more likely to be remembered.

Conclusion

Human beings are more likely to remember the specific details of negative events from their past and hold less detailed memories for positive and neutral events. This negativity bias in memory can be attributed to an attentional preference for negative stimuli. When stimuli are attended to, they are more likely to be encoded and stored in long-term memory. The emotional processing mechanism of an event differs depending on the valence of environmental stimuli. When we have experienced negative events, we are more likely to remember specific, local details of the event. Additionally, the activity levels in various brain regions vary based on the valence of an observed stimulus. Negative stimuli are attended to a greater extent than positive or neutral stimuli during encoding, thus our memory for them can be more detailed. This is evolutionarily beneficial as being able to retrieve and attend to specific details of a threatening situation can allow us to better respond to and avoid them in the future.

How we respond to negative emotional situations can determine the level of social acceptance a person receives. An appropriate response to the negative emotions of others can facilitate a deeper connection in social relationships. Furthermore, negative emotional stimuli tend to be less commonplace, making their presence distinct, allowing them to stand out amongst other memories. Future research should address the connection between the negativity bias in attention and memory and an individual's perceptions of life events, in addition to ways to overcome this negativity bias when it may not be beneficial.

The negativity biases in attention and memory are particularly important to understand as people are being more frequently exposed to negative events through television and social media. When major negative events, such as terrorist attacks, occur, images of the event and aftermath are scattered throughout media. Many
people find themselves repetitively exposed to negative events, such as the videos of planes crashing into the world trade center during the 9/11 attacks or the audio recordings of the 911 emergency calls from the Columbine High School Massacre, increasing the salience of their memory for the event. The repeated exposure to these images can create a sense of an impending threat, resulting in behavioral changes, as seen in the integration of lockdown drills in schools following the Newtown Shooting (Trevelyan, 2014).

Many people actively choose to expose themselves to negative images, they share posts about negative events with their social media followers or choose to watch documentaries about serial killers or natural disasters. The negativity bias in attention can explain why people struggle to avoid looking at negative stimuli such as car accidents despite the unpleasant emotions they elicit. Future research should address the effect of the increase in exposure to negative events, how knowledge of the mechanisms behind the negativity bias in attention and memory can be used to counter the effects of repeated exposure to negative stimuli, and whether there is a difference in this negativity bias in individuals who choose to experience negative events.

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The Relationship between Biculturalism and Mental Health Outcomes among College-bound Latino Adolescents

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ABSTRACT. Cultural beliefs and behaviors can serve as both risk and protective processes for Latino adolescents, with some recent empirical work suggesting the important protective role of bicultural values (e.g., endorsing high levels of both mainstream culture and culture of origin). We expanded on past research to explore whether bicultural values were associated with internalizing (depressive, anxiety, stress) symptoms and externalizing (alcohol use) symptoms among a sample of Latino adolescents preparing to begin college. We hypothesized biculturalism to protect against all negative outcomes. Our sample consisted of 209 college-bound Latino adolescents (65% female; 85.1% Mexican descent; 10.6% 1st generation, 62% 2nd generation) who were enrolled in university for the coming fall. All multivariate models included sex, ethnicity, parent education, and immigrant generation status as covariates. Correlations and multivariate analyses revealed that higher bicultural values were associated with lower depressive symptoms, lower anxiety symptoms, lower stress, and greater alcohol use. Gender was shown to moderate the relationship between biculturalism and alcohol use. Overall, findings suggested that greater bicultural values were associated with lower endorsement of internalizing symptoms for all participants, but higher endorsement of alcohol use over the last year for the highly bicultural females. Biculturalism may be particularly protective for Latino adolescents who are preparing to attend college given the need for them to transition into an environment with high acculturative demands. However, our results also highlight that these bicultural females may be at greater risk for alcohol use and related problems.
According to the Pew Research Center, the Latino population constitutes about 18% of the total United States population and is the second fastest growing ethnic group (Flores, 2017). This has led to a dramatic increase in research on cultural factors affecting the mental health of this population. Psychological research is shifting to explore links between cultural adaptation and mental health outcomes (Gonzales, Jenson, Montano, & Wynne, 2015). Latino adolescents are of particular interest, because adolescence is already a developmental period characterized by drastic changes, newfound independence, and consequential mental health impacts. During adolescence, and especially during the transition to college, individuals are exploring their identity development and are beginning to make their own decisions about health behaviors (World Health Organization, 2005).

