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Extending the Model of Intuitive Morality and Exemplars:

Sex Differences in Evaluations of Moral Conflict in Narratives

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Philosophy

in Communication

by

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December 2020

The dissertation of Chelsea A. Lonergan is approved.

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ABSTRACT

Extending the Model of Intuitive Morality and Exemplars:

Sex Differences in Evaluations of Moral Conflict in Narratives

by

Chelsea Lonergan

The Model of Intuitive Morality and Exemplars details the short- and long-term processes

driving media selection, assessment, and production cycles (Tamborini, 2011), however, it does

not account for linkages that have been found between biological sex, hormonal stress response,

moral judgment, and media preference. The role of sex, stress, hormones, and potential

interaction effects on moral media content evaluation were therefore assessed in addition to

foundational MIME predictions. It was hypothesized that moral intuitions, sex-specific stress

response, and hormonal markers would predict shifts in the salience and perception of care and

loyalty. In this study, participants were tracked over two weeks during the highly stressful initial

unfolding of the global Coronavirus pandemic. Moral intuitions, psychographics, and

demographics were measured, as well as self-reported stress and a battery of life situation and

belief variables later used to develop a theoretical stress prediction model. An experimental

induction took place halfway through the study, whereby participants were randomly assigned to

either a high stress or low stress Coronavirus news prime, and then asked to evaluate two of eight

possible stories varying in story condition (care vs. loyalty upheld) and moral conflict (conflict

vs. no conflict). Repeated measures analyses were conducted using a Linear Mixed Models

Approach. Results failed to replicate well-documented MIME patterns, although various

significant interactions between story type, sex, stress, news prime condition, and menstrual

phase on both story enjoyment/appreciation and measures of character morality were uncovered.

Further, sex differences in sensitivity to different moral foundations, as well as relationships

between perceptions of virus threat, notions of purity, xenophobia, and ethnocentrism were

found. Possible explanations of unexpected findings are offered. Implications and future

directions regarding research and data analysis are discussed.

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The search for what drives individual media selection, processing, and evaluation has

grown exponentially since the build-up leading to World War II (Giles, 2003). Scholars from the

fields of media psychology and communication have developed numerous theories aimed at

specifying the various facets which predict how humans engage in the media world around them.

A substantial portion of these have rested on notions of moral conflict, moral decision-making,

and how individuals process and react to such moral content overall. The Model of Intuitive

Morality and Exemplars (MIME) is one such model which details the short- and long-term

processes driving media selection, assessment, and production cycles (Tamborini, 2011). MIME

takes into account theories and frameworks from moral and media psychology to explain how

media content interacts with moral intuitions to predict how individuals will judge and ultimately

select media messages. Although MIME is built upon evolutionary notions of moral psychology,

it does not account for evolutionary theories of sex-differentiated responses to stress-inducing

moral decision-making. By connecting bodies of literature supporting linkages between

biological sex, moral psychology, and media selection, MIME can be extended to include sex-

specific differences in evaluations of moral conflict in narratives.

Overview of the MIME

Importantly, MIME is based on a dual-process logic borrowed from Moral Foundations

Theory (MFT; Haidt & Joseph, 2007). MFT posits that there are five evolved domains or

foundations of moral intuitions which differ in terms of cultural salience, but act as the

boundaries within which individuals have mostly intuitive or 'gut'-based moral assessments

(with some slower deliberations when faced with conflict). These foundations include: 1)

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Care/Harm (concerned with empathy and others' suffering); 2) *Fairness/Cheating* (concerned with reciprocity and justice); 3) *Loyalty/Betrayal* (concerned with in-group/out-group, self-sacrifice and patriotism) ; 4) *Authority/Subversion* (concerned with negotiating legitimate hierarchies of dominance); and 5) *Purity/Degradation* (concerned with contamination and regard for sanctity). These five areas can be thought of as initial foundations that are evolved, while each foundation's respective salience is malleable and culturally dependent.

The MIME's Dual Process Rationale

In addition to using logic from MFT, MIME also uses information-processing logic borrowed from exemplification theory (Zillmann, 2002). In this theory, exemplars (entities or events which represent their larger category) have stronger influences on judgments, as they are higher on both the availability and representativeness heuristics. This allows them to be cognitively more accessible or quicker to think up. Thus, media content which presents concrete and highly emotion-inducing exemplars will ultimately strengthen the influence of that representation during subsequent moments of individual assessments. The likelihood that we judge behavior in media as moral (e.g., prosocial vs. antisocial) is therefore predicted by how accessible the foundations are via recent, frequent, concrete, or emotionally charged exemplars.

MIME predicts that depending on the extent to which a receiver perceives media content as "*consistent* with their overall moral-domain system" (Tamborini, 2013, p. 55), their intuitive affective reaction to that content will be positive; reactions will be negative or indifferent if the content is inconsistent with their moral salience system. For example, content that upholds (does not violate) care and loyalty foundations will be evaluated positively by individuals with high intuition salience in care and loyalty. Content exposure can also make one foundation dominantly salient, meaning it is highly accessible due to the recency of the exemplar prime,

and/or its concrete and emotion-inducing nature, so that it precludes conscious processing of other foundations. For example, an individual exposed to content which depicts a graphic, bloody fight in which the protagonist ruthlessly destroys the antagonist may deem it morally just if they are reminded that—just like them—the protagonist comes from a harsh upbringing. However, if they are exposed to the same content after just leaving church, where they listened to a sermon about forgiving enemies, they may instead deem the fight to be unnecessarily cruel and immoral. In both these example scenarios, receivers of media content are *not* experiencing moral conflict. Individual evaluative reactions to this type of morally salient media content are instead fast and automatic, resulting in perceptions of behavior/characters that is either moral (prosocial) or immoral (antisocial), as well as experiential states of enjoyment or repugnance (Lewis et al., 2017). Although this process helps to explain audience reactions to more straightforward narratives, media content, especially appealing dramatic narratives, often instead create situations of moral conflict.

Contemporary media commonly depicts moral conflict aimed at playing with the boundaries between clearly prosocial or clearly antisocial behavior. Despite being a major area of research, no commonly shared conceptualization of prosocial or antisocial behavior seems to exist among media scholars. Equivocality in what constitutes a prosocial or antisocial act can lead researchers to label the same act differently or to use the same label for vastly different acts. For example, if the town sheriff shoots a bank robber in order to enjoy the thief's suffering, the act might be called brutality. But if the same act was performed out of a sense of duty to the town, the act might be called honorable. MIME researchers argue that the model's dual-process understanding of moral intuition salience can be used to address potential confusion in this area of research (Hahn et al., 2019; Tamborini, Hofer, et al., 2017).

Motivations underlying behaviors are central to classifying the acts as prosocial or antisocial, and the absence of a comprehensive scheme that explicates this process can further confound research in this area. The potential for this problem is amplified in narratives that portray conflict, whereby the salience of one altruistic intuition overrides another. Because, by definition, the sublimated intuition in such cases is also salient, awareness of its violation could make it difficult to label the act as clearly prosocial or antisocial. To address this concern, MIME researchers have put forth a definition for prosocial and antisocial behavior based on salient motivations (Hahn et al., 2019; Tamborini, Hofer, et al., 2017). Using the model's framework, they define prosocial and antisocial actions in line with the dual-process model's determination of positive and negative appraisal. When only one altruistic intuition is made salient, and an act upholds that dominantly salient intuition over other unnoticed intuitions, the act is easily classified as prosocial and its violation antisocial (as no other salient concern is present). In these cases the audience's experience of enjoyment or repugnance (respectively) shows the actions' intuitive prosocial or antisocial nature.

By comparison, if media content represents moral conflict, the MIME suggests that individual evaluative reactions to morally salient media content is done slowly and deliberately, resulting in experiential states of appreciation or rejection, although overall enjoyment is lowered by the stress and discomfort of being exposed to moral conflict. Specifically, when two intuitions are salient, violating a subordinated altruistic intuition in order to uphold an overridingly salient one would be classified as prosocial (and its violation antisocial). In these cases the audience would experience appreciation or discontent (respectively), again showing the actions' intuitive prosocial or antisocial nature. However, if neither intuition is made overridingly salient, the

viewer experiences a moral dilemma, regardless of which intuition is upheld, which results in affective ambivalence.

Evolutionary Theory

The MIME has branched off of several central evolutionary concepts and theories. Haidt & Joseph's (2007) MFT provides the basis for its five evolved foundations. As Graham and colleagues (2013) suggest, moral knowledge has evolved via "*functionally specialized mechanisms* which work together to solve recurrent adaptive problems quickly and efficiently" (p. 62). These moral foundations can be considered as stemming more broadly from within- and between-group dynamics such as reciprocal altruism, whereby an individual makes a sacrifice for another with the expectation of similar treatment in the future.

Individualizing vs. Binding Foundations

These notions of within- and between-group behavior are illustrated in the way some researchers study MFT's moral foundations. Graham and colleagues (2009) frame the functionality of moral systems as either *individualizing* or *binding*. *Individualizing* foundations (care/harm and fairness/cheating) put the individual as the locus of moral value while *binding* foundations (loyalty/betrayal, authority/subversion, and purity/sanctity) put the group as the locus of moral value. Both moral systems are designed to suppress selfishness in order to promote group strength and survival.

Other researchers have argued with the terminology and connection of MFT foundations to specific ingroup *and* outgroup dynamics. Sinn and Hayes (2017) borrow from Evolutionary-Coalitional Theory to suggest that MFT's *individualizing* foundations of care and fairness serve to reduce the threat of within-group exploitation. More specifically, while those very low on *individualizing* foundations (i.e., "dark triad" traits of narcissism, machiavellianism, and

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psychopathy) may have favored the exploitation of outgroups to bolster ingroup fortitude, those more in favor of egalitarianism and moral universalism may have served as a protection against selfish leaders who exploit ingroup members as well as outgroup ones. Sinn and Hayes (2017) also suggest that *binding* foundations serve to increase group cohesion and solidarity against outgroup threats. At its core, then, it is clear that the MIME taps into evolved notions of group dynamics to shape moral decision-making.

Pathogen Prevalence

Pathogens have existed as a constant, recurring threat to humans' ability to both survive and reproduce. This notion has spurred the pathogen prevalence hypothesis, which suggests that humans have evolved both physiological as well as cognitive or behavioral defenses to pathogens (Schaller & Murray, 2008). Thornhill & Fincher (2014), in discussing the similar parasite-stress theory of values and sociality, outline what they deem as two human immune systems: the classical (physiological) immune system, and the behavioral immune system. This second system encompasses affect (i.e., feelings of disgust), cognitions (i.e., worry about pathogens), values and behaviors regarding in-group and out-group members (i.e., cooperation), and prejudice directed at those perceived to be unclean, unhealthy, or otherwise contaminated.

Higher levels of geographical pathogen prevalence (i.e., malaria, leprosy, dengue, typhus, or tuberculosis) have been linked to higher levels of collectivism rather than individualism (Fincher et al., 2008), salience for the *binding* moral foundations of loyalty, authority, and purity (Van Leeuwen et al., 2012), and spiritual beliefs, which mediate the relationship between pathogen prevalence and conservativeness (Bastian et al., 2019). Scholars have linked pathogen prevalence to other types of conservatism, including xenophobia, ethnocentrism, extraversion,

sociosexuality, openness to experience, and aspects of mate selection (Fincher et al., 2008;

Schaller & Murray, 2008).

Under the elevated risk of pathogen threat, the importance of cooperating with the in-

group and demonstrating solidarity rises with it. Using the backdrop of the coronavirus/Covid-19

pandemic, level of *binding* foundation salience as well as self-reported faith in President Trump

significantly predicted the intention to social distance or not (Graham et al., 2020). In a

longitudinal study by Rosenfeld & Tomiyama (2020), endorsements of, and conformity to,

traditional gender roles were higher during, rather than before, the pandemic. Effects were not

dependent on level of health concern, political ideology, or other demographics. Overall, men

identified more strongly with masculinity, women with more femininity, and both with the

endorsement of traditional gender roles/stereotypes. Of note, in a pre-pandemic study on

ecological stress, Kaiser (2019) found that after controlling for level of gender equality, sex

differences in personality were largest in more developed countries with higher historic pathogen

prevalence.

The Role of Biological Sex

Differences in how males and females make moral judgments or interact with specific

media content have been consistently found (e.g., Oliver, 2000). These areas, although quite

relevant, have yet to be fully integrated into research focusing on the MIME. In this section,

findings linking biological sex (or oftentimes gender, used interrelatedly) to the MIME, to moral

psychology, and to media selection and perception will be outlined. Two competing models of

hormonal stress response will then be discussed and offered as explanatory mechanisms

undergirding these connections.

Biological Sex and the MIME

So far, MIME research has largely ignored sex differences in moral decision making. As of this writing, very few studies utilizing the MIME have also included sex or gender as either a moderating or peripheral variable, with some noteworthy findings that have been left mostly unexplored. In one study, Hodge and colleagues (2019) administered a survey measuring game playing behaviors and stages of moral reasoning to adolescents. Unexpectedly, males had higher moral scores as well as higher levels of self-reported gameplay and higher levels of genre variety, which in turn significantly predicted moral scores. The researchers suggest that these findings may result from either higher levels of moral disengagement in males (i.e., "it is just a game") or higher levels of stress in women from playing video games in general, and violent games specifically.

Grizzard et al. (2014) found that one's salience level towards care/farm and fairness/reciprocity (but not loyalty or authority) was significantly related to feelings of guilt when playing a game as either a terrorist (high guilt) or UN soldier (low guilt). With this, the sample was 71% female, although sex differences were not analyzed in any detail. Instead, the authors state "finally, we would note the lack of covariates utilized in the current study. Numerous variables, including gender, game play experience, and political affiliation, may be expected to interact with guilt or moral intuition salience. We examined this potential in our data analyses, and all results were robust to the inclusion of these covariates. Still, future research should examine the potential for individual differences to moderate the results presented here" (p. 503). Although the authors acknowledge the need for future research, no further theoretical explanation for why an overrepresentation of females in their study might affect results is

offered. This is also despite their admonition that such covariates are likely to interact or affect moral intuition salience (though they do not detail why).

Bowman, Jöckel, & Dogruel (2012) compared Americans' and Germans' moral sensibilities, and preference for movie and television genres. The researchers also considered the partial influence of age and gender on genre preference, and uncovered several partial effects of gender on genre preference. Males significantly preferred action, horror, and sports, while females significantly preferred drama and comedy. Similarly, Joeckel et al. (2013) had both American and German adolescents play video games which differed in whether the non-player characters violated moral foundations or not. From this, the researchers found that German adolescents were more likely to uphold salient moral foundations while behaving 'randomly' when making decisions regarding non-salient moral foundations. In contrast, American adolescents made 'random' moral decisions regardless of salience level.

