

The Masculinity-Based Model of Aggressive Retaliation in Society (MARS)

Conor J. O’Dea¹, Elliott Jardin², and Donald A. Saucier³

¹ Department of Psychology, Union College

² Department of Psychological Sciences, Miami University Middletown

³ Department of Psychological Sciences, Kansas State University

Recent researchers have highlighted the need for research on deadly shootings and other forms of aggression in society. To provide a theoretical roadmap for future research in this area, we have brought together social-psychological, anthropological, sociological, and neuro-biological literature. We present a theoretical model we have labeled the Masculinity-based model of Aggressive Retaliation in Society (MARS). Masculine honor cultural ideologies foster a norm that young men should swiftly and decisively respond against threats to their masculinity. We contend that better understanding how these top-down expectations that are placed on young men interact with bottom-up processes such as hormones, brain area activation, and brain area connectivity will help explain the risk factors behind extreme forms of retaliatory aggression including shootings in modern society, and why the vast majority of these heinous crimes are committed by young men. These predictors have been established in the literature individually as causes of violence and aggression, but we contend that these may function as additive risk factors and their *deadly combination* that may lead to retaliatory aggression as a perceived last resort for affected boys and young men.

Public Significance Statement

We have created a Masculinity-based model of Aggressive Retaliation in Society (MARS). This model helps to explain retaliatory aggression in modern society and we believe it will, with further testing, help to better understand the manifestation of extreme forms of aggression in society like shootings and violence.

Keywords: aggression, masculinity, masculine honor, violence, shootings

Gun violence and aggression are among the worst tragedies in modern society and are among the most covered news stories in the media (Wamser-Nanney, 2021). There are likely many factors contributing to gun violence and other forms of aggression in modern society. However, consistent with Brown et al. (2009), we contend that ideologies relating to masculinity and masculine honor help explain why aggression occurs, especially aggression to reaffirm one’s precarious/threatened masculine image. Throughout the duration of this manuscript, we will refer to this reestablishment of masculinity through aggression as “retaliatory aggression.” We believe these ideologies help to explain why nearly 95% of school shooters are male and why these crimes are committed at higher rates in the American South (e.g., Brown et al., 2009). Below we review relevant social psychological, anthropological, and neurological research that has led to the creation of our Masculinity-based model of Aggressive Retaliation in Society (MARS).

Masculinity-Based Model of Aggressive Retaliation in Society

Our biopsychosocially based MARS model is presented in Figure 1. Although many biopsychosocial models have been proposed in previous research (some even dealing with aggression and gun violence; e.g., Hargarten et al., 2018), this novel examination of the specific role of masculine honor ideologies in increasing the likelihood of aggression is necessary. It is important to note that our model attempts to *help* better understand manifestations of retaliatory aggression committed by men in society. We do not contend that these are the only risk factors, or that our model will explain all facets associated with retaliatory aggression. Instead, we bring together research in the areas of anthropology, sociology, biology, and social psychology to propose a novel, largely untested, model that we hope will inspire future research aimed at preventing aggression. Specifically, we have identified five broad risk factors that theoretically help to explain retaliatory aggression (although their specific connections to gun violence remain largely untested). Risk Factor 1, *provocation*, contends that provocation increases the risk for retaliatory aggression propensity. Cultural norms and ideologies related to masculinity and honor provide information as to what is sufficient provocation for aggressive responding (e.g., threats and insults). Risk Factor 2, *perceived behavioral expectation*, contends that social expectations increase the risk for

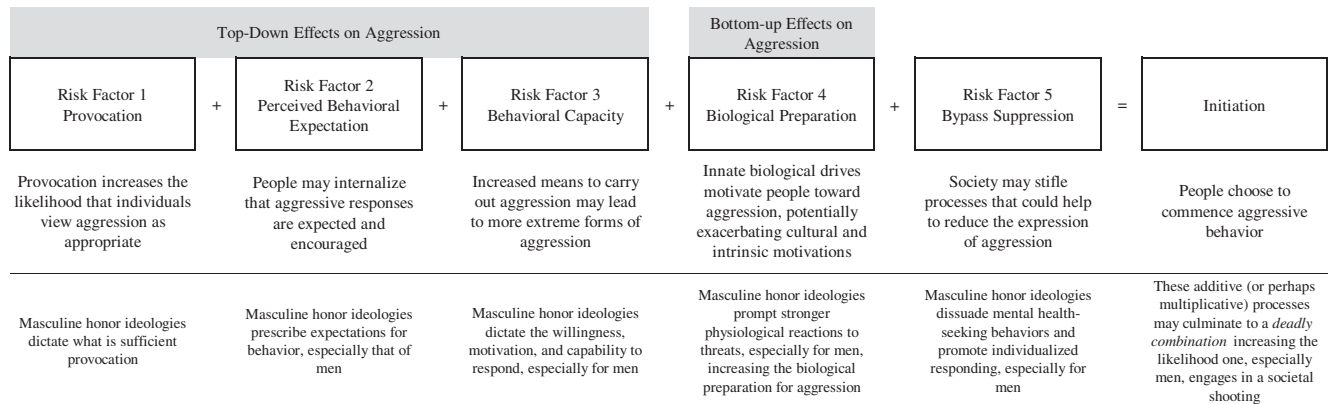
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Conor J. O’Dea  <https://orcid.org/0000-0001-9727-1779>

This model has not been disseminated previously.