Some studies have shown that Latino adolescents are at increased risk for negative mental health outcomes. Latino adolescents, compared to their non-Latino peers, were at higher risk for developing a mood disorder (including depression and anxiety; Anderson & Mayes, 2010; Glover, Pumariega, Holzer, Wise, & Rodriguez, 1999; Siegel, Aneshensel, Taub, Cantwell, & Driscoll, 1998). Some studies have also shown that Latino youth were also more likely to report higher rates of alcohol and drug use than their White peers (Cheref, Lane, Polanco-Roman, Gadol, & Miranda, 2014; Johnston, O'Malley, Bachman, & Schulenberg, 2010; Swendsen et al., 2012; Venegas, Cooper, Naylor, Hanson, & Blow, 2012). However, other studies have found Latino adolescents to demonstrate lower rates of negative mental health outcomes compared with other racial groups (Alegria, Vallas, & Pumariega, 2010; Blum, Beuhring, Shew, Bearinger, Sieving, & Resnick, 2000).

Understanding the sociocultural context and cultural values may be particularly important when examining Latino adolescent development. In order to understand Latino adolescents’ sociocultural context, we need to understand whether there are components of their environment that serve as protective factors or risk factors for mental health outcomes. These cultural factors may help explain developmental processes and outcomes for Latino youth, and ethnic minority youth more broadly (Garcia Coll, Akerman, & Cicchetti, 2000).

Much past research has focused on the role of acculturation and enculturation in the development and well-being of Latino youth. Acculturation includes the learning of U.S. values, norms, and culture, while enculturation involves the retention of traits from the original culture (Berry, 2003). Some studies have linked processes of acculturation with poor mental health outcomes in Latino populations, and particularly for Latino adolescents. Acculturation has been linked to depressive and anxiety symptoms, specifically within Latino college students (French & Chavez, 2010; Huynh, Devos, & Dunbar, 2012; Hwang & Goto, 2008; Lorenzo-Blanco, Unger, Baezconde-Garbanati, Ritt-Olson, & Soto, 2012). Studies have also linked higher rates of acculturation to higher rates of substance use (Brook, Whiteman, Balka, Win, & Gursen, 1998; Felix-Ortiz & Newcomb, 1995; Gil, 2000; Perez & Padilla, 1980; Vega, Gil, & Zimmerman, 1993). This link between acculturation and substance use was demonstrated with Puerto Rican, Cuban American, and Mexican American adolescents (Brook et al., 1998; Perez & Padilla, 1980; Vega et al., 1993). The two factors were positively related from early through late adolescence (Brook et al., 1998; Vega et al., 1993). The correlation between acculturation and substance use included more frequent alcohol and drug use, use of greater quantities, higher rates of lifetime use, and use of more serious substances (Felix-Ortiz & Newcomb, 1995; Vega et al., 1993).

However, research findings have not always been consistent. For example, low levels of integration with mainstream culture have also been associated with poor mental health. Vega et al. (1995) found lower levels of acculturation in U.S. born Latino adolescents was associated with the highest levels of substance use. This could be due to additional stress caused by lack of integration with U.S. culture. Other researchers have found no association between acculturation and well-being in adolescents. As for internalizing symptoms, Masten and colleagues (2004) found no relationship between
acculturation and depressive symptoms in samples of Mexican American women and European American women, similar to the results found by other researchers in samples of Mexican American adolescents (Konerua, Weisman de Mamania, Flynn, & Betancourt, 2007; Lopez, 2011). The inconsistencies in acculturation research could reflect the complex processes that encapsulate acculturation, suggesting that different aspects of acculturation could have differing effects on mental health outcomes.

