# The Effect of Agency Assignment on Responses to COVID-19 Messages

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## Author Note

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**Abstract**

When considering COVID-19 related messaging, psychological reactance seems to be higher for messaging using viral agency assignment over human agency assignment. We used four infographics depicting messaging with agency assignment and self vs. self-other references to see if the messaging had an effect on people's psychological reactance. Participants completed a questionnaire with perceived freedom threat, negative emotion, and negative cognition variables to measure psychological reactance. As hypothesized, we found that COVID-19 agency assignment had a significant effect on psychological reactance compared to human agency and that the reference did not have a significant effect. Therefore, our study replicated the results of Ma and Miller's (2021) study and produced practical implications suggesting the use of viral agency assignment for healthcare messaging moving forward.

*Keywords:* COVID-19 messaging, psychological reactance, healthcare messaging, agency assignment

**The Effect of Agency Assignment on Responses to COVID-19 Messages**

The COVID-19 pandemic poses a severe threat to global public health. There have been a significant number of virus-related deaths, and these deaths have caused widespread fear leading the United States into economic recession, political contention among leaders, and much more (Ma & Miller, 2021). Evidence suggests increased polarization between political parties and their willingness to become vaccinated against COVID-19 (Fridman et al., 2021). Because of these severe implications, it is increasingly important to understand how rhetoric around the virus is influencing people's opinions and actions they are willing to take to decrease viral spread. Studying public health implications will help us understand which demographics have been most impacted by the virus and determine if there is a significant relationship between engagement in preventative methods and the experience of health disparities. According to Callaghan et al. (2021), abstaining from preventative behaviors could exacerbate existing inequalities for susceptible populations. Prevention nonadherence is related to lower intentions to get the COVID-19 vaccine in groups that sees the virus as less threatening. Because of this, it is important to highlight these demographics so that prevention messaging is directed towards them (Fridman et al., 2021). When targeting populations currently unwilling to get vaccinated, we can study what type of messaging might change their minds and hopefully decrease the spread of COVID-19 within this target group. Ultimately, we expect to replicate Ma and Miller's (2021) study and hypothesize that relative to human agency, COVID-19 agency assignment will lead to a higher level of psychological reactance as demonstrated by a higher perceived threat to freedom, anger, and negative cognitions.

COVID-19 related attitudes and prevention behaviors largely depend on factors related to one's demographic, rural status, political ideology, COVID-19 experiences, and more. For

example, Callaghan et al. (2021) found that rural residents are less likely to participate in preventative behaviors, including wearing a mask in public, disinfecting their environments, working from home, and avoiding dining in restaurants and bars. Messaging campaigns should target these groups to increase the number of people taking steps to reduce the spread of COVID-19 (Callaghan et al., 2021). A large part of getting hesitant populations involved in preventative measures is understanding the influences of public health messaging.

When regarding public health messaging, there is a general risk of nonadherence due to messaging factors, including perceived issue importance and message fatigue (Ball & Wozniak, 2021). The constant mention of COVID-19 can lead to messaging fatigue, a state in which intended recipients become tired of persistent exposure to similar information (Koh et al., 2020). Studies have already found that COVID-19 messaging fatigue and low perceived importance could predict perceived freedom threat, which is also associated with increased reactance and nonadherence (Ball & Wozniak, 2021). This constant repetition of information increases the risk of desensitization and people taking health information less seriously (Koh et al., 2020). Therefore, public health officials must be aware of the psychological mechanisms that lead citizens to be less attentive to public health messaging.

Studies have also shown that a specific type of public health messaging, agency assignment, can influence message perception. Agency assignment, or the attribution of action to a particular entity, affects the perceived threat around health messages. Dragojevic et al. (2014) found that health messages that assign agency to a viral threat (specifically HIV) have higher fear, perceived threat, and perceived susceptibility than messages with human agency. Because of this information, we can understand how agency assignment could lead to higher psychological reactance.

Psychological reactance is when one responds defensively to a communication message viewed as freedom-threatening. Studies show that reactance is related to a higher perceived freedom threat and lower adherence to preventive behavior (Ball & Wozniak, 2021). Freedom threats can even lead people to move away from their previous supportive opinion and disagree with the person posing a threat (Worchel & Brehm, 1970). Reactance has also been demonstrated through anger and negative cognitions in response to an unfavorable message. Previous studies have shown that reactance can be operationalized through negative cognition and anger indices (Dillard & Shen, 2005). This operationalization gives us a way to empirically study and measure the connection between reactance and health messaging using self-reporting methods. Therefore, supplementary research supports the notion that COVID-19 messaging, specifically agency assignment, will lead to increased reactance through mechanisms including perceived freedom threats, negative cognition indices, and self-reported anger.