Correspondence concerning this article should be addressed to Conor J. O’Dea, Department of Psychology, Union College, 807 Union St. Schenectady, NY 12308, United States. Email: odeac@union.edu

Figure 1
Our Masculinity-Based Model of Aggressive Retaliation in Society (MARS)



Note. For reasons discussed below, Risk Factor 5 is unique in that it comprises both top-down and bottom-up features.

retaliatory aggression propensity. Specifically, when individuals internalize social expectations for, and perceive/accept the responsibility for, responding aggressively, we contend their propensity toward retaliatory gun violence will be heightened, and there is evidence that men may internalize these expectations at even higher rates than they are socialized (Vandello, Ransom, et al., 2009). Risk Factor 3, *behavioral capacity*, contends that retaliatory aggression propensities are exacerbated when individuals have greater access and accessibility to weapons, a capability to use them, and sufficient perceived justification (see Risk Factor 1) for the use of these weapons. Risk Factor 4, *biological preparation*, contends the effects of bottom-up biological factors (testosterone, brain areas of interest and neural connections) increase propensities toward retaliatory aggression by exacerbating the top-down aggressive propensities discussed in Risk Factors 1–3. Risk Factor 5, *bypass suppression*, contends that retaliatory aggression propensity is exacerbated by the discouragement of social support (e.g., mental health seeking/resources, lack of emotional expression).

Top-Down Influences on Aggression

Hegemonic Masculinity

Hegemonic masculine ideologies perpetuate the idea that men are superior to women, or rather that certain exhibitions of masculinity are superior to other exhibitions of masculinity or femininity (Connell & Messerschmidt, 2005)—these dominant masculinities foster the socialization, normalization, and exhibition of behaviors that perpetuate this status and power imbalance (e.g., Donaldson, 1993). Among these hegemonic beliefs is the expectation that men adhere to traditional prescribed gender roles, including being protectors, standing up for themselves, not showing emotion, and distancing themselves from people perceived as feminine or gay (Brand & O’Dea, 2021; Figueiredo & Pereira, 2021; Gul & Uskul, 2021). Indeed, these rigid gender roles normalize the use of aggression as a way for men (primarily straight, cisgender, White men) to

reassert their masculinity, and men often experience stress or negative evaluations from others when they do not adhere to these strict norms (see the gender role strain paradigm; Levant & Richmond, 2016; see also research on backlash against gender deviant men, e.g., Moss-Racusin, 2014; Moss-Racusin et al., 2010; Moss-Racusin & Johnson, 2016). Some researchers have described the attainment of masculinity, especially hegemonic masculinity, as “precarious” showing that the achievement of the expectations placed upon men about what it means to *be a man* are more precarious for men than is the achievement of the expectations placed upon women about what it means to be a woman (see Bosson et al., 2009; Levant, 2011; Vandello & Bosson, 2013; Vandello & Cohen, 2003, 2008; Vandello, Cohen, et al., 2009). The more that men conform to these gender role expectations and the more stress/conflict (see Eisler & Skidmore, 1987) that they experience if their masculinity is called into question, the greater men’s propensities toward aggression are (DiMuccio & Knowles, 2021; Jin et al., 2021; Merino et al., 2021).

This is further illustrated by many of the existing scales measuring ideologies related to hegemonic masculinity including threat (e.g., Masculine Contingency Scale, Burkley et al., 2016) and/or violence as a category (e.g., Conformity to Masculine Norms Inventory, Parent & Moradi, 2011). It is likely that most or even all conceptualizations/expectations of hegemonic masculinities in modern society in some way reinforce men engaging in retaliatory aggression to reestablish their masculinity. However, recent researchers have begun to focus on one specific socially constructed hegemonic masculinity that is reinforced in American culture, masculine honor beliefs, as a particularly pervasive risk factor for gun violence and gun-related attitudes (e.g., Brown et al., 2009; Lantz & Wenger, 2021; Ray et al., 2021; Warner & Ratcliff, 2021). It is around this facet of hegemonic masculine ideologies that our current model is situated with regard to the cultural and ideological expectations that are placed upon men. It is not our intent to overlook alternative explanations for men’s behavior, but to focus on the ideological effects of masculine honor to provide a clear roadmap for future

research in this area as well as suggestions for reducing retaliatory aggression-related likelihoods.

Risk Factors 1 and 2: Provocation and Perceived Behavioral Expectation

Origins of Provocation and Expectation

Masculine honor ideologies are broadly described as prescriptive and proscriptive normative expectations for men. Specifically, in cultures of honor, men are considered protectors (Cohen & Nisbett, 1994; Cohen et al., 1996; Nisbett, 1993). Nisbett (1993) describes the expectations for men's behavior as evolving in the American South due to the ease of theft victimization in the herding culture (income and livelihood were primarily centered around livestock herding; see also Figueredo et al., 2004; Shackelford, 2005). Because livestock are vulnerable to theft, Southern herders needed to develop a tough reputation as a means of protecting their livelihoods. Because gender roles prescribed herding to be a male profession (and the obvious benevolently sexist attitudes that persist in modern society regarding masculine honor ideologies; see Saucier et al., 2016), these expectations developed primarily for men to earn a tough reputation and to respond aggressively to threat. Societal statistics corroborated this, showing significantly greater prevalence of retaliatory homicides in the American South compared to the American North during the 20th century (e.g., Baron & Straus, 1988; Gastil, 1971), especially by young, White males (Nisbett, 1993).

Indeed, cultures of honor do not dictate that men should be aggressive constantly, and seminal and recent research corroborates these expectations (Cauffman et al., 2000; Cohen & Nisbett, 1994; O'Dea et al., 2018). As such, these cultural and ideological expectations for violence/aggression may only manifest in specific situations. Generally, people are expected to be polite, engage positively with their community, and to socialize others with these expectations (Cohen et al., 1999; Harinck et al., 2013; O'Dea et al., *in press*). However, if others do not afford them the same politeness, people, especially men, experience threat to their masculine self-image and even negative perceptions from others (O'Dea et al., 2017, 2018).