A different body of research has focused on enculturation, the process of retaining one's original culture, and has documented positive associations with mental health. Enculturative values such as family, respect, and religiosity have been linked with fewer negative internalizing symptoms in Latina adolescent females (McDonald, McCabe, Yeh, Lau, Garland, & Hough, 2005). Family was associated with lower rates of depressive symptoms and suicide among a Latino population (Valdivieso-Mora, Peet, Garnier-Villarreal, Salazar-Villanea, & Johnson, 2016). Familismo and respeto have further been found to correlate with lower rates of substance use (Lin, 2007).

Historically, enculturation and acculturation were often explored as opposites on a spectrum. An individual was either enculturated to their host culture, or acculturated to the new culture. LaFramboise and colleagues (1993) suggested that both constructs could be evaluated as coexisting simultaneously. Researchers began investigating enculturation as protective against the negative outcomes that have often been associated with acculturation. It was seen as a moderator of acculturation (Corona, Rodriguez, McDonald, Velazquez, Rodriguez, & Fuentes, 2017; German et al., 2009; Gil et al., 1994; Neblett, Rivas-Drake, & Umaña-Taylor, 2012; Umaña-Taylor, Updegraff, & Gonzales-Backen, 2011). However, this theory has not been fully substantiated in the research; some studies do not support the idea that enculturation protects against the risks posed by acculturative processes (Berkel et al., 2010; Marsiglia, Kulis, Hecht, & Sills, 2004; Stein, Gonzalez, Cupito, Kiang, & Supple, 2015; Zamboanga, Schwartz, Jarvis, & Van Tyne, 2009).

A new idea emerging in the research combines acculturation and enculturation into biculturalism (Gonzales, Knight, Morgan-López, Saenz, & Siroli, 2002). Biculturalism, as defined by this study, involves scoring high on both acculturative and enculturative measures. Biculturalism has been shown to have many benefits, as the individuals have the skills from two cultures from which to benefit. With Latino youth in particular, the skillset and resources from both cultures can help the adolescents to navigate life’s challenges more easily (Buriel, 2012; Padilla, 2006; Zeiders, Updegraff, Kuo, Umaña-Taylor, & McHale, 2016). Latino adolescents scoring high on bicultural scales have shown higher rates of prosocial behaviors, more positive self-evaluations, better academic outcomes, greater cognitive flexibility, and higher resilience (Buriel et al., 1998; Carlo, Basilio, & Knight, 2016; Gonzales, Germán, & Fabrett, 2012; LaFromboise et al. 1993; Landsman, Padilla, Leiderman, Clark, Ritter, & Dornbusch, 1992).

Biculturalism has also been shown to relate to better mental health, specifically among Latino adolescents. Related to substance abuse, Goldberg and colleagues (1993) found a link between biculturalism and reduced risk for substance abuse among a sample of Latino adolescents. Losoya and colleagues (2008) found a similar negative relationship between bicultural values and rates of alcohol drinking and drug use among Mexican American juvenile offenders. Similarly, in a diverse sample of adolescents, Wei and colleagues (2010) found that those scoring higher on bicultural competence also scored lower on depressive symptom inventories. Finally, Bauman and Summers (2009) found that biculturalism moderated associations between bullying and depressive symptoms in a sample of middle-school aged Mexican American youth. Studies have yet to investigate the link between biculturalism and anxiety symptoms.

The evidence linking biculturalism with improved mental health in Latino youth has not always been consistent though (Cano et al., 2015; Lorenzo-Blano et al., 2012). For example, Cano and colleagues (2015) found no direct link
between biculturalism and alcohol use or depressive symptoms among a sample of late adolescent Latinos. However, indirect links were established when moderators of ethnic discrimination and intragroup marginalization were taken into account. Lorenzo-Blanco and colleagues (2012) found no direct link between biculturalism and substance use, but did find an indirect link through perceived discrimination.

The inconsistency of past results and lack of research examining anxiety symptoms in past studies led to the development of the current study. Generally, I hypothesized that biculturalism would promote better well-being within our sample of college-bound Latino youth. I predicted that those who scored higher on biculturalism would also report lower levels of depressive symptoms, anxiety symptoms, stress symptoms, and alcohol use.