As they state, "to control for random effects due to gender, we used male characters for the five morality scenarios and female characters for the training and foil scenarios" (p. 486). The researchers do not explain why gender may have an effect, although both samples were almost evenly split between males and females. Although they do attempt to control for "extraneous gender effects" (p. 486), there are no measures in place to validate this. In considering a more fleshed-out potential for gender effects, it is possible that using male characters may alter perceptions of belonging to either an in-group or out-group, especially for the male participants. With this, introducing a harm/care violation first (with no counterbalancing measures) may have aggravated males and females within the moral violation condition specifically, as they could not control the outcomes. It is also worth noting that care/harm is consistently found to be the most salient of the five moral foundations and therefore would have

the highest chance of influencing participants of both genders and nationalities (i.e., Tamborini et al., 2012). This may have then lead to sex-differentiated violations within the subsequent narratives, muddying the overall results and contributing to the seeming 'random' violations. Only more drilled-down statistical analyses would be able to assess whether more nuanced sex differences and interactions exist.

Bowman, Schultheiss, and Schumann (2012) assessed players' prosocial (i.e., 'socializing', 'relationship' or 'teamwork' motivations) versus antisocial (i.e., 'competition' or 'personal advancement' motivations) gaming behaviors, finding that younger male players were significantly more likely to report more antisocial behavior as well as a higher suspension of disbelief regarding their role and responsibility in the gaming world. As the authors state, notions of character attachment and morality can be applied to any form of media engagement. Although they suggest their findings could be related to socially-prescribed ideals of females as nurturing, it is just as likely that such results are a result of sex-differentiated attunement, processing, and responses to moral foundations such as loyalty/out-group competition in males, and care/harm in females.

Tamborini and colleagues (2012) put forth one of the only communication studies specifically utilizing sex as a key moderator on moral subculture and media engagement. They assessed trait variables (such as biological sex), moral subcultures, and assessment of media content. They presented participants with four narratives varying in perpetrator disposition (positive/liked or negative/disliked) and perpetrator motive (justified/protection of life or unjustified/personal gain), and measured self-reported assessments of the acceptability of violence in the given narrative. The researchers uncovered biological sex as a key moderator— for males, acceptability of violence was highest in the negative disposition/justified motive

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condition, and lowest in the negative disposition/unjustified motive condition, while for females, acceptability of violence was highest in the positive disposition/justified motive condition, and also lowest in the negative disposition/unjustified motive condition. Although they do not provide specific theoretical explanations for their three-way interaction, some potential connections (based in key content or theme differences) can be offered:

A perpetrator who is at first unliked, then uses violence to overcome a bully who threatens him, is likely highlighting in-group/out-group dynamics, marking himself as the 'underdog', and (presumably, successfully) dominating the out-group member in a justified way—this is akin to the media content often preferred by males (such as sports, action, or horror) which highlights the use of violent means to dominate the out-group, gain prominence in the in-group, or overcome similar social adversity. In contrast to this, females found violence to be most acceptable when the perpetrator was initially liked (i.e., "one of the most likeable people you could ever meet at school"; Tamborini et al., 2012, p. 142). Being likeable may suggest that this individual is caring, trustworthy, cooperative, and generally behaving in a prosocial manner which renders them significantly *likeable* (and not just *popular*, which may instead carry complex in-group/out-group connotations invoking hierarchy). When such an undeniably positive character must then use violence to protect himself, the use of harm is overshadowed (ironically) by the 'caring' individual's self-protection against a 'harmful' target. Such content is reminiscent of female-preferred genres which emphasize care-centered (rather than in-group vs. out-group) conflict.

This study, along with the other research discussed here, shows initial evidence of the role of biological sex as a key moderator in media content and moral processing. Clearly, well-

developed explanations of *why* sex is a key moderator, and studies explicitly testing such

hypotheses are needed in the sub-discipline.

Biological Sex and Moral Decision-Making

Research in moral psychology has uncovered consistent differences in how males and

females process and respond (cognitively and behaviorally) to moral content and dilemmas.

Gilligan (1982) famously suggested that women are more attuned to caring for others,

relationships, and overall compassion while men were more attuned to justice, rules, and rights.

However, much research since then has rested on highly complex notions of social regulations,

social desirability and gender roles (Yang et al., 2017). Meta-analyses (e.g., Meyers-Levy &

Loken, 2015) on gender and morality find that females tend to be higher in measures of moral

sensitivity (You et al., 2011), are less likely to lie for monetary self-benefit (Dreber &

Johannesson, 2008; Erat & Gneezy, 2012), but are more likely to lie if it benefits another

individual while financially hurting no one (Erat & Gneezy, 2012).

In assessing moral dilemmas, research shows that cross-culturally (Stimpson et al., 1992),

and independent of other factors such as religion or education level, males tend to make

utilitarian decisions (or those based on maximizing the outcome) while females tend to make

deontological ones (or those based on following a 'higher' moral code even if the outcome is not

as good; Fumagalli et al., 2010). Especially in contexts with highly emotional dilemmas (i.e.,

impersonal and personal moral dilemmas versus non-moral ones), females have been found to

put more effort into searching for options beyond the scope of the context (e.g., out-of-context or

counterfactual thinking; Migliore et al., 2014). As these authors state, this finding "may reflect a

conflict between deontological rules and cognitive control of the problem solving" (p. 5).

Essentially, it is the emotional component within moral dilemmas which slows down evaluations and leads to slower RTs overall.

However, in a study assessing 'appropriateness' of a character's harmful/non-harmful actions, both males and females engaged in utilitarian processing, but females are significantly more likely to engage in deontological processing (Friesdorf et al., 2015). Similarly, in donation appeals, studies have shown that females are more responsive to caring moral views compared to justice (Brunel & Nelson, 2000; Jaffee & Hyde, 2000), and sympathy appeals compared to pride—the opposite for males (Kemp et al., 2013). In responding to moral violations by companies, females report more outrage and are more likely to indicate their willingness to boycott (Lindenmeier et al., 2012), or blame the company if their product caused others harm (Laufer & Gillespie, 2004).

Studies on trust have found that females are consistently more trusting than males (Feingold, 1994), although they are significantly more careful in trusting online individuals during e-commerce or online gaming interactions (Meyers-Levy & Loken, 2015). Milanowicz and Bokus (2013) studied childrens' moral judgments, finding that young girls are care-oriented (only towards the opposite sex), while young boys are more justice-oriented (only towards the opposite sex) when reporting their own ending to a fable they are reading to a recipient. Studies specifically utilizing MFT have found that when controlling for political orientation (another robust predictor), females report higher levels of care/harm, fairness/cheating, and purity/desecration than males (Graham et al., 2011; Wilhelm & Joeckel, 2018).

A series of studies done by Feldman-Hall and colleagues (2016) showed that women's and men's considerations of harm, but not fairness, predicted moral decision-making. More specifically, under both hypothetical and real scenarios, scenarios featuring females were more

likely to be protected from harm (compared to scenarios featuring males), and more likely to be the recipient of costly altruism. Mercadillo et al. (2011) found neural evidence for sex differences in moral processing. Specifically, when shown compassion-eliciting photos such as war scenes, females had greater activation in complex emotional-cognitive processing regions such as the thalamus and putamen compared to males. The authors suggest that "compassion mechanisms evolved differentially in women, probably in connection with social skills including maternal preverbal communication and emotional responses to helpless offspring" (pp. 8-9).

Biological Sex and Media Engagement

Research has also uncovered consistent and significant patterns in how males and females differentially choose, prefer, and/or respond to media genres. In general, men are consistently and significantly more likely than women to prefer (or report more enjoyment from) cross-genre movies with violence and/or sexuality, as well as frightening horror movies (Sparks, 1991; Krcmar & Kean, 2005; Wühr et al., 2017).

Oliver (2000) reviews findings uncovering patterns in sex-differentiated selective exposure to, enjoyment of, and responses to media across genres. For example, for males but not females, exposure to a horror scene led to a significant relationship between self-reported distress and delight (Zillmann et al., 1986). Similar but further, in a study by Johnston (1995), males reported higher levels of appreciation for violence in horror movies, higher levels of empathy for killers, and lower levels of empathy for victims. In contrast, there were no gender differences in motivations such as 'thrill-watching'. In offering explanations for these consistent differences in male versus female media preferences, Oliver (2000) suggests that themes in the content of media entertainment may be the driver. Specifically, she states that "while females appear to enjoy dramatic content that most prominently features issues related to intimacy and

interpersonal relationships, males appear to enjoy dramatic content that features characters overcoming obstacles, defeating (often violently) their opponents, or demonstrating their domination" (p. 225).

Oliver and colleagues (2000) showed that stereotypical genre delineations, such as watching 'tearjerkers' which are generally preferred by females, could shift as a function of the theme. Specifically, when a tearjerker focused on a paralyzed basketball player, males and females were just as likely to anticipate enjoyment. When a tearjerker instead focused on a group of friends dealing with one's leukemia diagnosis, females were significantly more likely to anticipate enjoyment. This shift in frame could be likened to shifts in moral foundations. For example, focusing on an athlete's struggle with adversity could illustrate loyalty if the individual attempts to overcome issues and defeat the other team. In contrast, focusing on a group of friends and a cancer diagnosis could illustrate care and the alleviation of others' pain.

The Underlying Mechanism: Hormonal Stress Response

Moral conflict is inherently emotionally stressful; the brain regions implicated in emotional processing (i.e., anterior cingulate cortex, vmPFC, amygdala, hippocampus) are relevant to moral reasoning and altered during the acute stress response (Youssef et al., 2012). This response may be attributed to two competing evolutionary stress response models hinging on either testosterone in males, or oxytocin in females.

The first is Cannon's (1932) classical 'fight-or-flight' model (FoF) of threat response, which suggests that individuals who correctly choose to fight (when they are more likely to win) or flee (when they are less likely to win) increase their chance of survival. This is built on male-specific hormonal fluctuations driven primarily by testosterone, and manifests itself in heightened sensitivity to in-group/out-group dynamics and lower levels of care towards the out-

group. Higher levels of testosterone in males have been linked to higher levels of physical and psychological aggression, dominance, risk-taking, competition against other males (especially sexual competition), and decreased parental investment or nurturing behaviors (see e.g., Archer, 2006 for a thorough meta-analysis).

A competing model is Taylor et al.'s (2000) tend-and-befriend (TBT) model, which suggests that females respond to stress by 1) "tending" or caring for and soothing offspring, and 2) "befriending" or facilitating the formation and strengthening of primarily female social groups to reduce vulnerability to stressors or threats. This is built on female-specific hormonal fluctuations driven primarily by oxytocin, and manifests itself in heightened sensitivity to care and cooperation, regardless of initial group membership.

Studies in moral psychology have indeed uncovered links between sex-specific hormones and differentiated responses and decision-making within emotional, moral, and social contexts. In a study conducted by Montoya and colleagues (2013), 2D:4D ratios moderated the effect of administered testosterone on females' moral judgments. Specifically, females with high 2D:4D ratios were more likely to shift from deontological to utilitarian decision-making when administered oxytocin. This was only evident in dilemmas which were personal (i.e. highly emotion-inducing) and which had inevitable harm. This suggests that females who may be naturally lower in testosterone (as indicated by higher 2D:4D ratio) will shift moral assessments when given the hormone; binding sites for testosterone in the brain have considerable overlap with key moral processing regions such as the vmPFC.

Higher levels of testosterone have also been linked to parochial altruism—higher levels of distrust towards out-group members (via games like the Ultimatum Game or Prisoner's Dilemma), and higher altruistic punishment towards offers deemed unfair (Diekhof et al., 2014).

Higher levels of testosterone have been linked to decreased trust of emotionally neutral faces during competition in males but not females (Carré et al., 2014).

Higher levels of oxytocin in females have been linked to suppression of self-interest and increases in altruism when evaluating moral dilemmas (Scheele et al., 2014). Higher levels of oxytocin in females (but not males) has also been linked to prosocial tendencies in a conflict story task (Shang et al., 2017).

Meta-analyses have shown that The Trier Social Stress Test (TSST; the most common stress induction method) has uncovered some sex differences, with stressed males, but not females, showing enhanced negative/fear conditioning (Allen et al., 2014). Youssef and colleagues (2012) showed that under conditions of stress, females will tend to make less utilitarian moral decisions than males, particularly in extreme (i.e., highly emotional) dilemmas.

Moral reasoning has also been linked to Life History (LH) strategy, with females showing higher levels of moral reasoning with slower LH strategy compared to males (Dunkel et al., 2016). This is especially interesting as fast LH strategy is linked to higher levels of consistent environmental stress, while slow LH strategy is not (Van der Linden et al., 2018). In a study using a BART stress task, females showed greater avoidance of risk while males showed increased risk-taking proclivity (Starcke & Brand, 2012). Starcke et al. (2011) also found that when individuals underwent the TSST, there was a significant positive relationship between cortisol level and egoistic (or non-altruistic) decision-making in highly emotional moral dilemmas. In studies of stress, sex, and self-other perceptions, stressed females show higher self-other distinction or reduced egocentricity bias than non-stressed females. Males showed the opposite pattern (Tomova et al., 2014).

In a recent study by Schweda and colleagues (2019), males and females underwent a stressor task (vs. control) before playing a group-based social dilemma game. Participants were told their opposing groups had vastly different political views to prompt intergroup rivalry. Individuals were given an initial €10 and the options to distribute it between three pools: 1) the "keep" pool which is kept by them; 2) the "within-group" pool, where 50% of the total pooled amount (from all three players) is distributed to each member; or 3) the "between-group" pool, which is identical to the within-group pool except that each outgroup member loses the same amount that each ingroup-member receives. The researchers hypothesized that increased stress would lead to increased contributions to the between-group pool, illustrating both 'outgroup hate' and 'ingroup love' suggested by FoF and TBT, respectively.

Schweda et al.'s (2019) results were complex and not in full support of their hypotheses. Instead, the most robust finding was that increased heart rate predicted outgroup-hostile behavior. No significant main effects of stress, sex, or various measured hormone levels were found on contributions, nor were any significant interactions between stress and sex. Interestingly, many findings puzzled the researchers themselves, who have found support for stress-related effects in the past. They suggest that the adapted version of the prisoner's dilemma game is not a measure of complex group dynamics so much as a measure of strategy. Although their many nuanced results are interesting to consider within the broader literature (such as the finding that when controlling for testosterone, cortisol levels predicted within-group contributions), it is certainly possible that the context was not relevant enough, or the stressors not sensitive enough, to uncover any sex-stress interactions on prosocial/antisocial inter- and intra-group dynamics.