One of the first to test the aggressive reestablishment of masculinity after a threat, Cohen and Nisbett (1994) examined the effect of the region of the United States (North vs. South) on White males' propensities toward retaliatory violence. Specifically, Cohen and Nisbett (1994) examined differences between White males' perceptions of violence by those belonging to Southern and Northern states. Interestingly, Cohen and Nisbett (1994) did not find substantial regional differences on endorsement of aggression generally. However, controlling for various other factors (e.g., income, education, age), Cohen and Nisbett (1994) showed that Southerners were much more likely to endorse violence in response to threats and insults. These findings indicate that Southerners, compared to Northerners, were more affected by insults (despite not showing these responses in facial expressions), were more prepared to respond aggressively, and were also more physiologically primed for aggression in response to being insulted. These findings suggest that insults were taken more seriously and seen as a greater threat by Southerners (see also Cohen et al., 1996).

Modern Manifestations of Retaliatory Aggression

In modern society, men adhering to these ideologies are expected to preemptively reduce provocation and retaliate against anyone who poses a threat to their masculinity, earning higher status and reputation (see research by Evans et al., 1998). Some of these preemptive behaviors include risk-taking and behaviors intended to demonstrate how tough one is (e.g., Barnes, Brown, & Osterman, 2012; Evans et al., 1998; Osterman & Brown, 2011). Other behaviors more directly and consistently display one's masculinity to anyone who could potentially pose a threat (e.g., posture and muscularity; Saucier, Miller, et al., 2018, Saucier, O'Dea, et al., 2018). Indeed, masculine honor is continuously demonstrated to ward off potential threats and insults (Saucier, Miller, et al., 2018, Saucier, O'Dea, et al., 2018; see also Ijzerman & Cohen, 2011), and used to reinforce men's feelings of invulnerability to threat (Fessler et al., 2014). Men may not always be successful in warding off threats, in which case, retaliatory aggression is expected.

It is important to note that retaliatory gun violence is not exclusively perpetrated in the American South, and in fact, recent evidence has shown that retaliatory gun use may not be as influenced by strict cultural or regional differences as once thought (e.g., Copes et al., 2014). Similarly, Southern masculine honor ideologies are not exclusively constrained to the American South. As such, researchers recently have begun conceptualizing masculine honor as an ideological individual difference rather than as a regional difference (Barnes, Brown, & Tamborski, 2012; Imura et al., 2014; Rodriguez et al., 2002; Saucier et al., 2016). These conceptualizations have been widely used to predict behaviors associated with violence and defense and may even explain regional differences in expectations for men's behavior (Saucier, Miller, et al., 2018, Saucier, O'Dea, et al., 2018).

Supporting these experiences of threat, Saucier et al. (2015) measured adherence to masculine honor ideologies and asked men if they had ever been in a physical fight and for those who had, researchers asked participants what provoked them to fight. Insults that directly targeted their masculinity (e.g., "bitch"), their bravery (e.g., "coward"), or their sexual orientation (e.g., "faggot"; see also Archer & Benson, 2008; Carnaghi et al., 2011; Cross et al., 2012; Preston & Stanley, 1987; Saucier et al., Submitted) were most threatening to their masculinity. Further, these were subsequently provocative of physical aggression due to men's need to protect their masculine self-image, showing what men view as sufficient provocation.

That said, despite the relationships discussed above, people (even those high in masculine honor beliefs) generally do not value extremely aggressive responses in modern society (e.g., O'Dea et al., 2017, 2018, 2019, Under review). Aggression is not expected or encouraged without provocation (O'Dea et al., 2018). Masculine honor beliefs were uncorrelated (and at times even negatively correlated) with positive perceptions of men who aggressed against a nonthreatening stranger (O'Dea et al., 2018; supporting the norms of politeness discussed above; Cohen et al., 1999; Harinck et al., 2013). Despite these boundaries, research has shown that men often overestimate society's expectations for violent behavior, and those higher in masculine honor are more likely to perceive extreme and more severe aggression as acceptable (O'Dea et al., 2019; Vandello, Ransom, et al., 2009).

Contrasting Expectations for Men and Women

Aside from gender roles not prescribing aggressive retaliation for women, very little research has contrasted the expectations for men's retaliatory aggression with the expectations for women. We contend that better understanding the differences in expectations for men and women will help to explain why so many more violent acts of aggression are committed by men than women. Some literature has examined violent behavior by women in cultures of honor (e.g., D'Antonio-Del Rio et al., 2010; DeWees & Parker, 2003; Lee & Stevenson, 2006; Whaley & Messner, 2002), showing that Southern women are more likely than their Northern counterparts to commit violent offenses (see Doucet et al., 2014). Chalman et al. (2021) extended these findings by examining how men and women are perceived when they choose to respond or not respond to a threat. Consistent with the above, higher levels of masculine honor beliefs were associated with more positive perceptions of men who defended against, and more negative perceptions of men who ignored, a threatening stranger (Chalman et al., 2021). That said, higher levels of masculine honor beliefs were associated with more positive perceptions of women regardless of whether they aggressed against, or ignored, a threatening stranger. Indeed, aggressive responses to threats seem like more of a prescription for men and more of a choice for women according to masculine honor beliefs (Chalman et al., 2021; see also Cichangir, 2012; Vandello, Cohen, et al., 2009).