I have several exploratory sub aims. First, given identified gender differences in internalizing and externalizing symptoms, I predicted that the association between biculturalism and both internalizing and externalizing outcomes would differ for males and females (Lorenzo-Blanco et al., 2012; Rosenfield, Phillips, & White, 2006). Specifically, it was hypothesized that biculturalism would be protective for females in the prediction of depressive symptoms, anxiety symptoms, and stress symptoms, and for males in the prediction of alcohol use. Additionally, this research study also aimed to explore whether the dimensions of biculturalism (bicultural comfort and bicultural facility) differ in the prediction of mental health outcomes.

Method
Participants
Data were collected as part of a longitudinal study being conducted at a large southwestern university in the United States. A sample of 209 Latino/a late adolescents was recruited during the spring semester of their high school senior year through phone calls, email correspondence, and orientation sessions. Participants all lived within 35 miles of the university and planned to attend in the fall. The sample consisted of 136 females and 73 males between the ages of 16-19 (35% male, M_age= 17.59, SD=.531). All participants identified as Latino/a, and furthermore, 85.1% identified as being of Mexican descent (n=178). 10.6% were first generation immigrants, and 62% second generation immigrants.

Procedure
The Institutional Review Board from the university approved all measures and procedures. Participants completed an online questionnaire that took approximately 60-80 minutes to complete. The questionnaire assessed a wide range of behaviors and attitudes. Included in this questionnaire were the Depression, Anxiety, and Stress Scale, Alcohol use and Binge Drinking Scale, and the Mexican American Biculturalism Scale, which were used for this study. Signed consent forms were obtained from the participants, and also obtained from the parents if the participant was under the age of 18. Participants were paid $25 for completing the questionnaire.

Measures
Internalizing. One of the scales completed by participants during the questionnaire was the Depression, Anxiety, and Stress Scale (DASS; Lovibond and Lovibond, 1995). This scale was used to assess internalizing symptoms, as it contains items related to depression (14 items), anxiety (14 items), and psychological stress (14 items). Sample items include "I couldn't seem to experience any positive feelings at all" and "I felt I was close to panic." Participants indicated how strongly the statements applied to their past week, with scores ranging from 0 "Did not apply to me at all" to 3 "Applied to me very much, or most of the time." A sum score for each scale was calculated. The DASS has shown good reliability and validity in a variety of settings and with samples of Latino adolescents and young adults (Corona et al., 2017; Antony et al., 1998; Brown et al., 1997). Internal consistency in this sample was good, with Cronbachs alpha of .95 for depressive symptoms, .89 for anxiety, and .93 for stress.

Alcohol Use. Alcohol use was assessed using the "Alcohol use and Binge Drinking" scale from Monitoring the Future (Johnston et al., 2015). The question for this study asked “On how many occasions (if any) have you used alcohol... during the past 30 days?” Respondents could choose a category from 0, 1–2, 3–5, 6–9,
10–19, 20–39, to 40 or more occasions of alcohol use.

**Biculturalism.** Biculturalism was assessed using the Mexican American Biculturalism Scale (MABS; Basilio et al., 2014). For the current study, the wording was adjusted from "Mexican American" to include all Latinos. The scale contains three subscales: bicultural comfort, bicultural facility, and bicultural advantages. The first two subscales were used for this study. For bicultural comfort, the responses ranged from 1 (e.g., "I am only comfortable when [I need to speak in English/Spanish]") to 5 (e.g., "I am always comfortable in both of these situations"). Higher scores indicated high bicultural comfort. Bicultural facility was assessed through agreement statements such as "[N]eeding to speak Spanish sometimes, and English other times is ____," and responses ranged from 1 (very easy) to 5 (very difficult). Responses were reverse scored, and higher scores indicated higher levels of bicultural facility. Items were summed to create subscale scores. In this sample the subscales were highly correlated (r = .87), and therefore the mean of the two scales was used in all analyses.

**Data Analysis Plan**

Frequencies, means, and standard deviations were calculated for all study variables. To examine correlational associations between study variables, zero order correlations were run. Correlations between biculturalism, mental health outcomes, and potential covariates were examined. Second, multivariate linear regressions were performed, one for each outcome (depressive symptoms, anxiety symptoms, stress symptoms, alcohol use) to identify the relative influence of biculturalism on the mental health outcomes. Sociodemographic variables of interest were included as covariates (gender, ethnicity [Latino only or bi/ethnic/multiethnic], parent education, immigration generation). Next, moderating pathways were tested. An interaction term between gender and biculturalism was generated and entered into the multiple regression models. Simple slopes were examined to decompose significant interactions. Statistical analyses were run using SPSS. A significance level of p<.05 was used for all analyses.