Rationale

It is clear that there is a highly complex relationship between stress, sex, hormones, various psychosocial traits, and evaluations of morality, and moral decision-making. The current study is by no means able to account for each potentially relevant moderator, however, it does look at such relationships within a context that is perhaps more sensitive to moral decision-making: narrative (or story) evaluation. Due to robust sex differences within narrative preferences, and the murkiness inherent within many other studied contexts (i.e., strategic group economic games), it is helpful to establish whether such sex differences in media selection and evaluation can be attributed to moderators common in MIME or moral psychology research.

Taken all together, there is compelling evidence that sex predicts moral decision-making, and also that sex predicts media selection or evaluation. Hormonal differences in stress response may be the driving mechanism for these patterns. Thus, biological sex (via hormones) moderates the relationship between moral sensibility and stress-inducing moral conflict to predict differences in outcomes such as enjoyment or evaluations of character morality. From an evolutionary, intergroup perspective, *care* and *loyalty* are two of the most salient foundations and reflect females' tendency to reduce suffering and bond prosocially, as well as males' tendency to bolster in-group/diminish out-group members and strength.

Additionally, research (see e.g., Bartsch & Hartmann, 2017; Lewis et al., 2014; Tamborini et al., 2013) has shown that media content which is void of moral conflict, will spur self-reported enjoyment in cases where salient foundations are maintained (i.e., an individual who most cares about *purity* will enjoy a story where *purity* is upheld as long as no other foundations are violated). Due to the dual-process nature of moral evaluation, introducing conflict (i.e., the simultaneous upholding of one foundation and the violation of another) induces

some cognitive or emotional stress, and requires the audience to consciously assess the narrative. In cases of moral conflict, self-reported perceptions of enjoyment are replaced by notions of narrative or character appreciation (see e.g., Tamborini, 2011). Therefore:

H1: Individual's level of salience towards the upheld foundation will predict story evaluation (enjoyment or appreciation) and perceived morality of characters.

The theoretical arguments made in previous sections introduced another key moderating variable: level of stress. If it is true that sex-differentiated hormonal stress responses (i.e., FoF and TBT) predict differences in moral reasoning, then one would expect that under conditions of heightened stress, MIME's predicted interaction between moral salience and media content is altered by sex in specific ways. Essentially, a three-way (sex x stress x salience) interaction would suggest that in contexts without conflict, care (for females) and loyalty (for males) would become even more dominantly salient than perhaps salience in and of itself would predict. In contexts with moral conflict, these foundations would become overridingly salient, per the MIME's framework. In cases *with* moral conflict, these respective foundations would instead become overridingly salient for males and females, leading to evaluations of appreciation rather than enjoyment. Therefore:

H2a: When exposed to care-upholding content, females high in stress and care salience will report the highest levels of enjoyment/appreciation and perceived morality of foundation-upholding characters compared to all other females.

H2b: When exposed to loyalty-upholding content, males high in stress and loyalty salience will report the highest levels of enjoyment/appreciation and perceived morality of foundation-upholding characters compared to all other males.

Finally, due to the previously-theorized role of hormones in stress response models,

H3: Hormonal markers will moderate these relationships.

As discussed, research in evolutionary psychology shows that pathogen prevalence is highly predictive of various social 'immune system' responses. These include collectivism, attunement to *binding* foundations like loyalty, xenophobia, sociosexuality, and more (Fincher et al., 2008; Schaller & Murray, 2008; Van Leeuwen et al., 2012). Research before and during the (current, as of writing) pandemic also shows that increases in pathogen prevalence predict larger sex differences, and more alignment/endorsement with traditional gender roles (Kaiser, 2019; Rosenfeld & Tomiyama, 2020). Given these findings, it is possible that differences in males' and females' moral salience would be significantly magnified during the high stress of a global pathogen threat, perhaps more in alignment with the 'traditional' ideals of female caring and male loyalty. In addition to hypotheses 1 through 3, the following were also proposed:

H4: Salience for care will be higher for females (rather than males), while loyalty will be higher for males (rather than females).

H5: Perceived virus threat and protection efficacy will predict: 1) care salience in females; 2) loyalty salience in males; 3) purity salience overall; 4) collectivism; 5) xenophobia; and 6) ethnocentrism.

Method

Design

This study was quasi-experimental, approved by the IRB on May 15, 2020, and conducted during the months of July and August 2020 in three waves: T1, T2 one week later, and T3 two weeks after T1. The main, between-subjects, independent variables included biological sex (male vs. female), moral salience, state stress, perceived viral threat and protection efficacy, type of stress priming news articles (positive vs. negative), story conflict (conflict vs.

no conflict), and story condition (*care* upheld/*loyalty* violated vs. *loyalty* upheld/*care* violated).

Other non-central independent variables included gender identity, dark triad characteristics

(narcissism, machiavellianism, and psychopathy), political affiliation, and political orientation.

The main dependent variables were change in state stress, self-reported story enjoyment and

appreciation, and self-reported perception of character morality.

Participants

Prolific.co was used to gather a paid research sample; this is an online service with over

70,000 users who are able to qualify for and participate in academic or marketing studies online.

Only those whose first language was English, and who had completed at least 10 prior Prolific

studies (due to this study's longitudinal nature and need for reliable participants) were able to

participate. The total compensation for completing all 3 portions was $5, at a rate of about $8 per

hour on average, per Prolific's recommendations. 550 people agreed to participate in the study.

65 were removed for not completing most of parts 2 and/or 3, 10 were removed because they

indicated post-debrief that they did not consent for their collected data to be used, and 1 was

removed for reporting that they were under 18 years old.

A final sample of 474 participants (222 males, 248 females, 4 unknown) completed 1, 2,

or all 3 parts of Study Two. In terms of gender, 220 identified as men, 242 as women, 6 as non-

binary, and 2 as transgender. Ages ranged from 18 to 78, with an average age of 33 ($SD = 11.64$).

Most (52.7%) labeled themselves as Democrats, 19.4% as Republicans, and 19.8% as having no

political affiliation. On a scale from 0 (extremely liberal) to 100 (extremely conservative),

participants were generally liberal-leaning ($M = 35.03$, $SD = 28.41$).

Most participants reported themselves as White (74.1%), followed by Asian (12.9%),

Black (11.2%), Hispanic/Latino (6.1%), American Indian/Alaskan or Other/Mixed (both 1.9%),

Middle Eastern (0.4%), and finally Hawaiian/Pacific Islander (0.2%)[1]. Participants were living in 44 different U.S. states (none indicated Alaska, Hawaii, Montana, North Dakota, South Dakota, or Wyoming), with the highest percentage of participants (12.6%) coming from California. Refer to Figure 1 for a map showing specific participant distribution.

Materials

In order to manipulate story conflict and content, eight short stories were created. There were two main storylines—titled "Building a Mystery" (BAM) and "Reckless Driving" (RD)— with both the story type (moral conflict/CON vs. no moral conflict/NO) and upheld foundation (care upheld/CU vs. loyalty upheld/LU) manipulated. Note that in the conflict condition, the stories with care upheld (CU) simultaneously had loyalty violated, and vice versa for the loyalty upheld (LU) condition. The eight stories therefore included CU/NO, LU/NO, CU/CON, and LU/CON versions of both BAM and RD (refer to Appendix A for all eight story stimuli). All characters were assigned gender-neutral names, and there were no gendered pronouns. The stories were written to be as similar as possible to each other, by using identical or similar storylines, as well as similar sentencing or phrasing whenever doing so would still allow for the story to properly match the condition.

The stories were validated using the eMFD (Hopp et al., 2020), an extension of Graham and colleagues' (2009) Moral Foundations Dictionary. The eMFD was developed using six content-analytical studies in which large, crowd-sourced human coders helped create and validate a corpus of words which significantly relate to the five moral foundations. The four stories were iteratively analyzed using the eMFD to make sure their words represented *care* and *loyalty* significantly more than the other three foundations (fairness, authority, and purity). It is

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[1] Ethnicity percentages total over 100% because participants could select multiple options.

important to note that it is nearly impossible for any more complex (i.e., 'realistic') story to perfectly isolate one or two foundations. For example, the eMFD itself shows that many words associated with the *loyalty* foundation also factor heavily onto *fairness* or even *authority*.

In addition, six news articles (positive vs. negative) were used to prime participants' levels of stress. Due to the pandemic and nature of online research, it was likely participants were maintaining a high level of baseline stress, making traditional stress induction methods challenging both ethically and feasibly. News articles about the pandemic were therefore used as a stress prime by either stoking (negative/pessimistic) or assuaging (positive/optimistic) common virus and quarantine-related fears. The topics included the viral threat and mortality rate, the health of the economy, and the state of social relationships amidst social isolation.

These news articles were adapted from real news sources (refer to Appendix C for the experimental articles as well as the original sources). Of note, the positive and negative articles were given the same title (adapted from one of the original sources) and labeled clearly as an "*OPINION*" piece. When at all possible, one article was shifted slightly in wording to convey the opposite frame (i.e., if meaning was not lost, there were no illogical statements, and no statements of false "facts" were made). To help control for potential biases in participants' perceptions of the news sources, the articles were presented as stemming from an unidentified news source and author. Items measuring agreement, optimism/pessimism, and perceptions of source trustworthiness/credibility were included as manipulation checks and distractor items.

Measures

Demographics and Psychographics

Participants indicated which U. S. state they resided in, as well as their age. Biological sex, gender, and ethnicity were measured with one item each. Levels of narcissism,

machiavellianism, and psychopathy (dark triad) were measured via a 6-item adaptation of Jones & Paulhus' (2014) short dark triad (SD3) scale (from 1 to 5, with 5 representing the highest levels). Neuroticism was measured using an 8-item subset of John et al.'s (2008) Big Five Inventory (BFI), also ranging from 1 to 5 (highest neuroticism). The Revised Sociosexual Orientation Inventory (SOI-R; Penke & Asendorpf, 2008) was used to measure individuals' sociosexuality or overall ideas regarding uncommitted sex. This scale included 9 items, where 0 represented the lowest levels of uncommitted sexual behavior or attitudes, and 8 represented the highest. Lastly, political affiliation was measured with one item, and political orientation was measured using a sliding scale ranging from 0 (Extremely Liberal) to 100 (Extremely Conservative).

Stress and pandemic-related measures were also included. Socioeconomic status was measured as well as current living situation (i.e., educational, occupational, and cultural SES; see e.g., Scherer & Siddiq, 2019) which included the number and type of cohabitants (i.e., parent, sibling, child, roommate, etc.), satisfaction with various relationships, and current/prior work status (i.e., working from home, working outside the home, furloughed, etc.). Level of social distancing or self-isolation was reported from most (4, "All of the time") to least (0, "Not at all").

Perceived vulnerability to coronavirus risk perceived protection efficacy, xenophobia, and level of cultural collectivism/individualism were adapted from Kim, Sherman, and Updegraff (2016). Perceived risk and perceived protection efficacy were measured using a 6-item scale ranging from 1 (least) to 7 (most). Xenophobia was measured using both a hypothetical travel ban scale (6 items, including an attention check, ranging from 0 to 2, where 2 is the highest level), as well as affective perceptions of immigrants in terms of hostility, admiration, and approval (6 items ranging from 1 to 10, where 10 represents the most

xenophobia). Finally, the collectivism/individualism scale included 7 items, one of which was an attention check ("I am paying attention and choosing strongly agree"). Answer choices ranged from 1 to 7, with 7 indicating the highest levels.

Participants were asked to self-report current stress levels, as well as stress levels at 6 previous timepoints spanning over the beginning stages of the pandemic. These retroactive stress timepoints were prompted using event cues, but participants were reminded that those were used only to help them recall the time, and were not necessarily the *cause* of their stress. The timepoints included late January, late February, mid-March, late March, late April, and late May. As an example, the time event cue for mid-March was "March 13th: Trump declared a national emergency". Self-reported stress ranged from 0 (Not at all stressed) to 100 (Extremely stressed).

Hormonal Markers

Selective body hair distribution was used to measure testosterone levels. This was adapted from Ferriman & Gallwey (1961), and asked participants to self-rate their vellous (non-'peach fuzz') hair level and distribution from 0 (least) to 4 (most), for their chest, upper, and lower abdomen. Higher scores indicate higher levels of testosterone. Menstrual phase was measured by asking participants to report the first day of their last menstrual period on a calender. For participants who reported a first day that was within 56 days (2 cycles) of their survey-taking, they were categorized into either their Follicular phase (day 1 through 14 from menstrual period onset) or Luteal phase (day 15 through 28). Menstrual phase indicates complex fluctuations of hormones such as estrogen, progesterone, and oxytocin, which rises during the Follicular phase, and falls during the Luteal phase (Engel et al., 2019). Lastly, height and weight was used to calculate participants' Body Mass Index (BMI) as a potential way to account for idiosyncratic health-related responses or results.

Moral Intuitions

Moral intuitions were measured using an adaptation of Clifford and colleagues' (2015) moral vignettes. The original measure includes 106 one-sentence hypothetical scenarios in which one foundation (emotional care, physical care, fairness, loyalty, authority, liberty, sanctity, or a non-moral social norm) is violated, and then participants are asked to rate how morally wrong the situation is. In order to significantly decrease the measure's cognitive and time requirement, one vignette from each cluster was chosen that had one of the highest factor loadings. This culminated in 7 randomly-ordered items that mapped onto emotional care, physical care, fairness, loyalty, authority, purity, and non-moral social norm (as a check). Participants rated each scenario from 1 (Not at all wrong; low salience) to 5 (Extremely wrong; high salience).

Media Evaluations

Participants were asked to answer a multiple-choice comprehension (i.e., attention check) item after each story. Self-reported enjoyment and appreciation of the short stories was measured using a 6-item adapted version of Oliver & Bartsch's (2010) scale. Self-reported perceptions of character morality were measured using a number of scales. The first was a 12-item adapted version of the Shortened Character Moral Foundations Questionnaire (CMFQ-S; Eden et al., 2015; Grizzard et al., 2019). Unlike the original CMFQ-S, the current study specified the character, or patient (see Gray, Waytz, & Young, 2012; Gray & Wegner, 2012), which the agent was acting upon. This was done to reduce ambiguity in interpreting the morality of a certain character (i.e., thinking that although Alex betrayed Riley, Alex was loyal to the local community).