Risk Factor 3: Behavioral Capacity

Aggression is an effortful behavior intended to harm others who do not want to be harmed (e.g., Anderson & Bushman, 2002; Bushman & Anderson, 2001). As such, importance is placed on the capacity to be able to inflict physical harm onto their target(s) by those who enact aggression (especially physical; see research on Resource Holding Power and self vs. other assessments of fighting capacity; e.g., Archer & Benson, 2008; see also Barnes, Brown, & Tamborski, 2012; Nisbett & Cohen, 1996). There are several factors that can increase the behavioral capacity for aggression by actors generally including physical features/compartments of the actor (Ijzerman & Cohen, 2011; Lefevre et al., 2014), their physical size, and their muscularity (see Saucier, Miller, et al., 2018, Saucier, O'Dea, et al., 2018). Indeed, those who are larger and more muscular, and thus presumably stronger, are assumed to have greater behavioral capacity to successfully harm the targets of their aggression. Other factors may include their behavioral skill set, including their ability to or having been trained to fight along with their willingness to win fights by any means necessary (e.g., more extreme or *unfair* forms of aggression; see O'Dea et al., 2019). Indeed, those with more ability and/or training have greater behavioral capacity (and they also perceive greater behavioral capacity for themselves) to successfully harm their targets (e.g., Fessler et al., 2014).

As we consider the specific case of retaliatory aggression in the form of gun violence, the behavioral capacity to enact a shooting relies on the shooter having access to and ability to operate a firearm. Simply put, a shooter needs a gun. Access to firearms is dependent on the gun laws in place in the potential shooter's location as well as the social norms that allow for, condone, encourage, restrict, or prohibit owning and using guns in their location (see Cooke, 2004).

Many researchers have tied the ownership of guns and firearms not to the need for protection, but rather to seek control and social status (e.g., Cooke, 2004; Diener & Kerber, 1979). Indeed, those higher in masculine honor ideologies (a highly reputational variable) are more accepting of guns, are more likely to carry and own guns, and as previous research has shown, are more likely to commit violent retaliatory crimes with guns (Bock et al., 2021; Matson et al., 2019). As gun laws make gun ownership easier, and as social norms encourage their ownership and use, the behavioral capacity for committing gun violence increases (see also suicide rates by those higher in masculine honor beliefs who value gun ownership; Bock et al., 2021; Klonsky & May, 2015). Indeed, research suggests that the mere presence of a gun can increase feelings of aggression/violence (see weapons effect; Anderson et al., 1998; Kleck & DeLone, 1993). Further, a gun may render physical size differences and the ability to fight much less relevant in terms of their influence on the successful performance of aggression (Archer & Benson, 2008). Like those physical size differences and fighting abilities, however, boys and men may have greater behavioral capacity to commit retaliatory gun violence due to traditional male gender roles and masculine honor ideologies that condone or encourage them to own guns and to use them to defend themselves against threat and insult. Supporting these conclusions, O'Dea et al. (2019) showed that people higher in masculine honor ideologies are more supportive of extreme forms of aggression in response to a reputational affront. These extreme forms of aggression included the use of weapons. Taken together, these behaviors and attitudes form the basis of our third risk factor, Behavioral Capacity.

Summarizing the Top-Down Effects of Honor Ideologies on Male Aggression

Summarizing these top-down influences of aggression, it appears that men are more likely to respond aggressively when their sense of masculinity is threatened (Risk Factor 1: Provocation). Further, there are differing expectations for the behavior of men and women in cultures of honor regarding how to respond to provocation/threat and these differences have led men to perceive greater responsibility to respond aggressively, even to the point of extreme violence to slights/threats against their masculinity (Risk Factor 2: Perceived Behavioral Expectation). These propensities, we predict, are further exacerbated by access to and capability to use firearms (Risk Factor 3: Behavioral Capacity). Below we describe how each of these expectations and cultural effects can be exacerbated by bottom-up biological processes (Risk Factor 4: Biological Preparation), and how the likelihood of retaliatory aggression may be further increased by biological and societal processes that bypass the suppression of aggressive behavior (Risk Factor 5: Bypass Suppression). These risk factors then promote what we are labeling a *deadly combination* which we predict provides insights into the propensity for individuals, especially men, to engage in extreme forms of aggression.

Bottom-Up Influences on Aggression

Risk Factor 4: Biological Preparation

In contrast to top-down influences of the MARS Model (Risk Factors 1, 2, and 3), the bottom-up processes which constitute

reactive aggression (Risk Factor 4) are largely driven by the fight or flight response. We predict, although this is largely based on speculation for which we build a case below, that these biological factors may exacerbate the top-down effects described in Risk Factors 1–3. That said, future research should test the additive or multiplicative effects of these risk propensities to better understand if they exacerbate one another or function independently. Affective or reactionary aggression results from unregulated impulsive ideation caused by different brain areas and hormones working in tandem to produce a greater likelihood that one will aggress (Lickley & Sebastian, 2018). The neuro-biological patterns associated with affective aggression include hypo-activity/function in the frontal lobe and increased activity in right subcortical areas (Raine et al., 1998). This pattern of activity is influenced by several underlying biological, biochemical, and psychological factors including frontal lobe mass (Sajous-Turner et al., 2019), testosterone levels/testosterone fluctuation (Simon & Lu, 2006), levels of serotonin (Yanowitch & Coccaro, 2011), and stress (Lupien et al., 2009).