However, we do not know if the agency assignments will have long-term bias implications, as this seems to differ across health issues. In comparison to diabetes, Glowacki et al. (2016) illustrated how respondents had higher perceptions of disease severity with disease agency assignment over human agency, but their prevention willingness was higher with human agency than with disease agency. Since this contrasts what we have seen with research relating to viral threats, we are unsure why there is a difference in the willingness to adhere to prevention for diseases versus specifically viral threats (Glowacki et al., 2016).

The replication crisis is the idea that efforts to replicate study findings often fail to garner the same result. There are often differences in the determined statistical significance, which indicates that experiments might not have had an effect as we believed. However, studies have found that this crisis might be more related to inadequate sample sizes and single study

replications rather than actual failure to replicate (Maxwell et al., 2015). There is a need for large sample sizes and multiple investigators to combat the crisis (Maxwell et al., 2015). Experts are pushing for a reexamination of the current professional incentive systems, publication requirements, and research practices since issues within these systems are likely at the root of the problem. Alleviating research-related issues could mitigate the crisis naturally (Jamieson & Pexman, 2020). This reckoning calls for a period of reform and a critique of foundational issues. Theoretical and philosophical psychologists are currently addressing this crisis through collaboration with other reformers (Wiggins & Christopherson, 2019).

Some research has been replicated through studies where participants evaluate various scenarios. Oppenheimer et al.'s (2009) sunk costs study found that participants were more likely to attend a football game in the freezing cold if they had paid for the ticket than if the admission was free (Klein et al., 2014). This study replicated very well as the effect sizes were comparable across replicated studies. In Tversky & Kahneman's (1981) gain versus loss framing study, changing one's focus from losses to gains resulted in participants decreasing their willingness to take risks (Klein et al., 2014). Once again, the effect sizes were comparable, and the replicated study was determined to be significant. However, studies such as one conducted by Carter et al., (2011) have not been replicated. Carter's study wanted to determine if flag priming, or subtle exposure to the American flag, would increase conservatism among US participants. This study failed to replicate as the latter research did not demonstrate comparable effect sizes, and the study was deemed insignificant (Klein et al., 2014). Similar findings exist for Caruso et al.'s (2013) currency priming study claiming that exposure to money increases participants' endorsement of their current social system. This study also did not replicate as the replicated tests did not garner significance (Klein et al., 2014).

Failing to replicate research is extremely problematic as it decreases the reliability of studies and the effects that have been found. There is also a possibility that the true effect has not yet been found, and this poses the risk of misinformation spreading about a false effect (Maxwell et al., 2015). Lack of replication is also problematic because it can lead to generalizations about the effects (Klein et al., 2014). Ultimately, the crisis has caused disappointment and skepticism about the field of psychological science. Luckily, there is a greater demand for replication than ever, and this demand presents an opportunity for improvement (Jamieson & Pexman, 2020).

At this point, there have been no replications for Ma and Miller's (2021) COVID-19 agency study because the study was conducted recently, and there has not been enough time to replicate it yet. However, similar research has been conducted for the H1N1 influenza virus, indicating similar relationships between agency assignment and perceived threat. McGlone et al. (2013) found that viral agency-assigned messages increase perceptions of severity, intention to seek vaccination, and personal susceptibility compared to human agency assignment. Considering this data, we can loosely say that Ma and Miller's (2021) study parallels McGlone et al.'s (2013) study as they are both dealing with virus agency assignment and perceived threat variables. Replicating Ma and Miller's (2021) study is essential as the implications for a false effect could potentially inhibit public health initiatives. If agency assignment demonstrates a significant impact on people's preventative behaviors, then public health officials should frame COVID-19 messaging using viral agency assignment. Replication will also allow us to see what psychological reactance looks like and how we can combat it to increase adherence to preventative protocols.

Given what has been summarized above, it stands to reason that our study would replicate the findings of Ma and Miller (2021). COVID-19 agency assignment should

demonstrate increased psychological reactance in comparison to human agency. This reactance will likely present itself as anger, a perceived freedom threat, and negative cognitions. COVID-19 responses are influenced by various factors which include demographics, attitudes, messaging fatigue, and agency assignment. This study is threatened by the replication crisis since Ma and Miller's (2021) study has not yet been replicated. If the findings replicate, we can more confidently say that there is an effect and that COVID-19 messaging should focus on viral agency. If we cannot replicate the findings, we will have to look for another variable responsible for this psychological reactance and hopefully move towards increased COVID-19 preventative behaviors.