Additional measures of character perception were included as based off of items from Tamborini et al. (2013). These include items asking about the overall behavior of the character

in terms of the five moral foundations, overall character morality, the extent to which the character behaved according to the situation versus their personality, perceptions of deservingness of outcomes for specific characters, and character liking. Level of story interest was measured by asking participants to report level of interest in a potential full-length film.

Procedure

Participants were recruited using Prolific.co, and were briefed on the study before signing up and following an anonymous Qualtrics link to complete the first survey (T1). Participants were instructed to start all questionnaires between the hours of 12:00 to 16:00h to control for diurnal variation. The first survey, T1, measured demographics, psychographics, retroactive stress levels, living situation, moral salience, and general media preference and exposure (i.e., Shade et al., 2015).

After one week, participants who had completed T1 were asked to complete the second questionnaire (T2). Female participants were asked to self-report the use and type of hormonal contraceptives, as well as asked to indicate the first day of their last menstrual period (to assess menstrual phase; i.e., Kirschbaum et al., 1993; 1999). Participants were then asked to self-report state stress during the previous week as well as currently, and any changes in their behaviors or current living situation. They were then asked to read three news articles which were randomly assigned as either positively framed or negatively framed. Articles were presented in a randomized order. After each article, participants reported how much they agreed or disagreed with the article, and perceptions of the author's credibility and trustworthiness. A manipulation check asked how optimistic or pessimistic they considered the articles to be. Participants were then randomly assigned to read and respond to two of the eight possible stories. Here,

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participants were randomly assigned to read and respond to one of two story conditions: CU vs. LU. One story had moral conflict and the other did not.

After another week, participants who completed T2 were able to complete the final survey (T3). As at T2, participants were asked to self-report state stress and any changes in their living situation. As at T1, perceived vulnerability to coronavirus risk, perceived protection efficacy, xenophobia, level of collectivism/individualism, and moral salience were measured again. Finally, participants were asked to upload their Netflix viewing history, and report height, weight, and selective body hair distribution.

<div align="center">

Results

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Media Use

Participants reported watching an average of 642.91 minutes (about 10 hours and 43 minutes; $SD = 610.27$) of television/streamed shows, and 280.53 minutes (about 4 hours and 41 minutes; $SD = 310.16$) of movies in a typical week. Netflix was the most frequently used streaming service, with 55.8% indicating that they used it at least 'most of the time.' When ranking their favorite genres (1 being most preferred), most participants indicated comedy shows ($N = 306$; $M = 1.71$, $SD = 0.80$) and action/adventure movies ($N = 303$; $M = 1.79$, $SD = 0.80$) as within their top 3.

Coronavirus-Related Attitudes and Behaviors

When asked how often they were social distancing at T1, participants reported an average of 3.24 (with 4 being "all of the time"; $SD = 0.74$). Household sizes ranged from 0 to 19 (excluding the self but including pets), with an average of 2.82 ($SD = 2.15$). 207 (64.1%) were working full-time and 116 (35.9%) part-time, with most (214 or 45.6%) saying they were working from home. 121 (25.6%) participants reported they were unemployed, laid off, or

furloughed. 173 (36.6%) indicated that their employment had changed within the preceding 3 months. Of those whose employment had recently changed, 38 (22%) had become unemployed.

The average level of overall relationship satisfaction was 4.04 (1 to 5, with 5 being "Very satisfied"; $SD = 0.83$). Participants reported an average stress level over the preceding months (about 4-5, starting late January at the start of the global pandemic) of 55.48 ($SD = 20.57$) on a 0 ("Not at all stressed") to 100 ("Extremely stressed") sliding scale. On a scale from 1 to 7 (7 being the highest) participants' average perceived vulnerability to coronavirus was 5.12 ($SD = 1.36$), and their average perceived protection efficacy was 4.01 ($SD = 1.40$).

Psychosocial Attitudes

4 participants failed two attention checks and were excluded from the following analyses. Average xenophobia levels were 1.34 (from 0 to 2, with 2 as the most xenophobic; $SD = 0.59$) when responding to hypothetical ban petitions, and 3.33 (from 0 to 9, with 9 as the most xenophobic; $SD = 1.81$) when reporting perceptions of hostility, admiration, and approval towards immigrants. The average level of ethnocentrism was 3.20 (1 to 7, 7 being most ethnocentric; $SD = 1.27$). Participants, on average, were more individualistic (1 to 7 scale; $M = 5.04$, $SD = 0.79$) than they were collectivistic ($M = 4.36$, $SD = 1.22$).

Lastly, in terms of the dark triad (1 to 5, 5 as highest), the average score for machiavellianism was 3.79 ($SD = 0.72$), narcissism was 2.74 ($SD = 0.91$), and psychopathy was 1.95 ($SD = 0.89$). Neuroticism (also 1 to 5) was at an average of 2.94 ($SD = 0.87$), and sociosexual orientation (0 to 8) was 2.65 ($SD = 1.58$). These results more or less align with similar findings (Jones & Paulhus, 2014; Noftle & Robins, 2007; Penke, 2011).

Moral Intuitions

In addition to filtering out those with failed attention checks, outliers were removed. Moral vignettes (where 1 is "not at all wrong" and 5 is "extremely wrong") were used as measures of moral salience levels at both T1 and T3 (refer to Table 1). At T1, purity was highest ($M = 4.37$, $SD = 1.02$), followed by overall care (the average of both physical and emotional care; $M = 4.19$, $SD = 0.74$), fairness ($M = 3.77$, $SD = 0.99$), authority ($M = 3.28$, $SD = 0.96$), and loyalty ($M = 2.54$, $SD = 1.23$). Non-moral social norms (used as a check) received an average score of 1.43 ($SD = 0.81$). It is worth noting that although purity was highest when compared to *averaged* care, by itself, physical care was highest ($M = 4.43$, $SD = 0.79$).

Average scores for Machiavellianism, narcissism, and psychopathy (the dark triad, where 1 is low and 5 is high) were 3.79 ($SD = 0.78$), 2.74 ($SD = 0.91$), and 1.98 ($SD = 0.93$), respectively. Participants had an average neuroticism score (also from 1 to 5) of 2.94 ($SD = 0.87$). Sociosexual orientation ranged from 0 (lowest) to 8 (highest), with participants scoring an average of 2.65 ($SD = 1.58$). The average political orientation was 34.82 (0 as most liberal and 100 as most conservative; $SD = 28.37$). Most participants (53.2%) identified as Democrats, followed by no affiliation (20%), Republican (18.7%), Libertarian (3.6%), Other (3%), then Green (1.5%).

Story Manipulation Checks

A story pretest was conducted using a separate sample of undergraduate students. Of the initial 144 participants who completed most or all of the online questionnaire, 13 were eliminated for indicating they were non-native English speakers, and 3 were eliminated for failing both attention checks. The final sample size was 128 (84 females, 44 males), with an

average age of 21.59 (*SD* = 1.97). Most self-reported their ethnicity as White (60.2%), Asian

(26.6%), or Hispanic/Latino (16.4%).

Participants were randomly assigned to read one version (CU or LU) of the BAM story,

and one version (CU or LU) of the RD story. All stories had conflict, and story order was

randomized. Independent samples t-tests compared perceptions of both characters in both stories,

and how they differed between the story conditions (see Figure 2). For BAM, the main character

was perceived as significantly less harmful in the CU group than LU group, $t(126) = 5.95$, $p <$

.001, and significantly more loyal in the LU group than CU group, $t(126) = -5.62$, $p < .001$. For

Figure 2

Story Pretest: Main Characters' CMFQ Scores
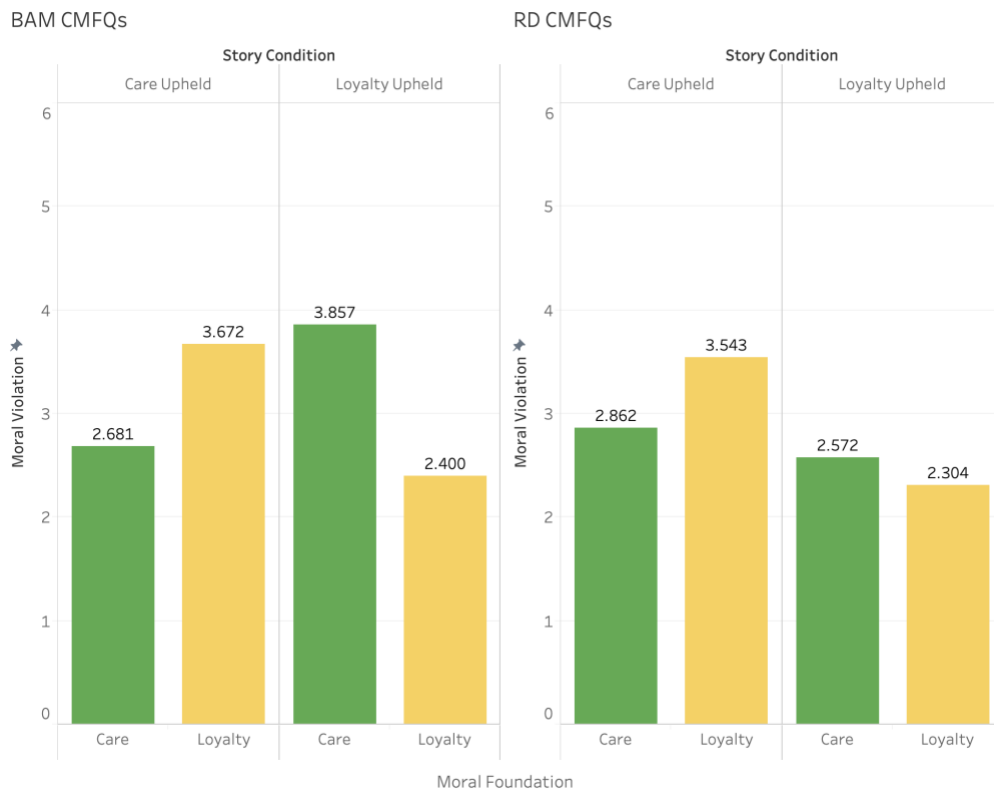
Note. Scores indicate perceived level of foundation violation.

RD, the main character was perceived as non-significantly more harmful in the CU group compared to LU group, $t(125) = -1.58$, $p = 0.12$, but was seen as significantly more loyal in the LU group than CU group, $t(125) = 4.04$, $p < .001$. These results suggest that the manipulation mostly worked.

Moral Salience and Story Evaluation

Repeated measures analyses were conducted using a Linear Mixed Models (LMM) approach, with story order as the indicator. H1 predicted significant interaction effects between salience level and story condition such that high care salience in the CU group, and high loyalty salience in the LU group, would predict increased enjoyment/appreciation and character morality. LMM analyses assessed the effects of care salience, loyalty salience, story condition (CU vs. LU), and conflict (NO vs. CON) on story evaluation (enjoyment for stories without conflict, and appreciation for those with it) and measures of character morality. Salience levels from T3 were not used in case salience level shifts between T1 and T3 were due to the article or story evaluations themselves, as the MIME would suggest (e.g., exposure predicts moral salience; Eden et al., 2014).

When assessing story evaluation as the DV, the interaction between story condition, conflict, and care salience approached significance, $F(3, 420.99) = 2.12$, $p = .09$ (see Figure 3), while that between story condition, conflict, and loyalty salience did not. High care salience individuals gave the highest ratings to the conflict stories, while the lowest ratings went to low salience individuals reading LU_NC stories. As predicted, increased care salience was related to increased enjoyment/appreciation of both CU stories relative to low care salience, but it was also related to increased appreciation of LU_C stories, not as predicted. No interaction effects were significant when using measures of character morality as the DV.

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Peripherally, there was a main effect of loyalty salience on story evaluation, $F(1, 347.93)$ = 4.46, $p < .05$, with higher loyalty salience predicting higher evaluation scores. In terms of character morality, there was a significant main effect of care salience, $F(1, 339.74) = 7.13$, $p < .01$, with high salience predicting higher character morality. H1 was mostly unsupported.

Figure 3

H1 Story Evaluation: Story Type x Care Salience
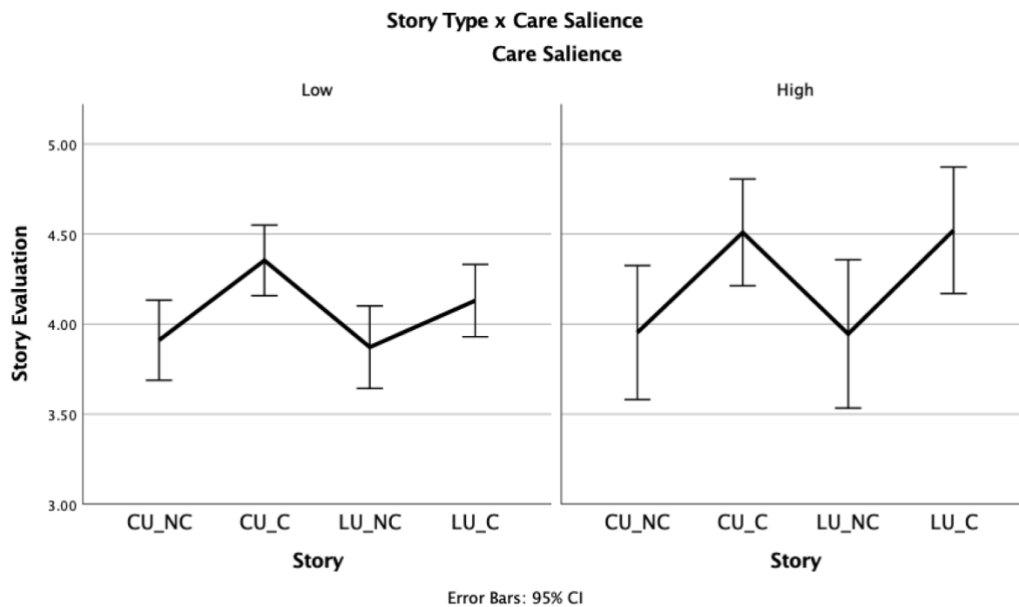
Note. The *y*-axis is limited to 3-5 for easier interpretation. Evaluation scores ranged from 1 to 6.

Priming News Article Manipulation Checks

News articles were used to prime participants into higher or lower state stress. The news articles were analyzed in order to determine whether the positive vs. negative treatment worked. Any data where participants spent less than 20 seconds reading the articles were excluded. A t-

test was used to compare the positive and negative article groups and determine whether they differed significantly in agreement, author trustworthiness/credibility, or optimism/pessimism.