Amygdalar Effects on Aggressive Responding

Among other important functions, the amygdala prioritizes emotionally salient information and facilitates, with other regions such as the hypothalamus and periaqueductal gray, a preconscious physiological reaction (Davis, 1992). This is of particular interest to our model because the amygdala assists in the orchestration of the fight or flight response. This is largely seen to be evolutionarily adaptive, serving an important function in detecting potential danger, and allowing people, especially men in cultures of honor, to preemptively and retaliatory respond to threats (Öhman, 1986). The amygdala invokes a largely bottom-up response that is preconscious and outside awareness, as evidenced by its increased processing of affective information within the first 200 ms of processing (Jardin et al., 2019; Pollock et al., 2012; Rotshtein et al., 2010) and sympathetic nervous system activity to stimuli presented below conscious awareness (Whalen et al., 1998). This bottom-up response leads to a cascade of allostatic changes to the human body, making an aggressive event far more probable.

Testosterone and vmPFC Development on Aggressive Responding

Testosterone influences aggressive behavior by blunting the activity of the vmPFC/orbitofrontal cortex, decreasing suppression of the amygdala and increasing reactively aggressive propensities (Bos et al., 2013; Spielberg et al., 2015; Volman et al., 2011). This is of great consequence because the role of the vmPFC/Orbitofrontal cortex in regulating emotion is well documented, and disruptions of this connection likely lead to a greater propensity for aggression. White Southern males have shown higher levels of perceived threat to slights against their masculinity than do Northerners, and this was accompanied by elevated levels of both testosterone and the stress hormone cortisol (Cohen et al., 1996). As such, we expect greater fluctuations in testosterone and, therefore, greater blunting of the vmPFC/orbitofrontal cortex, causing less suppression of the amygdala. This *deadly combination*, we predict, should produce significantly greater aggressive propensity in those from cultures of honor/those who endorse masculine honor ideologies—and these effects should be greater for men than for women due to the differences in

testosterone and the differing social expectations described above, especially for young men (due to puberty).

The development of the vmPFC is also affected by conditions of nurture and social development (Morey et al., 2016). This is highly consequential because impaired vmPFC function is linked to depression, anxiety, and a greater propensity toward violence (Johnstone et al., 2007; Rauch et al., 2006, van Wingen et al., 2010). Maltreated youth (potentially those who have experienced bullying or abuse) with Post-Traumatic Stress Disorder (PTSD) show decreased right vmPFC volume compared to controls, and maltreated youth without PTSD show larger left amygdala volume than do controls (Morey et al., 2016). Damage to frontal regions seen in maltreated youth with PTSD is thought to be due to cell death of stress-sensitive neurons in the vmPFC (Lupien et al., 2009). This could potentially lead maltreated youth to be at greater risk for aggressive behaviors due to an inability to inhibit aggressive responses, especially those that are caused by threats, such as threats to one's safety and masculinity. Men and young boys are at the highest propensity, especially in cultures of honor, of engaging in reckless and risky behavior (see Barnes, Brown, & Tamborski, 2012; Evans et al., 1998; Osterman & Brown, 2011) due to motivations to consistently showcase their precarious masculinity (Bosson et al., 2009; Vandello & Bosson, 2013; Vandello & Cohen, 2008). These risk-taking behaviors are influenced by individual differences in brain development. While this risk period may not affect many adolescents (Casey & Caudle, 2013), the nonuniformity of brain development may explain why adolescents are more likely to make suboptimal emotional decisions (Dreyfuss et al., 2014). Limbic-driven emotional goals override rational top-down decision-making in the frontal lobe (Casey et al., 2008), which we predict may be especially likely when those top-down decisions are being encouraged by masculine honor ideologies.

Goal-Oriented Aggression

Each of the above instances of aggression seems to be based more in the *heat of the moment*. While retaliatory aggression can be in the heat of the moment, it can also be planned. We contend that our model will help explain both manifestations of aggression, but that they come from different biological mechanisms. Goal-oriented/proactive aggression involves both the planning and orchestration of violence, which is more often the case in premeditated gun violence. Due to the qualitatively different nature of this form of aggression, it makes sense that it is influenced by other biological mechanisms. Those who are abnormally high in these aggressive tendencies often show decreased levels of empathy (Euler et al., 2017). Boys often score lower on levels of empathy than do girls (Jolliffe & Farrington, 2006), perhaps partially explaining existing sex differences in proactive aggression (Decety & Ickes, 2009). The affective components of empathy are thought to involve both the anterior cingulate cortex and the anterior insula (Decety & Jackson, 2004; Hein & Singer, 2008; Olsson & Ochsner, 2008). These structures provide an account of physical and emotional pain in oneself and in others (Decety & Jackson, 2004). Additional factors that predict proactive aggression include a positive relationship between gray matter volume and the dorsolateral prefrontal cortex, a negative relationship between gray matter volume and the posterior cingulate cortex, and negatively correlated functional connectivity between the posterior cingulate cortex and the right

dorsolateral prefrontal cortex, inferior parietal lobes, anterior cingulate cortex and the bilateral precuneus (Zhu et al., 2019). Applied to our MARS model, empathy is another important factor to consider when examining the likelihood of planned retaliation to threats to masculine honor. Interestingly though, one caveat to this assertion, while general self-reports of levels of empathy (not specifically pathological) predict aggression, masculine honor beliefs show much stronger relationships with acts of aggression ranging from verbal confrontation to extreme forms of violence and the effects of masculine honor were not exacerbated by levels of empathy (O'Dea & Loginov, In preparation).