**Results**

**Descriptive Statistics and Correlations**

Sum scores on the depressive symptoms scale were 7.32 (SD= 8.63), on the anxiety symptoms scale 7.93 (SD= 7.29), and on the stress symptoms scale 9.88 (SD= 8.90). These average scores fall within the mild severity categories for the symptoms, indicating relatively mild rates of internalizing symptoms in our sample. Although the overall mean scores for internalizing symptoms were low, there was high variability in responses. The mean alcohol use in our sample was about 1-2 occasions of drinking within the past 12 months, indicating that our sample did not highly endorse drinking behaviors. Bicultural comfort and bicultural facility were correlated at r = .87, so they were combined for an overall biculturalism score. The mean overall biculturalism score among the sample was 3.59, indicating a moderately to highly bicultural sample.

Descriptive statistics and correlations are presented in Table 1. Correlations revealed that higher bicultural values were associated with lower depressive symptoms (r = -.33, p<.001), lower anxiety symptoms (r = -.23, p<.01), lower stress (r = -.33, p<.001), and greater alcohol use (r = .16, p<.05; see Table 1).

**Main effects**

In multivariate analyses and after adjusting for covariates, similar patterns emerged (Table 2). Covariates include parental education, gender, immigration generation, and ethnicity (Latino only or bi/multi ethnic). Greater endorsement of biculturalism was associated with lower depressive symptoms (β = -.28, p < .001), anxiety symptoms (β = -.18, p < .05) and stress (β = -.27, p < .001). Interestingly, higher endorsement of bicultural values was associated with increased levels of alcohol use (β = .21, p < .01).

**Moderating effects**

Gender was next examined as a moderator. No significant moderating effects were found for biculturalism and depressive symptoms, anxiety symptoms, or stress symptoms. Gender did, however, significantly moderate the relationship between biculturalism and alcohol use (β = -.24, p < .001; Table 3). After running a simple slopes analysis, results suggested that this relationship was significant.
for females (β = .34, p < .001), but not for males (β = -.13, p = .30). Females with higher biculturalism scores were shown to report the highest occurrences of drinking (Figure 1).

**Discussion**

The current study found that high bicultural values were associated with lower depressive symptoms, lower anxiety symptoms, and lower stress symptoms. Surprisingly, I also found a positive correlation between bicultural values and reports of alcohol use, especially among the highly bicultural females in our study. This may suggest that biculturalism is protective in the prediction of internalizing symptoms for all Latino adolescents, and a potential risk factor for alcohol use among Latina adolescents.

Past research has suggested biculturalism to be protective against depressive symptoms (Bauman & Summers, 2009; Wei, 2010). Consistent with past research, our study further corroborated the connection between higher biculturalism and lower levels of depressive symptoms. Past research had not addressed the link between biculturalism and anxiety or stress, but the current study expanded upon foundations by investigating these relationships. The current study showed biculturalism was correlated with lower anxiety and stress symptoms, suggesting that biculturalism may be an important protective factor against the development of internalizing symptoms more generally. Past research has shown biculturalism to be associated with lower levels of substance use in Latino youth (e.g., Goldberg, 1993; Losoya et al., 2008). However, the current study found biculturalism was related to greater alcohol use, particularly among females in the sample. The inconsistency between past and current findings could be due to the population differences. Past research studied multiple ethnic groups (Wei, 2010) or Mexican-American juvenile offenders (Losoya et al., 2008). The cultural and adjustment processes for these populations might highly vary from the experiences of the current population (college-bound Latino adolescents).