As expected, groups differed significantly in perceptions of article optimism/pessimism for all three topics. Those in the positive group rated articles as significantly more optimistic than those in the negative group for the viral articles, $t(334) = -17.77$, $p < .001$, economy articles, $t(341) = -19.21$, $p < .001$, and relationship articles, $t(341) = -14.32$, $p < .001$. These results suggest that the manipulation worked.

A t-test was also used to compare overall reported levels of article agreement, as well as perceived author trustworthiness and credibility between the news groups. Overall, those in the negative news group agreed with all articles more, and rated all authors as more trustworthy and credible, than those in the positive news group did. This difference was significant for all dependent variables (all $p < .05$) except when it came to perceived credibility and trustworthiness of the relationship articles.

Sex, Stress, and Story Evaluation

Predicted Stress Model

Although stress level was self-reported throughout the study, a separate model to predict stress level was created. This model took into account 1) employment-related stress; 2) financial stress; 3) relational stress; 4) viral age risk; 5) social isolation; 6) perceptions of viral threat and protection; and 7) stress countermeasures. The difference between participants' reported SES and their state-specific "living wage" (*SES distance*, or *sd*) was first calculated using data published from Anderson, 2020 and Dennison, 2019.

Refer to Table 2 for the full predicted stress model and calculation protocol. Higher scores indicated higher levels of predicted stress. After one outlier was removed, participants'

Table 2

Model of Predicted Stress

$$stress = e + f + r + a + i + (t - p) - c$$

Variable	Notation	Calculation					
Employment change stress[a]	e	$2sd$	$2h$	$1.5h$	$2t$		
Financial stress	f	$sd + 2k - so$					
Relational stress	r	$[(n_{so} * rs_{so}) + rs_{so}] + [(n_{fm} * rs_{fm}) + rs_{fm}] + [(n_{fs} * rs_{fs}) + rs_{fs}] + [(n_{rm} * rs_{rm}) + rs_{rm}]$					
Age-related risk stress	a	ages 18-29 = 1	ages 30-39 = 2	ages 40-49 = 3	ages 50-64 = 4	ages 65-74 = 5	ages 75-84 = 6
Isolation stress	i	no isolation = 0	Maximum isolation = 4				
Perceived viral threat	t	lowest = 1	highest = 7				
Perceived viral protection efficacy	p	lowest = 1	highest = 7				
Stress countermeasures	c	none = 0	maximum = 16[b]				

Note: sd = socioeconomic distance (state-specific income – reported income); h = total people in household; k = total kids in household; so = total significant others in household; fm = family members; fs = friends; rm = roommates or housemates

[a]Calculations from left to right: if 1) newly unemployed, laid off, or furloughed; 2) newly working from home; 3) previously working partially outside the home; or 4) newly working outside the home

[b]Totaled scores for amount of exercise, sleep, diet, and meditation

predicted stress ranged from -38 to 26, with an average of -7.19 (SD = 13.32) and was normally

distributed. Predicted stress was also significantly correlated with participants' self-reported

stress from mid-March, r(467) = 0.15, late March, r(470) = 0.17, late April, r(470) = 0.20, late

May, r(472) = 0.31, at T1, r(465) = 0.32, at T2, r(368) = 0.25, and at T3, r(374) = 0.28 (all p

values ≲ .001). The predicted stress model did not significantly predict self-reported stress in

late January, r(469) = 0.03, p = .46, or late February, r(471) = 0.06, p = .20. Finally, a t-test

showed that females had significantly higher predicted stress levels than males, t(467) = -3.33, p

= .001.

The Effects of Sex and Stress

H2a and H2b predicted sex and stress as moderating variables, such that the highest

evaluations and perceptions of morality would belong to males high in stress/loyalty salience in

the LU group, and females high in stress/care salience in the CU group. LMMs analyzed the

effects of sex, predicted stress, news priming condition (positive/low stress vs. negative/high

stress), care salience, loyalty salience, story condition (CU vs. LU), and conflict (NO vs. CON)

on story evaluation (enjoyment for stories without conflict, and appreciation for those with it)

and measures of character morality. It's important to note that a full factorial model wasn't

tested, and instead only theorized interaction effects were included.

There was a significant interaction between story condition, conflict, sex, and stress on

story evaluation, F(7, 355.45) = 2.90, p < .01, as well as on main character behavioral

appropriateness, F(7, 359.92) = 2.20, p < .05, with the interaction approaching significance on

overall character morality, F(7, 390.79) = 1.79, p = .09 (see Figure 4). Low stress females

generally gave the highest ratings, with high stress females showing an increase in CU_C

appreciation, and a drop in LU_NC enjoyment—as predicted. However, there was not a

significant difference in ratings of LU stories for low vs. high stress males. Regarding character

morality, high stress females rated the CU_C character's behavior as more appropriate, and the

LU_NC character as generally less moral, than low stress females did, consistent with H2a.

However, high stress males rated the LU_C character's behavior as most inappropriate,

inconsistent with H2b.

Figure 4

H2 Outcomes: Story Type x Sex x Stress

Error Bars: 95% CI

There was a significant interaction between story condition, conflict, sex, and news prime

on story evaluation, $F(11, 420.26) = 1.82$, $p < .05$. As predicted, males enjoyed LU_NC stories

more after reading negative news (i.e., high stress prime) rather than positive. Females who read

negative news enjoyed the CU_NC stories more than those who read the positive news, which was predicted, however they also rated both the CU_C *and* LU_NC stories lower.

There were no significant interaction effects on story evaluation or perceived character morality with either care or loyalty salience as was predicted. However, peripheral findings showed a main effect of predicted stress on story evaluations, $F(1, 329.60) = 14.74$, $p < .001$, with low stress participants rating stories more highly. High stress females appreciated conflict stories more than high stress males did and enjoyed no conflict stories less than low stress females. Both low stress females and high stress males rated the LU_C main characters' behavior as more inappropriate (and as generally less moral) than low stress males. In general, high stress females rated the LU characters' behavior as more inappropriate, and characters as generally more immoral, compared to the CU characters. Overall, H2a and H2b remained moderately supported.

The Effect of Hormonal Markers

H3 predicted that hormonal markers would further moderate relationships with story evaluation and character morality. LMM analyses assessed the effects of testosterone (body hair measure) and menstrual phase (follicular vs. luteal) as part of the models tested in H2.

When looking at story evaluation as the dependent variable, there was a significant interaction effect between story condition, conflict, care salience, stress, and menstrual phase, $F(8, 94.73) = 2.05$, $p < .05$. In general, stories were rated highest by high care salience, low stress participants who were in their Follicular phase of the menstrual cycle. With higher stress and high care salience, story evaluations dropped for those in the Follicular phase compared to those in the Luteal phase also with high stress and high care salience. This was especially

prevalent for the CU_NC stories, which was enjoyed more on average by high stress participants in the Luteal phase. Refer to Figure 5 for an illustration of these findings.

When assessing perceptions of the main character's behavior as the dependent variable, there was a near-significant interaction effect between story condition, conflict, care salience, news prime, and menstrual phase, $F(15, 88.79) = 1.74$, $p = .06$. Participants low in care salience and in the negative prime news group (i.e., high stress) rated the LU_C main character's behavior as most inappropriate, particularly during the Follicular phase. The CU_C character's behavior was perceived as most appropriate for high care salience, negative prime/high stress participants in their Follicular phase, while the character's behavior was deemed most *in*appropriate for high care salience, positive prime/low stress participants in their Luteal phase. Refer to Figure 6 for an illustration of these patterns.

Some additional, non-central, analyses revealed significant main effects of both news prime, $F(1, 56.35) = 10.25$, $p < .01$, and stress, $F(1, 44.27) = 5.27$, $p < .05$, on ratings of overall character morality. Characters were rated as generally more moral by those who read the negative news prime (i.e., high stress), as well as by those higher in predicted stress. H3 was moderately supported.

Relationship Between Biological Sex and Moral Salience

H4 posited that females would have higher care salience and males would have higher loyalty salience. To test this, independent samples t-tests were conducted to assess moral salience levels between males and females. Overall, for T1 vignette measures, females had higher care salience levels ($M = 4.34$, $SD = 0.73$) than males ($M = 4.01$; $SD = 0.76$), $t(468) = -4.81$, $p < .001$. Males had higher loyalty salience levels ($M = 2.68$; $SD = 1.23$) than females ($M = 2.42$; $SD = 1.23$), $t(468) = 2.24$, $p < .05$.

Figure 5

H3 Story Evaluation: Story Type x Care Salience x Stress x Menstrual Phase

Follicular Phase: Story Type x Care Salience x Stress on Story Evaluation

Luteal Phase: Story Type x Care Salience x Stress on Story Evaluation
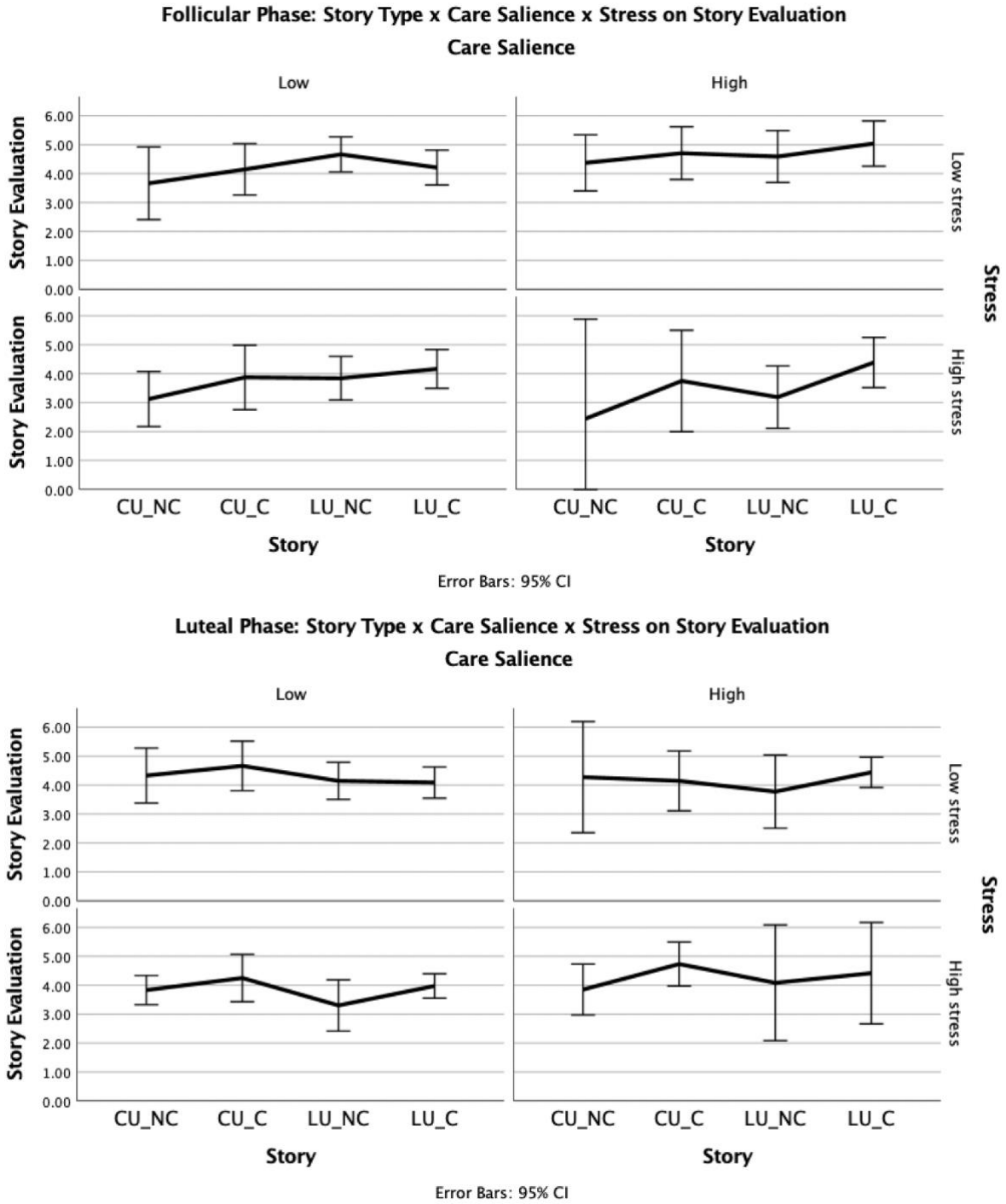
Figure 6