Summarizing the Bottom-Up Effects of Honor Ideologies on Male Aggression

It is clear that people, especially young men, may be at a heightened risk for aggressive reactions and goal-driven retaliation in response to threats to their masculinity. These responses are driven by their perceptions of how society expects them to act, but, as we have discussed, these top-down societal expectations may be exacerbated by biological forces. These biological forces seem to revolve primarily around amygdalar activity, with greater amygdalar activity being associated with increased aggression. Ideally, aggression would be suppressed. But fluctuations in testosterone can inhibit this suppression, making it more likely that individuals exhibit extreme forms of aggression. Goal-driven retaliatory aggression seems to function in similar ways. This goal-driven aggression may manifest in premeditated aggression such as planned retaliatory gun violence. It seems these planned shootings may be impacted by brain areas associated with empathic concern for others. Bringing each of these effects together, our MARS model outlines a *deadly combination* that we predict drastically increases the likelihood that people, especially young men, will choose to engage in extreme forms of aggression including gun violence, as a function of their Biological Preparation for doing so, our fourth risk factor.

Risk Factor 5: Bypass Suppression

Risk Factor 5 is a unique risk factor in that it presents both top-down and bottom-up psychological and biological processes. Physical aggression is deemed in most cases to be an overreaction and immoral in modern society and, while people higher in masculine honor beliefs are more permissive of aggression, there are limits to their endorsements (see O'Dea et al., 2019; O'Dea et al., Under review). In fact, Wong et al. (2020) showed that when asked about prescriptive and proscriptive norms of masculinity, one of the most widely prescribed and proscribed behaviors was *nonaggression* (e.g., "Should not act out violently against anyone"; p. 551). However, these anti-aggression societal norms are often studied in the context of general everyday behavior in which case, arguably, most people would be against the exhibition of violence—so the question of when violence is permissible, or perceived as permissible, arises. Indeed, as we previously discussed, testosterone can decrease the likelihood that the vmPFC will successfully dampen aggressive responding caused by the amygdala. It is in this way that biological factors may bypass the suppression of aggression. However, as we now introduce below, individuals, especially those higher in hegemonic masculine honor ideologies, may cognitively restructure events as justifiable of retaliatory aggression. It is in this

way that bypass suppression may also function as a top-down process.

Cultural Factors Affecting the Suppression of Aggression

Committing aggression against their target(s) requires the actor to either willfully violate those social norms that prohibit the commission of aggression or to morally justify the commission of aggression—men in cultures of honor often overjustify or over-perceive aggression as an acceptable response to threats (e.g., O'Dea et al., 2019; Vandello et al., 2009). These moral disengagement strategies may include cognitive restructuring the behavior as being moral due to provocation and societal expectations—essentially perceiving aggressive behavior as producing a societal benefit, or as less severe than it actually is (e.g., Bandura, 2016; Moore, 2015). In these cases, the aggression, which may have otherwise been suppressed as inappropriate and wrong, is now unleashed as necessary and right.

Another factor that may affect an actor's inability or unwillingness to suppress their aggressive behavior is the inability or unwillingness to otherwise cope with external stressors—men from cultures of honor tend to suffer from higher rates of undiagnosed mental health issues (Bock et al., 2021; Crowder & Kimmelmeier, 2014; Osterman & Brown, 2011) which previous researchers tie to the stigmatization of mental health (Brown et al., 2014; Foster et al., 2021; Gul & Uskul, 2021; Pederson & Vogel, 2007). Indeed, aggression is often committed with an objective in mind, and the objective may be to express anger or to cope with frustration. The lack of suppression of aggression may be more likely as individuals are less likely to access resources such as mental health treatment, that may provide them with other means to express their anger or deal with their frustration (Bock et al., 2021; Crowder & Kimmelmeier, 2014; Osterman & Brown, 2011; Swearer, 2019). Boys and men are less likely to seek mental health treatment because traditional gender roles and masculine honor ideology may imply or explicitly state that doing so is a sign of weakness, especially in Southern states (see Brown et al., 2014; Gul et al., 2021; McDermott et al., 2018; Pederson & Vogel, 2007; Vogel et al., 2011; Wahto & Swift, 2016). Indeed, men higher in masculine honor beliefs often seek to distance themselves from stigmatization and anything associated with femininity or weakness (e.g., penis size; Johnston et al., 2014; homosexuality, Brand & O'Dea, 2021; Falomir-Pichastor & Mugny, 2009; see also O'Connor et al., 2017); by disparaging others using terms that demasculinize or insult others (Plummer, 2001; Talley & Bettencourt, 2008). By avoiding seeking mental health treatment, men may perceive that they have reinforced their reputation as a manly man. Each of these effects come together to form Risk Factor 5, bypass suppression in which societal norms that would normally discourage aggression are bypassed due to more salient social norms to be tough, avoid showing weakness, and aggressively defend oneself against threat—leading to behavioral justification.

General Discussion

In this manuscript, we presented a novel Masculinity-based model of Aggressive Retaliation in Society (MARS) to help explain extreme forms of aggression (e.g., gun violence) carried out to reaffirm men's masculine image. We do not believe our model is

limited to just extreme forms of violence. We outlined five risk factors that we contend increase one's propensity to engage in a retaliatory aggression that is influenced by top-down and bottom-up factors. First, people's propensity may be increased when they perceive sufficient *Provocation*, often achieved through threat or insult against one's masculinity. Second, people's propensity for retaliatory aggression is exacerbated by *Perceived Behavioral Expectation* that others expect them to respond aggressively to the threat. Third, individuals' propensity toward retaliatory aggression is increased as people have greater *Behavioral Capacity* to carry out the aggression (achieved through means such as muscularity, intimidation, and the use of weapons). Fourth, *Biological Preparation* likely exacerbates the likelihood of aggressive responding. It is important to note that this may come in the form of exacerbating the original negative response to the threat, increasing the physiological need to respond, or even also during the suppression phase, lowering the likelihood that one might suppress their aggression. Fifth, societal stigma surrounding mental health-seeking behavior and perceived moral disengagement from the retaliatory aggression may cause *Bypass Suppression* to occur and circumvent the social norms prohibiting aggression. Our model presents the first combination explanation of retaliatory aggression propensity as a result of the combined effects of both top-down masculine honor cultural expectations and bottom-up biological preparations.