While biculturalism has been found to be beneficial across a range of populations, bicultural values may be particularly beneficial to the sample studied because it may help adolescents navigate between both cultures during times of transition or change (e.g., the transition to college). Because the transition to college involves many highly acculturative demands, high acculturation levels could benefit Latino adolescents during this life stage. By adapting or endorsing more American cultural values, adolescents can take advantage of opportunities in the higher education environment which values independent ideals and success. In addition, enculturation could also promote success for Latino adolescents through emphasis on familismo, respeto, and other Latino cultural values. By also remaining oriented to one’s own Latino culture, the individuals might be provided with resources that help them adapt to new situations and contexts (Gonzales et al., 2012). Studies have shown that bicultural youth who can interact well within both contexts have the highest resiliency, which might explain the decreased risk for internalizing symptoms (Gunnestad, 2006; Sirikantraporn, 2017).

Interestingly, we identified a pattern of associations between biculturalism and alcohol use that differed by gender, and was inconsistent with past research and our hypothesis. Gender differences were predicted based on known female prevalence of internalizing disorders and male prevalence of externalizing disorders (Lorenzo-Blanco et al., 2012; Rosenfield et al., 2006). Past research had not studied the interaction between biculturalism and gender and its effect on alcohol use. In this study, biculturalism was associated with greater alcohol use among females, but not males in our sample. It is possible that Latina adolescents may face increased acculturative peer pressure. Perhaps higher rates of alcohol use are the method by which these bicultural individuals have adapted to the American contexts. As they are trying to navigate through this life transition to college, the bicultural females may be susceptible to peer group influences. Alcohol use among females who reported low levels of biculturalism was approximately 1-2 occasions of drinking over the last year and was 3-5 occasions of drinking in the last year for females who were high on bicultural values. While the bicultural females are still not endorsing high levels of alcohol use overall, the increase
between 1-2 occasions and 3-5 occasions is significant. The effect of biculturalism on drinking behaviors was not significant for males. Whether highly or lowly bicultural, males endorsed a fairly low level of drinking behaviors (average 1-2 occasions of drinking in the past 12 months). Perhaps the males are not as susceptible to peer group influences, or by being influenced through different pathways.

The current study had multiple strengths and limitations. A strength of this study was its large, diverse sample. The 209 participants consisted of Latinos endorsing different countries of origin, generational status, and socioeconomic level. Another strength is that the data were collected from 16-19 year old students who were transitioning to college. Data from this key life stage could be used towards developing prevention strategies against internalizing and externalizing symptoms in college. One limitation of the study was its use of self-report measures for all bicultural values and mental health symptoms. Participants could have forgotten, exaggerated, lied, or estimated on the measures used for this study. The study is also cross-sectional, so it could not delineate the trajectory of how reports of biculturalism and adjustment outcomes will change once the participants begin college. Another limitation of the current study was that the population utilized was relatively low risk. On average, participants did not endorse high levels of any outcome. In particular, alcohol use was very lowly endorsed.

Future studies should continue to investigate the link between biculturalism and internalizing and externalizing symptoms among students once they enter college. Longitudinal data could show the changes in biculturalism and adjustment outcomes upon beginning college. The data from this study could also be used to guide targeted interventions for the promotion of Latino success in college. This could implicate that preventing internalizing symptoms in Latinos involves strategies focused on increasing biculturalism. However, highly bicultural Latino females might need additional interventions targeting substance use. Programs should specifically target bicultural females as at risk for developing externalizing symptoms. Ultimately, further research needs to be conducted on the effects of biculturalism on mental health outcomes and interventions involving biculturalism in order to promote wellbeing and adjustment among Latino adolescents.

References.


development and psychopathology.


Development and Psychopathology, 12(3), 333-356. https://doi.org/10.1017/S0954579400003059