H3 Character Perception: Story Type x Care Salience x Stress x Menstrual Phase

Follicular Phase: Story Type x Care Salience x News Prime on Character Behavior

Luteal Phase: Story Type x Care Salience x News Prime on Character Behavior
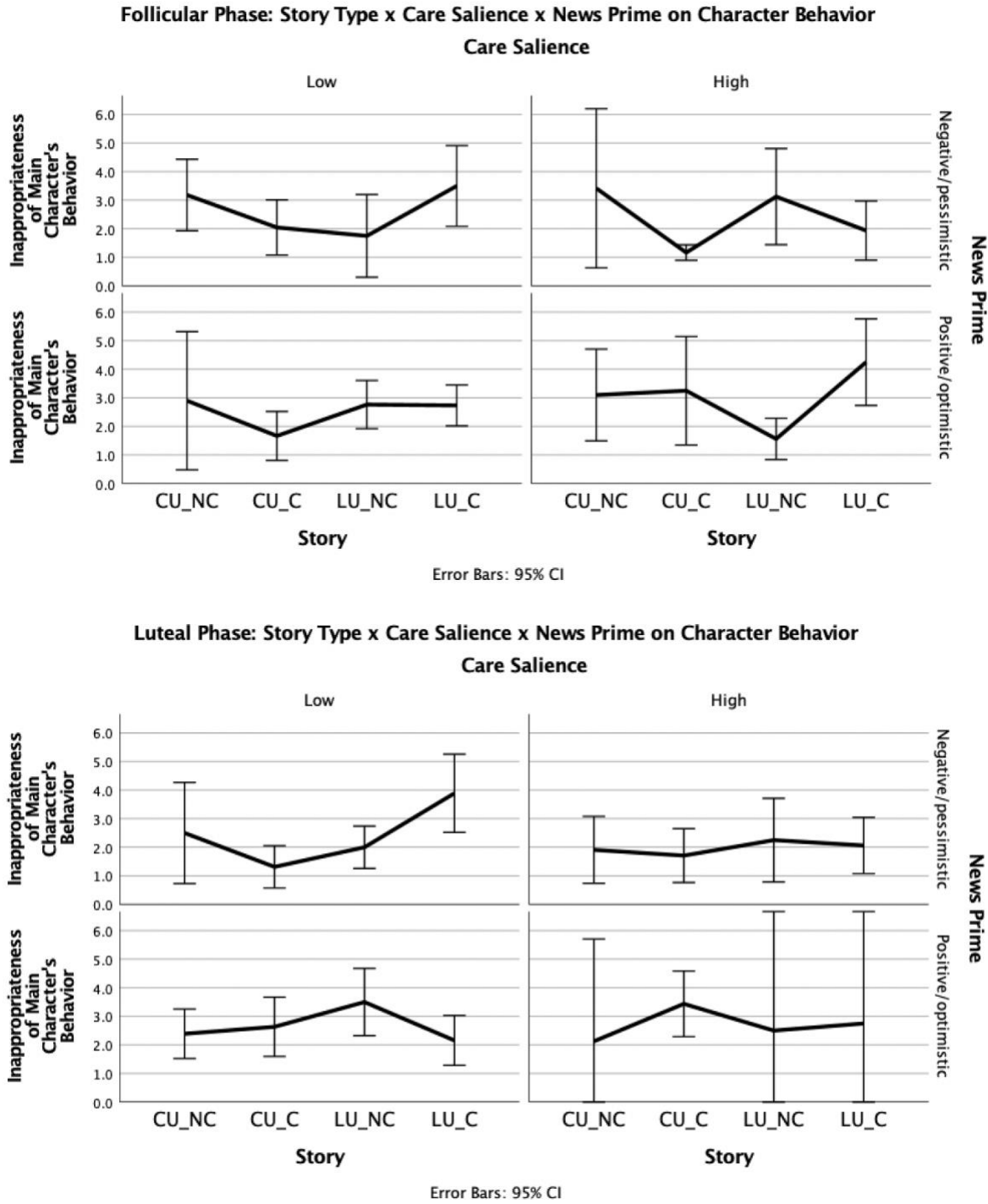
Exploratory analyses showed that differences in fairness and authority salience levels were not significant, although they were for purity and non-moral social norms. Females indicated higher purity salience levels ($M = 4.44$; $SD = 0.98$) compared to males ($M = 4.21$; $SD = 1.16$), $t(468) = -2.35$, $p < .05$, while males indicated higher social norm salience ($M = 1.60$; $SD = 0.98$) than females ($M = 1.38$; $SD = 0.80$), $t(468) = 2.69$, $p < .01$. H4 was supported.

Virus Threat, Protection, Sex, and Psychosocial Attitudes

H5 predicted that both perceived virus threat and protection efficacy would predict care salience in females, loyalty salience in males, general purity salience, and psychosocial attitudes like collectivism, xenophobia, and ethnocentrism. Bivariate correlations between care salience and perceived virus threat were calculated for males and females. For females, virus threat was significantly related to care salience, $r(246) = 0.19$, $p < .01$, such that higher care salience was associated with increased perception of threat. However, care salience was not significantly associated with perceived protection efficacy, $r(246) = -0.02$, $p = .70$. For males, loyalty salience was *not* significantly correlated with virus threat, $r(220) = -0.002$, $p = .98$, nor for protection efficacy, $r(220) = 0.10$, $p = .14$.

Overall, a bivariate correlation showed that virus threat was not significantly associated with purity salience, $r(470) = -0.03$, $p = .50$. However, perceived virus vulnerability was predicted by more positive (lower hostility) affective perceptions of immigrants, $r(470) = -0.31$, $p < .001$, as well as by decreased ethnocentrism, $r(470) = -0.26$, $p < .001$.

In general, protection efficacy from both T1 and T3 were significantly correlated with purity salience, $r(470) = 0.13$, $p < .01$. In addition, protection efficacy was significantly positively associated with xenophobia (affective perceptions of immigrants), $r(470) = 0.23$, $p < .001$, and ethnocentrism, $r(470) = 0.43$, $p < .001$. These results showed moderate support for H5.

Discussion

This study sought to capitalize on the naturalistic, ubiquitous, and highly stressful context of the global pandemic, and to assess the extent to which biological sex, stress, and hormonal markers interact with moral intuitions to predict the way individuals react to moral conflict in narratives. H1 posited the replication of classical MIME predictions, whereby higher care/loyalty salience was associated with higher narrative enjoyment, appreciation, and perceived character morality within stories where care/loyalty was upheld, respectively. Surprisingly however, results showed little support for H1. Only care salience was found to predict evaluations of stories where care was upheld, but no other proposed interaction effects were significant.

H2 garnered mixed support. High stress females (compared to low stress ones) appreciated the care upheld stories more, enjoyed the loyalty upheld stories less, rated the care upholding character as acting more appropriately, and rated the loyalty upholding character as generally less moral, which is all consistent with the predicted pattern in H2a. However, males did not follow predicted patterns, and even rated the loyalty upheld (conflict) character's behavior as most inappropriate, opposite of H2b. When analyzing the effect of the news prime stressor, negative or high stress news conditions (versus positive) did lead males to enjoy the loyalty upheld stories more. Females in the negative or high stress condition enjoyed the care upheld stories more, but also showed a decrease in appreciation of the care upheld stories and in enjoyment of the loyalty upheld stories. Most of these results supported H2a and H2b, although H2a predicted that high stress females would appreciate care upheld stories more, not less.

H3 introduced hormonal markers—body hair testosterone measures and menstrual phase—as moderators to the proposed patterns in H2. H3 garnered moderate support. Menstrual phase seemed to interact with care salience and stress, with high stress females in their Luteal

phase enjoying the care upheld stories the most. Females in their Follicular phase, who were then assigned to the negative news prime/high stress condition, also seemed to perceive characters upholding loyalty (and violating care) as behaving most inappropriately when their care salience levels were low. Further, they also rated the character upholding care (and violating loyalty) as behaving most appropriately when their care salience levels were high.

Lastly, as H4 predicted, females had higher levels of care salience while males had higher levels of loyalty salience. H5 also received moderate support, with females' (but not males') higher care salience levels relating to heightened perceptions of virus threat, which was also related to more positive affective perceptions of immigrants (i.e., lower xenophobia), and lower ethnocentrism. Generally, higher reported perceptions of protection efficacy were also correlated with higher levels of purity salience, higher xenophobia, and higher ethnocentrism.

It is perhaps most puzzling that H1, representing fundamental MIME predictions, was not supported. The MIME has been corroborated by a growing body of research across countries and cultures (see e.g., Tamborini, Eden, et al., 2017). Here, I can offer two possible explanations for why moral salience did not predict evaluations of this study's narratives. First, it might be that the stories themselves, which were original and developed by a small team of researchers, did not map onto the foundations of care and loyalty well enough, or significantly more than the other foundations. However, the stories were developed using a well-developed and validated corpus of foundation-specific words, the eMFD. Additionally, they were pretested using a separate student sample, where the care upheld/loyalty violated stories showed significantly higher ratings of loyalty violation, and the loyalty upheld/care violated stories showed significantly higher ratings of care violation. There was one exception to this, though, in that one

of the story's main characters was rated as actually violating care *more* in the care upheld/loyalty violated story. This may have introduced an artifact, leading to unsupported H1 predictions.

The other potential explanation is that measures of moral salience levels were flawed. Due to the intensive, longitudinal nature of this study, items needed to be carefully chosen and the survey needed to be as non-cognitively exhausting and efficient as possible. Moral salience was measured at the first and last timepoints, and to do so without contributing further to participant burnout, an adapted version of Clifford et al.'s (2015) vignette measure was used. Rather than present up to 106 scenarios, one item representing each foundation or social norm was chosen for T1, and another set of items was chosen for T3 (see Table 1). It is possible that these items did not capture individual salience levels well enough in isolation. However, it is worth noting that these items were chosen specifically because they were among those with the highest factor loadings within each cluster of foundation-specific items, so theoretically they should have represented each foundation well.

It was also surprising that loyalty salience overall predicted higher story evaluation scores, or that care salience overall predicted increased perceptions of character morality. Ideally, this study would have included even more stories in its repeated measures design. Alternatively, more pretesting would be helpful, as doing so may help to illuminate whether or not the fundamental mechanics of the stories themselves were leading to systematic and unintended perceptions.

When piloting this study in a lab experiment version, it also became apparent that some of the CMFQ or general story perception items may have been unclear, and particularly confusing when combined with more complicated moral narrative content. More specifically, the original CMFQ items—which *are* well-validated—do not specify the agent (the 'doer' of the

moral/immoral behavior) or the patient (the 'receiver' of the behavior and/or its consequences).

Given that these stories involve a main character, a secondary character, and some peripheral characters, it is possible that in applying these items to a more complex context, participants interpreted the items differently. For example, when reading the statement, "Alex...cheated" one might interpret the patient as the secondary character, while another might interpret the patient as a peripheral one. CMFQ items in this study were therefore adapted as best as possible, although they may have still remained confusing and in need of pretesting and refinement.

H3's findings also open the door for significant exploration and discussion. Studies on pre-menopausal women suggest that females in the Luteal phase react the most psychophysiologically to social stress in the form of salivary cortisol level, while females in their early Follicular phase, depending on idiosyncratic coping styles, are "more sensitive to stress, displaying slightly more Flight, Submission, and Displacement behaviors and a significantly larger percentage of assertive behaviors (low-aggressiveness)" (Villada et al., 2017, p. 38). TBT specifically theorizes about the role of oxytocin in female stress response. A meta-analysis on endogenous oxytocin levels showed that oxytocin increases significantly from the early Follicular phase to ovulation, and decreases significantly from ovulation through the mid-Luteal phase, with no significant difference in concentrations between the two timepoints themselves (Engel et al., 2019).

Put all together, the Follicular phase has been associated with higher Oxytocin levels, subjective feelings of stress, and more varied and stress-dependent behaviors, while the Luteal phase has been associated with lower Oxytocin levels, higher salivary cortisol levels, and lessened sensitivity to feelings of stress or subsequent behaviors. Higher stress levels, as suggested in this paper, would lead to the moral foundation of care becoming either dominantly

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or overridingly salient in media content. It's possible then that fluctuations in oxytocin levels, alongside a complex interplay of estrogen and progesterone (which moderate the oxytocin response), and cortisol, help to explain why females in their Follicular phase reacted the strongest to violations or maintenance of the care foundation.

As oxytocin increases and females experience more stress, the instinct to monitor others' behavior may be highest—leading to those highest in stress and in this phase to react the strongest to character behavior. Opposite of this, those in the Luteal phase have lowered affective feelings of stress, as oxytocin decreases, allowing them to be less vigilant of others' behavior, and more likely to experience higher-level, subjective feelings of entertainment. This may explain why those who felt most stressed in this phase reported the most enjoyment when care was upheld. Of course, further research would be required in order to ascertain whether actual endogenous levels of oxytocin or other hormones were indeed causing affective responses to stress or moral content. Still, the crossover between hormones, cognition, and behavior remains debated as the extent of its ability to permeate the blood-brain barrier keeps these exact connections unclear (see e.g., Nave et al., 2015).

Although this study led to some unsupported, and at times core, predictions, it has taken a sizable step forward in the search for theorizing, and then testing, potential key moderators in the MIME. It is still quite possible that given the consistent links between biological sex, hormones, and moral judgment, as well as biological sex and media preference, that a moderating relationship still exists in the model as a whole. Stress, as demonstrated in this paper, is an often slippery concept to study. It can be difficult to explicate its various manifestations or forms (i.e., chronic stress, physiological stress, or experiential stress), and even more difficult to measure. This study was the first we've known that has utilized a battery of demographic and

psychographic information to model predicted stress in the Coronavirus era *without* using more bias-prone, self-reported stress data. Results suggest that it is tapping into something substantial, as it significantly predicted seven out of nine self-reported stress timepoints.

Future analyses are needed to explore all facets of this large, complex, and highly rich dataset. For example, about half, or over 200, participants uploaded their Netflix viewing history. This data spans from the very beginning of their subscription, through the developing stages of the pandemic and quarantining. Time series analyses will help assess the more complicated interdependent relationships that may exist between media consumption, individual effects on stress or attitudes, and subsequent media selection. Although the story manipulation checks revealed a mostly successful treatment, additional data collection would be greatly beneficial. The creation, testing, and refinement of more novel conflict stimuli would help verify the existence (or lack, thereof) of significant outcome effects. As it stands now, these stimuli are closer to isolating and tightly controlling for just care and loyalty, but not perfect.

With the pandemic continuing to unfold, it would be particularly interesting to test the role of purity salience or conflict involving purity. The pathogen prevalence hypothesis, which suggests that humans have evolved both physiological as well as cognitive or behavioral defenses to pathogens (Schaller & Murray, 2008), predicts that salience for the moral foundations of loyalty, authority, and particularly purity mediate the relationship between pathogen prevalence and conservativeness (Bastian et al., 2019). As a viral pandemic is an unequivocally purity-central context, it stands to reason that individuals' purity salience would likely be both higher, but also more salient, and more predictive of conflict perception and feelings of enjoyment or appreciation.

This study captured a wide breadth and depth of psychosocial attitudes, moral intuitions, key demographics, and reactions to rich news articles and complicated short stories. It also includes real-world media selection data via Netflix use. Perhaps most exciting is that this dataset tracks over time a non-student, much more representative sample of Americans as they navigate an unprecedented global pandemic. A cleaned version of the dataset may be found at https://osf.io/dhwmb/ for other scholars to explore and analyze. Future research might build on the longitudinal and data-rich nature of this study to take a closer look at the role of purity, biological sex, stress, conservativism, and subsequent reaction to stories representing care and loyalty.

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Tables and Figures

Table 1

Moral Vignettes from T1 and T3

Foundation	T1	T3
Care Emotional	You see a woman commenting out loud about how fat another woman looks in her jeans.	You see a teenage boy chuckling at an amputee he passes by while on the subway.
Care Physical	You see a zoo trainer jabbing a dolphin to get it to entertain his customers.	You see a woman swerving her car in order to intentionally run over a squirrel.
Fairness	You see a student copying a classmate's answer sheet on a makeup final exam.	You see a runner taking a shortcut on the course during the marathon in order to win.
Loyalty	You see a coach celebrating with the opposing team's players who just won the game.	You see an employee joking with competitors about how bad his company did last year.
Authority	You see a girl repeatedly interrupting her teacher as he explains a new concept.	You see a girl ignoring her father's orders by taking the car after her curfew.
Purity	You see a man having sex with a frozen chicken before cooking it for dinner.	You see a very drunk woman making out with multiple strangers on the city bus.
Social Norms	You see a woman continuing to wear a large sun hat inside her apartment complex.	You see someone at the school gym lifting free weights in nice business clothes.