Limitations of Our MARS Model

Unfortunately, and rather sobering, although some research tracking the general trend of violence suggests a general decrease in extreme violence over human history (Pinker, 2011), extreme forms of retaliatory aggression including gun violence continue to manifest and are among the worst tragedies in modern society. Our MARS model is not meant to be a comprehensive model that can explain all human retaliatory aggression and every instance of aggression and violence that takes place. Instead, we humbly acknowledge that our model has limitations. Much of our model, especially the connection of the top-down societal expectations with the biological preparations for retaliatory aggression, are largely speculative. We have reviewed a large body of literature suggesting that these effects may be additively, and possibly multiplicatively, linked in predicting retaliatory aggression. Indeed, we hope that this model is expanded, critiqued, and further studied. We offer our model to not only better our understanding of aggressive retaliatory responding, but to also instigate consideration of the factors that exacerbate gun violence propensity. We expect our model will inspire further research into this complicated and devastating social issue.

Further limiting our conclusions, the biological correlates of aggression illustrate neural differences between those who are more or less violent. It is important to note that these studies suffer from limitations similar to other nonexperimental studies. Future research may further investigate using transcranial magnetic stimulation (TMS) to stimulate and inhibit various areas of cortex and subcortical structures to be able to infer causation. However, it may never be fully possible to index and measure exactly what is occurring neurologically during extreme forms of retaliatory aggression such as in a shooting or in preparation for a shooting. Unfortunately, despite people often describing warning signs by societal shooters after the fact, it is often difficult to see or know who might be at risk

for engaging in gun violence. We believe our MARS model provides a foundation for when someone may engage in these behaviors and the conditions that may emphasize these likelihoods. Thus, last resort preemptive application of our model may be limited. However, a better understanding of societal norms that encourage and foster all these processes will help society better shape expectations that are placed upon men for aggressive responding and will hopefully help to tear down the stigma surrounding mental health-seeking behaviors.

Future Research

We believe that our MARS model presents a novel account of the factors that can increase the likelihood of extreme forms of retaliatory aggression and gun violence in society. While each of these risk factors likely influence aggressive responding to retaliation, it is unclear how they are all connected. Their connections to extreme aggression may be additive, multiplicative, or even completely independent of one another. Future research examining these processes is important. As a specific example of the manifestation of these top-down and bottom-up predictors of retaliatory aggression that may also be influenced by our model, consider a teenager who is a victim of bullying. Victims of bullying frequently exhibit higher than normal levels of anxiety and depression (Hodges & Perry, 1999), poorer adjustment (Arseneault et al., 2006; Nansel et al., 2001; Veenstra et al., 2005), and lower self-esteem (Egan & Perry, 1998). Compounding these negative issues, seeking mental health treatment is perceived as weak and less of a priority in Southern states, where parents are less likely to prompt mental health seeking in children (see Brown et al., 2014). Research should be done to examine whether these effects are independent of, or compound with, the expectations placed on people, primarily men and young boys, to respond aggressively to threats and insults (children are encouraged to respond aggressively to bullies; see O'Dea et al., *Under review*). Although masculine honor ideologies necessitate preemptive behaviors (e.g., drive for muscularity; see Saucier, Miller, et al., 2018, Saucier, O'Dea, et al., 2018) to deter threat and insult, these may not be successful for individuals of smaller physical stature, less athleticism, or someone who does not internalize masculine honor ideologies personally despite being in an honor culture. Not adhering to these expectations may increase the likelihood of repeated victimization (see Nisbett, 1993).

This situation could create a lose-lose situation for boys and young men struggling with bullying, who may experience even PTSD-like symptoms. This continues into adolescence, even potentially inhibiting the formation and function of important brain structures and hormones important in the suppression of antisocial behavior and the development of empathic concern for others. These compound with fluctuations in hormones, especially testosterone, that can further inhibit the suppression of antisocial behavior. Indeed, future research should examine whether the provocation (bullying), perceived behavioral expectation (parents' expectations), and bypass suppression (lack of mental health support) are exacerbated by the perceived need and desire in cultures of honor to own and carry guns (behavioral capacity; e.g., Bock et al., 2021), with individuals highlighting the need for "good guys with guns" (see Stroud, 2012). While being told to "pull yourself up by the bootstraps and stand up for yourself!," some children unfortunately may experience a *deadly combination* of risk propensities

leading them into devastating forms of retaliatory aggression, such as shootings.

Our model may, most importantly, establish a need for future research into the factors that increase the likelihood that people generally, and young men in particular, may engage in retaliatory aggression against others. Our model offers speculative connections among risk factors that we believe, and the extant literature appears to support, increase the likelihood that one will commit a retaliatory shooting. Future research should examine these direct connections more intentionally, both individually and interactively. Future research should examine factors beyond those we identified for their potential to contribute independently to the propensity to engage in retaliatory shootings, as well as for their potential to catalyze or mediate the relationships between our proposed factors. Most importantly, future research should examine efforts at primary prevention and intervention that target our proposed risk factors, to either reduce the risk factors directly or to attenuate the relationships between our proposed risk factors and the propensity to engage in retaliatory aggression. The value of our model, as we have stated, may be in our providing specific areas for future research to not miss the opportunity to better understand and hopefully reduce retaliatory aggression.