Table 1 Descriptive Statistics and Zero-Order Correlations

<table>
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<th>2</th>
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<th>5</th>
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<td>5. Biculturalism Overall</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6. Bicultural Comfort</td>
<td>-.27*** -.18* -.29*** .16* .92***</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>7. Bicultural Facility</td>
<td>-.31*** -.25*** -.30*** .12</td>
<td>.85*** .58***</td>
<td>-</td>
<td></td>
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<td>8. Parent Education</td>
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<td>-.02</td>
<td>.03</td>
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<td>-.11</td>
<td>-.10</td>
<td>-.10</td>
<td>-</td>
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<td>9. Immigration Generation</td>
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<td>-.07</td>
<td>.03</td>
<td>.11</td>
<td>-.15*</td>
<td>-.13†</td>
<td>-.14* .44***</td>
<td>-</td>
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<td>10. Sex</td>
<td>-.08</td>
<td>-.12†</td>
<td>-.19**</td>
<td>-.02</td>
<td>.28***</td>
<td>.28***</td>
<td>.22*** .09</td>
<td>.06</td>
<td>-</td>
<td></td>
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<tr>
<td>11. Ethnicity</td>
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<td>.15*</td>
<td>.05</td>
<td>-.04</td>
<td>.05</td>
<td>.07</td>
<td>.01</td>
<td>-.34*** -.45***</td>
<td>-.11</td>
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</tr>
</tbody>
</table>

Mean | 7.32 | 7.93 | 9.88 | 1.85 | 3.59 | 3.41 | 3.77 | 3.70 | 2.63 | .34 | .83 |

Standard Deviation | 8.63 | 7.23 | 8.90 | 1.26 | .70 | .89 | .68 | 2.36 | 2.33 | .48 | .38 |

Minimum | .00  | .00  | .00  | 1.00 | 1.94 | 1.22 | 1.44 | 1.00 | .00  | .00  | .00  |

Maximum | 42.0 | 39.0 | 40.0 | 7.00 | 5.00 | 5.00 | 10.0 | 7.00 | 1.00 | 1.00 |     |

Skewness | 1.58 | 1.45 | 1.24 | 1.74 | .00 | -.10 | -.45 | .79 | .77  | .66  | .175 |

Kurtosis | 2.16 | 2.28 | 1.24 | 2.84 | -.61 | -.77 | .29  | -.42 | -.88 | -1.58 | 1.06 |

Note. Sex: Male= 1, Female= 0; Ethnicity: Latino=1, Multi-ethnic=0; Parent education: measure of socioeconomic status (mean composite of father and mother’s highest level of education). † p<0.10; *p<.05; **p< .01; ***p<.001

Table 2 Multiple Regression Analyses estimating Mental Health Outcomes to Biculturalism

<table>
<thead>
<tr>
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<th>DASS Depression</th>
<th>DASS Anxiety</th>
<th>DASS Stress</th>
<th>Alcohol Use</th>
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<td></td>
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<td>-.02</td>
<td>-.28</td>
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<td>0.27</td>
<td>-.05</td>
<td>-.06</td>
</tr>
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<td>Immigration Generation</td>
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<td>0.29</td>
<td>0.13</td>
<td>1.61</td>
</tr>
<tr>
<td>Sex</td>
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<td>0.03</td>
<td>-0.48</td>
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<td>3.78</td>
<td>1.72</td>
<td>0.17</td>
<td>2.20*</td>
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</table>
Note. N = 209 Sex: Male= 1, Female= 0; Ethnicity: Latino=1, Multi-ethnic=0; Parent education: measure of socioeconomic status (mean composite of father and mother’s highest level of education). † p<.10; *p< .05; **p< .01; ***p<.001

### Table 3 Multiple Regression Analyses estimating Mental Health Outcomes to Biculturalism with Gender as a Moderator

<table>
<thead>
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<th>DASS Anxiety</th>
<th>DASS Stress</th>
<th>Alcohol Use</th>
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<td></td>
<td>Est.  SE  β  t</td>
<td>Est.  SE  β  t</td>
<td>Est.  SE  β  t</td>
<td>Est.  SE  β  t</td>
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<td>R²</td>
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<td>.07</td>
<td>.11</td>
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</table>

Note. N = 209 Sex: Male= 1, Female= 0; Ethnicity: Latino=1, Multi-ethnic=0; Parent education: measure of socioeconomic status (mean composite of father and mother’s highest level of education). † p<.10; *p< .05; **p< .01; ***p<.001
Figure 1 Moderating Effect of Gender on Biculturalism and Alcohol Use

Figure 1. Figure 1 shows the interaction between biculturalism and gender and the effect on alcohol use. Covariates were ethnicity, parent education, gender, and immigration generation. * indicates the significant line ($p < .001$).