Note: All items were chosen because they had factor loadings above 0.4 (Clifford et al., 2015). Scenario orders were randomized.

Figure 1

Participant Distribution Map
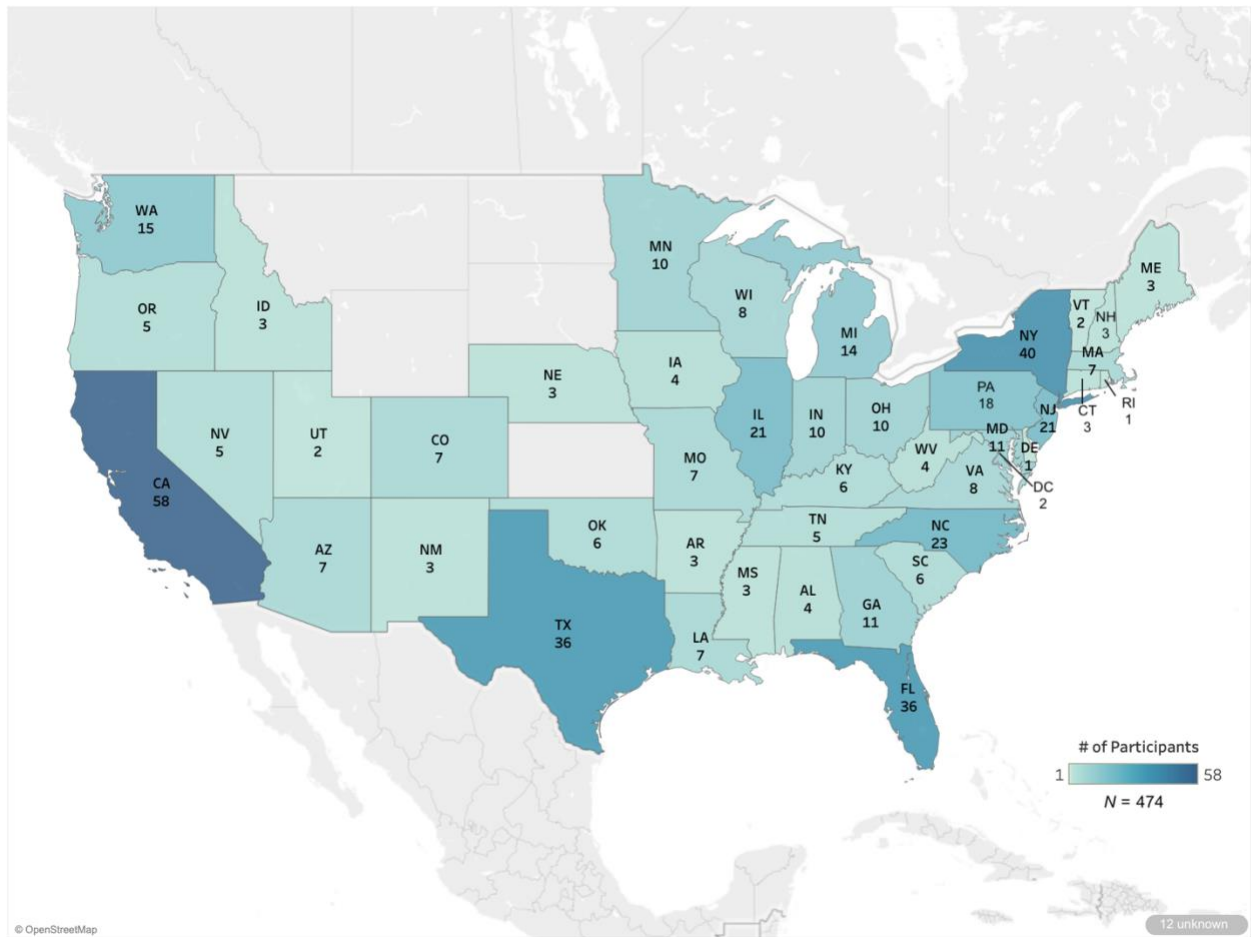
Note. 12 participants did not report their state.

Appendix A

Building a Mystery

[No conflict; *Care* upheld]

Alex lives in a small, local town. Alex and their longtime friend and business partner, Riley, are beloved and viewed as local allies. They are known for their construction business and have built many local homes and businesses, often at a discount or through locals-only deals. One night, Alex comes across a series of emails from community members asking Alex and Riley to help the community personally thank two families who have touched their lives. Through some more investigation, Alex finds out about the two loving families in the area and why they are more than deserving of support for their positive community impact. These families have devoted hours every week to working for local nonprofits, and have personally helped hundreds of others over the years. As Alex further learns, one of the young, growing families has been hoping to move into a bigger, nicer home. Another has been looking to turn their wildly successful home business into their very own storefront.

Inspired, Alex consults with Riley about this heartwarming discovery. Together, they ignite a town-wide push to help partially fund the construction of a home and a storefront business. In addition, Alex and Riley have the idea to use the thousands of extra donations to build low-income housing, shelters, and other programs supporting underprivileged children and families. Headlines about the 'heroic habitats' are leaked the next day, as Alex and Riley are warmly celebrated for their compassion. Alex and Riley visit with the two families, who thank them for their kindness with tears of joy in their eyes. In the end, Alex and Riley are able to smile and laugh over dinner with both families in their brand-new home.

Building a Mystery

[No conflict; *Loyalty* upheld]

Alex lives in a small, local town. Alex and their longtime friend and business partner, Riley, are beloved and viewed as local allies. They are known for their construction business and have built many local homes and businesses, often at a discount or through locals-only deals. One night, Alex comes across a series of emails to Riley, who left their account logged in and open. Through some more investigation, Alex finds out that Riley has been bombarded with emails from their main competitor the next town over. The competitor has been asking Riley to work for them, and each successive email offer includes higher pay and incredible benefits as the business is set to go global. As Alex sees, Riley has left each email unanswered.

Worried, Alex consults with Riley about this discovery the next day. "Even though I can't imagine running this business without you, I understand if you want the higher pay or the amazing benefits. I admit, even I'm a little jealous." After a moment, Riley smiles and says, "I wouldn't be here without you. I would never jump ship." Together, they write a response email to the competitor, explaining that they are appreciative but that they are devoted to their partnership and local community. The next day, the competitor shows up to their business and explains that they are so impressed by the partners' solidarity, they would like to work together, where Alex and Riley can completely manage their own team spanning locally as well as state-wide. Alex and Riley deliberate, agreeing weeks later to grow their businesses together. Headlines about the 'perfect partnership' are leaked the next day. In the end, Alex and Riley are able to continue working side-by-side, forming a bond that can truly withstand anything.

Building a Mystery

[Conflict; Care upheld/Loyalty violated]

Alex lives in a small, local town. Alex and their longtime friend and business partner, Riley, are beloved and viewed as local allies. They are known for their construction business and have built many local homes and businesses, often at a discount or through locals-only deals. One night, Alex comes across a series of emails they weren't meant to see. Through some more investigation, Alex finds out that some employees within the construction business have been instructed by Riley to seek out and destroy abandoned buildings where many homeless people, including poor families with children, live. These employees, whom Alex has grown up with and has been a supporter of for decades, have gone on raids to harass or even sometimes assault the homeless who won't immediately leave. After getting them to leave, Riley is able to publicly sweep in and offer "discounted" rates to build new homes, painting themselves as a hero who provides shelters during the "housing crisis" that they themselves are creating. Alex knows that if they leak this news to the press, they can stop the destruction of these innocent peoples' homes, but Riley will be slammed, the local solidarity will be broken, and the public backlash will force Riley to leave their hometown.

Mainly fearful for the future of the local community and its rapidly increasing rate of homelessness, Alex decides to dismiss Riley and the group of employees in order to alert the local news. Alliances between Riley, these longtime employees, and the local community are ruined. Headlines about an 'internal whistleblower' are leaked the next day, wreaking havoc on the partners' construction business and casting its publicly disgraced members as heartless and cruel puppet-masters, which they deserve. Alex is abandoned by Riley for their perceived betrayal as the company that once existed is demolished. Despite being thrown aside by Riley,

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Alex is warmly welcomed by the townspeople, who celebrate Alex's compassion. Alex ignites a town-wide push to curtail the destruction of the occupied buildings, and to rebuild low-income housing, shelters, and other programs supporting homeless children and families.

Building a Mystery

[Conflict; Loyalty upheld/Care violated]

Alex lives in a small, local town. Alex and their longtime friend and business partner, Riley, are beloved and viewed as local allies. They are known for their construction business and have built many local homes and businesses, often at a discount or through locals-only deals. One night, Alex comes across a series of emails they weren't meant to see. Through some more investigation, Alex finds out that some employees within the construction business have been instructed by Riley to seek out and destroy abandoned buildings where many homeless people, including poor families with children, live. These employees, whom Alex has grown up with and has been a supporter of for decades, have gone on raids to harass or even sometimes assault the homeless who won't immediately leave. After getting them to leave, Riley is able to publicly sweep in and offer "discounted" rates to build new homes, painting themselves as a hero who provides shelters during the "housing crisis" that they themselves are creating. Alex knows that if they leak this news to the press, they can stop the destruction of these innocent peoples' homes, but Riley will be slammed, the local solidarity will be broken, and the public backlash will force Riley to leave their hometown.

Alex loves Riley like a sibling, so Alex decides to disregard the misconduct towards the homeless and low-income population's housing, and defend the business partner's secret. Headlines about the mysteriously displaced or attacked homeless people living on the street, and the harmful 'housing crisis' threatening the poor continue to break. Photos of poor street children cover the front pages. However, Alex knows that they must protect their partner and their longtime employees by keeping the identities of the hired attackers a secret. Alex continues on despite the pain of knowing innocent people are being hurt, vowing to protect the close

partnership. Alex's loyalty and allegiance keeps the business organized as it keeps growing, and

their unity and ties as the 'heroic' homebuilders stay strong.

Reckless Driving

[No conflict; Care upheld]

Jordan is a paramedic within a larger urban city—New Patton. Jordan was born and raised in New Patton, and thoroughly loves it and its citizens. As difficult as Jordan's job and training can be, Jordan finds joy in vowing to keep the people of New Patton safe. Jessie—a paramedic in the same department—is almost always working the same shift. One night, Jessie tells Jordan about a program they heard about from across the city. The program, called 'Wellbeing Warriors' involves having local first responders such as off-duty paramedics, nurses, or firefighters volunteer to administer physical exams or other simple healthcare to those who may not have access to such services. Incredibly motivated, Jordan can't wait to volunteer, passionate about using their training to further help the community.

With Jordan's exhausting shift being only a few minutes away from being over, they still decide to drive over and volunteer as soon as they're off. After several days of training and paperwork, Jordan officially joins the volunteer group. During one volunteer shift weeks later, Jordan meets a young patient who tells them all about their life and recent history. As Jordan learns, the young patient was once a self-proclaimed reckless driver, often paying little attention to anyone or anything on the road that wasn't their phone. It wasn't until the patient started talking to other first responders within the 'Wellbeing Warriors' that they decided to devote their own life to helping others, too. Years later, Jordan is able to attend the patient's graduation from nursing school. In the end, the patient makes a toast during that night's celebration, tearfully thanking Jordan for inspiring them to trade in their life of recklessness for one of service.

Reckless Driving

[No conflict; Loyalty upheld]

Jordan is a paramedic within a larger urban city—New Patton. Jordan was born and raised in New Patton, and thoroughly loves it and its citizens. As difficult as Jordan's job and training can be, Jordan finds joy in vowing to serve the people of New Patton. Jessie—a paramedic in the same department, and someone who personally helped prepare Jordan when Jordan was a new hire, is almost always working the same shift. Jordan has always felt indebted and a deep sense of loyalty to Jessie, who has been there for Jordan through countless difficult times. One night, Jessie tells Jordan about an incredible job opening they heard was available across the city. Incredibly motivated, Jordan and Jessie talk excitedly about the coveted position, both passionate about seeing how far their training can take them.

The next day, their supervisor calls Jordan and Jessie into their office and announces that there's one opening for a promoted position—the first and likely last one for years—and that one of them will get it. After a moment, Jordan and Jessie explain that they are equally deserving of the position. "I wouldn't be here without Jessie" Jordan says, with Jessie answering, "And I wouldn't be here without Jordan." Stunned, the supervisor pauses before revealing a small smile. Their supervisor tells them a story about their past, that they were once a self-proclaimed reckless driver, often paying little attention to anyone or anything on the road that wasn't their phone. It wasn't until they started talking to other first responders and noticing the impressive teamwork, that they decided to devote their own life to joining such a strong community. Impressed by Jordan and Jessie's solidarity, their supervisor says they will make sure they are promoted together. In the end, Jordan and Jessie are able to continue working side-by-side, forming a bond that can truly withstand anything.

Reckless Driving

[Conflict; Care upheld/Loyalty violated]

Jordan is a paramedic within a larger urban city—New Patton. Jordan was born and raised in New Patton, and thoroughly loves it and its citizens. As difficult as Jordan's job and training can be, Jordan finds joy in vowing to keep the people of New Patton safe. One dark night while working, a pitch-black car dangerously speeds past Jordan's ambulance in the far-right lane. The car barely misses a merging vehicle trying to exit the freeway as it flies past them in the wrong lane. Jordan knows this driver is putting others at serious risk with their difficult-to-see car and speeds of over 80mph. Worried and anticipating a crash, Jordan decides to follow the car as it exits and turns into a close-by gas station. To Jordan's surprise, the driver is Jessie—a paramedic in the same department, and someone who personally helped prepare Jordan when Jordan was a new hire. Jessie greets Jordan with a friendly manner, laughing off the reckless driving as "one of the perks of knowing how to help anyone I might accidentally hit." Jordan has always felt indebted and a deep sense of loyalty to Jessie, who has been there for Jordan through countless difficult times. Still, Jordan knows that openly approving of Jessie's driving habits will potentially endanger New Patton's citizens.