Our model may also inspire other future research directions beyond the model itself. There is very little existing research aimed at understanding the expectations for children as a function of masculine honor ideologies and we hope that our model will promote additional research in this area. Although some of the existing scales measuring masculine honor beliefs do include items about the socialization of children (e.g., Saucier et al., 2016; “You would want your son to stand up to bullies”; see also O’Dea et al., *in press*), very little research has examined how strong these expectations are. Some recent unpublished research by our laboratory team (O’Dea et al., *Under review*), is beginning to show that, while masculine honor ideologies are associated with greater support of children responding aggressively to threats and insults, these effects are similar for young boys and young girls, but neither boys nor girls are held to these expectations as higher masculine honor ideologies were associated with more positive perceptions of children regardless of whether they aggressed, sought help from parents/teachers, or did not respond. Thus, it seems as though masculine honor ideologies may be associated with increased empathy for children who are bullied regardless of how the child chooses to respond. Further, although there is apparent support of young children aggressing in response to threats, insults, and bullying, and although people higher in masculine honor ideologies are supportive of gun rights (see also Barnes, Brown, & Tamborski, 2012; Barnes, Brown, & Osterman, 2012), O’Dea et al., (*Under review*) showed that school shooters, regardless of whether they had been bullied or not and regardless of one’s level of masculine honor beliefs, were perceived highly negatively. Thus, it seems that, while the nature of masculine honor ideologies is to support aggression in response to threats, these expectations have limits depending on the severity of the threat and the age of the victim. That said, given the support for aggression that O’Dea et al., (*Under review*) showed, children may not know where the line should be drawn and, thus, may internalize this support with increased support for more extreme forms of aggression despite their parents not being permissive of this behavior (also supported by Vandello et al., 2008 suggesting greater internalization of socialized expectations).

We hope our MARS model will promote future research examining whether the propensity to seek mental health explains the relationships that we predict in our studies differently for men and women. Interestingly, and perhaps the beginning of a solution to these issues and expectations if the stigma surrounding mental health seeking can be overcome, some recent research has suggested that actively working with young boys and men to talk about their emotions, support their community, provide role models, and to support them in resisting these hypermasculine norms can be beneficial to their own well-being and mental health (Chu, 2014; Kiselica & Englar-Carlson, 2010; Steinfeldt et al., 2012; Way et al., 2014).

Our model also extends recent theoretical discussion and empirical research on masculine honor ideologies/cultures by highlighting the need for more research on women’s roles. What little empirical research and theoretical discussion exist of women in cultures of honor primarily focus on sexual purity as a way for women to gain honor in their culture (e.g., Rodriguez Mosquera, 2011, 2013, 2016; Vandello & Bosson, 2013; Vandello & Cohen, 2003; Vandello, Cohen, et al., 2009). Researchers justified this lack of analysis on women’s behaviors and honor ideologies with statements such as men were “responsible for the vast majority of violent acts committed in American society” (Cohen & Nisbett, 1994, p. 553). However, with the shift in traditional gender roles in recent decades (e.g., Brooks & Bolzendahl, 2004; Cheung & Halpern, 2010), there is a need for more empirical research on women’s roles in cultures of honor (see Chalman et al., 2021; Martens & Saucier, *In preparation*). This research can promote the understanding of women’s roles amid shifting gender norms in modern society and explain how the differing expectations for men’s and women’s behaviors contribute to the greater likelihood that boys and young men will engage in aggression with a particular focus on retaliatory aggression.

Similarly, our model presents the need for understanding the broader role of hegemonic masculine ideologies in cultural contexts other than the conceptualization of masculine honor in the United States (specifically the American South). While masculine honor and hegemonic masculinity more broadly have been examined in other cultures (e.g., Spain, South America; see Rodriguez et al., 2002), and many similarities arise, what is perceived as honorable in one culture should not be assumed to be what is assumed in other cultures. Indeed, the application of our model to other cultures must be tested in future research to further test its reliability outside of the United States. Further, and rather unfortunately, because masculine honor beliefs in the United States have been attributable to the herding culture in the American South, a profession and area dominated by White, heterosexual, cisgender, majority group individuals, much of the existing research in this area has overlooked the need for modern examinations of intersectionality within masculine honor expectations. Indeed, it is important to compare and contrast the expectations for White, cisgender, heterosexual men with the expectations for nonmajority group members to better understand what leads (overwhelmingly men) people to commit violent actions like retaliatory aggression and (mass) shootings and if the reasons for this aggression differ depending on one’s varying intersectional identities.

Conclusion

There are many factors that contribute to acts of aggression. Our MARS model intends to organize the thinking about the propensity

to commit retaliatory aggressions with implications for better understanding the manifestation of retaliatory aggression in society. We have articulated the conditions, both top-down and bottom-up, both social and physiological, that may come together to inspire extreme aggression. Specifically, stress associated with provocation, stress from societal expectations to respond aggressively to threats/insults, the physical capacity to behave aggressively or use weapons, biological preparations to respond aggressively, and a societal discouragement of mental health treatment may independently and collectively predict negative outcomes for boys and young men. The simultaneous experience of these factors may lead to the *deadly combination* that inspires victimized boys and young men to lash out as their only hope for feeling valued in their social world. We believe that our MARS model ultimately suggests that we must work together as a society to provide other ways for individuals in our society to access support when they need it to prevent these extreme, and often deadly, manifestations of aggression.

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