Jordan decides to protect New Patton's citizens and drivers by reporting Jessie for reckless driving, despite Jessie having once taken Jordan under their wing. In a rage over the blatant betrayal, Jessie must face punishments including probation and loss of significant privileges. Jordan is fearful of the backlash or retribution they will likely receive from other paramedics in the department where Jessie's credibility and trustworthiness has always been so high, but Jordan knows their job is to keep New Patton citizens out of harm's way and to help minimize casualties whenever possible.

Reckless Driving

[Conflict; Loyalty upheld/Care violated]

Jordan is a paramedic within a larger urban city—New Patton. Jordan was born and raised in New Patton, and thoroughly loves it and its citizens. As difficult as Jordan's job and training can be, Jordan finds joy in vowing to keep the people of New Patton safe. One dark night while working, a pitch-black car dangerously speeds past Jordan's ambulance in the far-right lane. The car barely misses a merging vehicle trying to exit the freeway as it flies past them in the wrong lane. Jordan knows this driver is putting others at serious risk with their difficult-to-see car and speeds of over 80mph. Worried and anticipating a crash, Jordan decides to follow the car as it exits and turns into a close-by gas station. To Jordan's surprise, the driver is Jessie—a paramedic in the same department, and someone who personally helped prepare Jordan when Jordan was a new hire. Jessie greets Jordan with a friendly manner, laughing off the reckless driving as "one of the perks of knowing how to help anyone I might accidentally hit." Jordan has always felt indebted and a deep sense of loyalty to Jessie, who has been there for Jordan through countless difficult times. Still, Jordan knows that openly approving of Jessie's driving habits will potentially endanger New Patton's citizens.

Jordan decides to maintain close ties and respect for Jessie, mentally defending Jessie's reckless driving as a one-time offense. Jessie thanks Jordan for their willingness to let it slide, and laughs about how even though they were rushed, their high level of skill on the road will allow them to maneuver without crashing. Jordan feels nervous, and even though they know the chances of a future crash or injury are high, Jordan knows they must continue to be supported by Jessie and the other paramedics. After all, Jordan knows just how important it is for a team of paramedics to have unwavering unity.

Appendix B

Viral Threat: Positive

(adapted from Faust, 2020)

OPINION: COVID-19's Mortality Rate Isn't As High As We Think

There are many compelling reasons to conclude that SARS-CoV-2, the virus that causes COVID-19, is not nearly as deadly as is currently feared. Allow me to be the bearer of good news. The true case fatality rate, known as CFR, of this virus is likely to be far lower than current reports suggest. Even some lower estimates, such as the 1 percent death rate recently mentioned by the directors of the National Institutes of Health and the Centers for Disease Control and Prevention, likely substantially overstate the case.

As testing begins to include more asymptomatic and mild cases, more realistic numbers are starting to surface. New reports from the World Health Organization that estimate the global death rate of COVID-19 to be 3.4 percent, higher than previously believed, is not cause for further panic. This number is subject to the same usual forces that we would normally expect to inaccurately embellish death rate statistics early in an epidemic. If anything, it underscores just how early we are in this.

While the numbers coming out of China are scary, we don't know how many of those patients were already ill for other reasons. How many were already hospitalized for another life-threatening illness and then caught the virus? How many were completely healthy, caught the virus, and developed a critical illness? In the real world, we just don't know.

The data from the Diamond Princess suggests their patients were likely exposed repeatedly to concentrated viral loads (which can cause worse illness). Some treatments were delayed. So even the lower CFR found on the Diamond Princess could have been even lower,

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with proper protocols. It's also worth noting that while cruise passengers can be assumed to be healthy enough to travel, they actually tend to reflect the general population, and many patients with chronic illnesses go on cruises. So, the numbers from this ship may be reasonable estimates.

Yes, this disease is real. And, yes, there truly do appear to be vulnerable patients among us, those far more likely to develop critical illness from it. And that relatively small subset, if infected in high numbers, could add up to a tragically high number of fatalities if we fail to adequately protect them.

The good news is that we have huge advantages to leverage: We already know all of this and have learned it remarkably quickly. We know how this virus spreads. We know how long people are contagious. We know who the most vulnerable patients are likely to be, and where they are. Healthy people who are hoarding food, masks, and hand sanitizer may feel like they are doing the right thing. But, all good intentions aside, these actions probably represent misdirected anxieties.

Viral Threat: Negative

(adapted from Faust, 2020; changes are in red)

OPINION: COVID-19's Mortality Rate Is Higher Than We Think

There are many compelling reasons to conclude that SARS-CoV-2, the virus that causes COVID-19, is much more deadly than is currently feared. Allow me to be the bearer of bad news. The true case fatality rate, known as CFR, of this virus is likely to be far higher than current reports suggest. Even some lower estimates, such as the 1 percent death rate recently mentioned by the directors of the National Institutes of Health and the Centers for Disease Control and Prevention, likely substantially understate the case.

As testing begins to include more asymptomatic and mild cases, more realistic numbers are starting to surface. New reports from the World Health Organization that estimate the global death rate of COVID-19 to be 3.4 percent, higher than previously believed, may be cause for further concern. This number is subject to the same usual forces that we would normally expect to inaccurately downplay death rate statistics early in an epidemic. If anything, it underscores just how late we are in this.

While the numbers coming out of China are scary, we don't know how many of those patients were already ill for other reasons. How many were already hospitalized for another life-threatening illness and then caught the virus? How many were completely healthy, caught the virus, and developed a critical illness? In the real world, we just don't know.

The data from the Diamond Princess suggests their patients were likely exposed repeatedly to concentrated viral loads (which can cause worse illness). Some treatments were delayed. So the higher CFR found on the Diamond Princess could have been higher, even with proper protocols. It's also worth noting that while cruise passengers can be assumed to be

healthy enough to travel, they actually tend to reflect the general population, and many patients with chronic illnesses go on cruises. So, the numbers from this ship may be reasonable estimates.

Yes, this disease is real. And, yes, there truly do appear to be vulnerable patients among us, those far more likely to develop critical illness from it. And that relatively small subset, if infected in high numbers, could add up to a tragically high number of fatalities if we fail to adequately protect them.

The bad news is that we have huge disadvantages: We don't know much and are still learning slowly. We don't know exactly how this virus spreads. We don't know exactly how long people are contagious. We don't know exactly who the most vulnerable patients are likely to be, and where they are. Healthy people who are hoarding food, masks, and hand sanitizer may feel like they are doing the right thing. But, all good intentions aside, these actions probably represent misdirected anxieties.

Economy: Positive

(adapted from Amadeo, 2020)

OPINION: Top 5 Reasons Why the U.S. Economy Won't Collapse

The U.S. economy is doing fine. Here are the top 5 reasons why it won't collapse.

1. The U.S. debt is $24 trillion, more than the economy produces in a year. Although the debt-to-gross domestic product ratio is in the danger zone, it's not enough to cause a collapse. First, the United States prints its money. That means it is in control of its currency. Lenders feel safe that the U.S. government will pay them back. In fact, the United States could run a much higher debt-to-GDP ratio than it does now and still not face economic collapse. Japan is another strong economy that controls its currency. It's had a debt-to-GDP ratio above 200% for years. Its economy is sluggish but in no danger of collapse.

2. The United States won't default on its debt. Most members of Congress realize a debt default would destroy America's credibility in the financial markets. The tea party Republicans in Congress were a minority that threatened to default during the 2011 debt ceiling crisis and in 2013.

3. China and Japan are the biggest owners of the U.S. debt, but they have no incentive to create a collapse. The United States is the largest market for these countries. If the U.S. economy fails, so do theirs. Despite what doomsayers may claim, China is not selling all of its dollar holdings. The U.S. debt to China has remained above $1 trillion since 2013.

4. If anything, the dollar would slowly decline instead of collapse. It fell by 58% between 2002 and 2008. On Jan. 3, 2002, a euro could only buy $0.90. By Dec.

29, 2008, it was worth $1.42. The dollar's value falls as the euro's strengthens. That was a huge drop in the dollar's value, but it's far from a collapse. Since then, the dollar has strengthened by 24%. The euro could only buy $1.08 by April 3, 2020.

5. The dollar won't be replaced as the world's global currency. The doomsayers point to gold, the euro, or Bitcoin as a replacement for the dollar. China's actions indicate it would like the yuan to become a more widely-traded currency. None of these other alternatives have enough circulation to replace the dollar. Bitcoin has become the coin of choice for the underground economy.

Although the Great Depression wasn't a collapse, it was close. GDP fell by half. Global trade dropped by two-thirds. Unemployment was 25%. What caused it? Government actions turned a recession into a depression. First, the Fed raised the fed funds rate to protect the gold standard. Congress cut back on the New Deal too soon. That brought back the depression in 1937. It didn't end until Congress started spending again to build up the military for World War II. We aren't headed for an economic collapse or even a second Great Depression. The coronavirus will probably cause a severe recession lasting several months. A depression lasts for years.

Economy: Negative

(adapted from Amadeo, 2020; Forsyth, 2020)

OPINION: Top 5 Reasons Why the U.S. Economy Might Collapse

The U.S. economy is not doing fine. Here are the top 5 reasons why it might collapse.

1. While Washington's huge spending packages will help America get back on its feet, the rest of the world may not fare as well. Especially hard-hit will be emerging economies, which have basically gotten by on foreign borrowing after their export boom got off track in the last recession.

2. The only certainty about the outlook is that the U.S. economy is undergoing a severe contraction without precedent in history, even during the depths of the Great Depression of the 1930s. Yet just because this recession was mandated by government policies doesn't mean it can be reversed as easily.

3. While the policy response has been unprecedented, with more than $2 trillion in fiscal measures and trillions more in liquidity provisions from the Fed via a dizzying alphabet soup of facilities, these actions are attempts to fill the gaps left by the enforced shutdown of a large swath of the U.S. economy.

4. Even well-intentioned schemes, such as the Payroll Protection Program of forgivable loans to small businesses, have been fraught with problems. And another round of stimulus will be needed to tide over those hurt in this crisis, especially states and localities that, unlike the federal government, can't borrow without limit and in many cases must balance their budgets.

5. So far, the actions by Congress and the Trump administration, along with the Fed, have encouraged the equity and credit markets to stage strong recoveries. The

outlook for the economy is far less certain, not least of all because it will be determined by the course taken by the coronavirus. And that course, as we see daily, is far from predictable.

Although the Great Depression wasn't a collapse, it was close. GDP fell by half. Global trade dropped by two-thirds. Unemployment was 25%. What caused it? Government actions turned a recession into a depression. First, the Fed raised the fed funds rate to protect the gold standard. Congress cut back on the New Deal too soon. That brought back the depression in 1937. It didn't end until Congress started spending again to build up the military for World War II. We might be headed for an economic collapse or even a second Great Depression. The coronavirus will probably cause a severe recession lasting several months. A depression lasts for years.

Relationships: Positive

(adapted from Savage, 2020)

OPINION: How Quarantine is Strengthening Relationships

The coronavirus crisis is putting all our relationships to the test, from home-working couples juggling emails and childcare to unattached friends trying to offer mutual support remotely, at a time when many without partners feel more single than ever.

But some have really thrown themselves in at the deep end and are navigating the "new normal" with people they've never previously lived with or have only just met. Some have called the trend "corona cuffing", others are dubbing these couples "coronnials".

While the global Covid-19 pandemic is unique, it's not unusual for new couples to form or stick together in crisis situations, explains Matt Lundquist, a relationship psychotherapist based in New York. "In moments of fear and panic, we grab onto the safest, most-available-for-intimacy person around us," he says, adding that he observed a similar phenomenon after the 9/11 terror attacks in the US.

For those already in flourishing new relationships, cohabitation under these circumstances may heighten emotions and increase their connection, he argues. Others, however, may be "in denial" about their true feelings, having settled for "someone they knew under normal circumstances they shouldn't have gone on a fourth date with".

But Lundquist believes shacking up with an unsuitable long-term partner isn't necessarily a bad thing in the current climate.

"I think for many, isolation is pretty terrifying... so everybody needs to do what they need to do to get through this," he says. "A lot of therapists are needing to contradict what under normal circumstances would be good advice like avoiding getting into a relationship too quickly

or dating somebody who perhaps follows an old unhealthy pattern, and instead make concessions to help people find as much safety as they can to survive."

Whether you've gone into lockdown with a partner or you're simply sharing your home with a friend or relative you're not used to spending so much time with, "creating routines and rituals" is the best way to establish "a new normal" and avoid conflict, adds business and life coach Rebecca Morley.

She advises couples who are co-working from home to break up their days and weeks with shared activities, such as always having an afternoon coffee together or starting a weekend hobby. "It means you don't have to keep making decisions, so it takes away a bit of the emotional load and allows you to take things one step at a time."

"Under more 'normal' circumstances – whatever that word means – I don't want folks to settle. I want people to do the work to grow and develop and find a path towards a really healthy partner."

Relationships: Negative

(adapted from Associated Press, 2020)

OPINION: How Quarantine is Killing Relationships

Couples are revealing how the stress of quarantine is taking a serious toll on their relationships, as the heightened anxiety caused by the coronavirus pandemic continues to put strain on even the strongest of partnerships.

One 60-something husband who works in the food industry and still insists upon leaving every day for work, insists he needs to keep his business afloat. His frightened wife desperately wants him to stay home. For another couple, in the midst of a separation, the bitterly fought issue is the kids and whether they can safely see friends. One parent is allowing it in an effort to be the 'fun parent'; the other bitterly opposes it.

And for still another couple, it's simply about grocery shopping. She fills the cart, and he accuses her of hoarding unnecessarily. She argues that they need to be prepared.

Scenarios like these are playing out in urban high-rises, suburban homes and tiny rural communities across America as couples try to navigate what has abruptly become the 'new normal' during the coronavirus outbreak.

Described by therapists, lawyers or the couples themselves, they reveal how even the most subtle differences in temperament or coping strategy can be painfully exacerbated under the incredible stress and anxiety that the outbreak is causing.

It's a time when every domestic decision can seem to have impossibly high stakes, says Catherine Lewis, therapist and faculty member at Ackerman Institute for the Family in New York, from the seemingly small - whether to go grocery shopping - to the fraught calculus of which family members should isolate together.

"This pandemic is making us all think about our relationships, because you really cannot do one thing without it impacting somebody else," says Lewis, who's been conducting therapy sessions remotely.

"It's such a powerful example of how interconnected we all are."

Added to that, Lewis notes, is the utter helplessness of having no idea how long the situation will last.

She does see some couples finding "that they have a wild capacity to be resilient, to just find a way to move through the day." On the negative side, it's clear that people are generally not at their best when under deep stress.

"Normal patterns are intensified," she says. "There's increased annoyance, people snapping."