## Method

### Participants

We recruited a sample of convenience ($N$ = 281), composed primarily of college undergraduate students (83.30%). Of the sample, 68.30% were female, 24.90% were male, 1.10% self-described, and 5.70% did not respond. They ranged in age from 18 to 70 ($M$ = 22.81, $SD$ = 8.72). We also asked participants about their primary racial or ethnic identities (White = 198, Black or African American = 14, American Indian or Alaska Native = 11, Asian = 53, Hispanic, Spanish, or Latino origin = 15, Other = 6). Additionally, we collected information regarding participants' political ideology, resulting in a modal response of somewhat liberal, followed by very liberal, and then moderate, somewhat conservative, and very conservative (very conservative = 2.14%, somewhat conservative = 12.01%, moderate = 20.91%, somewhat liberal = 29.90%, very liberal = 28.83%). We recruited participants using social media and individual requests by our research methods course members for psychology majors. No

incentives were provided to participants to participate. The participants consented to participate in the study and were free to withdraw their participation at any time without consequence.

**Design**

We used a 2×2 factorial experimental design; the two independent variables in this study were agency assignment and reference point. Both agency assignment and reference point contained two levels. The levels of agency assignment were COVID-19 agency and human agency. The levels for reference point were self-reference and self-other reference. All levels of the independent variables were crossed, thus yielding four conditions: COVID-19 agency and self-reference, COVID-19 agency and self-other reference, human agency and self-reference, and human agency and self-other reference. We operationalized agency by having participants read a COVID-19 warning message containing facts and prevention guidelines worded to reflect either human agency, which portrayed humans as actively responsible for the infection, or COVID-19 agency, which described the virus as actively accountable for infection. We operationalized reference by having participants read a paragraph at the end of the message asking them to consider how preventative measures could benefit themselves (self-reference) or themselves and others (self-other reference).

The dependent variables were the levels of psychological reactance as measured by the perceived threat to freedom, negative emotions, and negative cognitions. To operationalize psychological reactance, we used a structured 7-point Likert self-report scale. On this scale, we asked participants to indicate their level of accordance with a series of statements regarding the message's impact on their freedom to choose, the extent of negative emotions felt when reading the message, and its degree of exaggeration (Ma & Miller, 2021).

**Procedure and Materials**

This study was conducted entirely online using the survey program Qualtrics on participants' personal devices. First, all participants were shown a consent form containing information about the purpose of the study and their involvement. Each participant was then asked to confirm their cooperation by reading this form and agreeing to participate in the study with a digital signature. Next, we asked participants general demographic questions regarding their gender, race, ethnicity, age, political ideology, and education level. All participants were then randomly presented with a COVID-19 warning message containing facts and prevention guidelines, such as "People die from COVID-19 every day," which was worded to reflect human agency (see Appendix). Another example, "COVID-19 kills people every day," mediated COVID-19 agency for our experimental manipulation of agency. For our experimental manipulation of reference, a paragraph at the end of the messages asked participants to consider how preventative measures could benefit themselves (e.g., "Consider how these actions will benefit you") or themselves and others (e.g., "Consider how these actions will benefit you and those close to you").

After viewing the message, we asked participants to indicate their level of accordance on a structured 7-point Likert self-report scale to a series of statements regarding the message's impact on their freedom to choose, the extent of negative emotions felt when reading the message, and the message's degree of exaggeration. Four statements were presented for each measure of psychological reactance. For example, the assigned statement assessing freedom threat was, "The message threatened my freedom to choose." One statement to consider negative emotions was, "Please indicate the extent to which you felt irritated while reading the COVID-19 message." Lastly, an example statement that assessed negative cognitions was "The message

tried to strain the truth." These statements allowed us to measure psychological reactance through threat to freedom, negative emotions, and negative cognitions. At the end of the study, a debriefing that explained the study's goals was given to the participants.

## Results

Our primary hypothesis was that framing COVID-19 as an active agent ("COVID-19 will infect you") will lead to increased reactance while framing humans as an active agent in the spread of COVID-19 ("you will get COVID-19") will lead to less reactance, as measured through freedom threat, negative emotions, and negative cognitions (Ma & Miller, 2021). To determine whether the effect of agency assignment on psychological reactance differed as a function of reference, we conducted a 2 (agency assignment: COVID-19, human) × 2 (reference point: self, self-other) analysis of variance (ANOVA). Factorial ANOVA also reflected the relationship between reference (self-reference vs. self-other reference) and psychological reactance. For all three dependent variables, it was determined that reference did not significantly differ in emotional reactance.

The results of our analysis supported our hypothesis in that we found a significant main effect of agency on freedom threat. As indicated in Figure 1, those in the COVID-19 agency group had significantly higher levels of freedom threat ($M$ = 3.29, $SD$ = 1.61) than those in the human agency group ($M$ = 2.34, SD = 1.44), $F$ (1, 176) = 17.43, $p < .001$, $\eta_p^2 = .09$. However, we did not find a significant main effect of reference point on freedom threat such that those in the self-reference condition had the same level of freedom threat ($M$ = 2.82, $SD$ = 1.64) as those in the self-other condition ($M$ = 2.76, $SD$ = 1.56), $F$ (1, 176) = 0.19, $p = .668$, $\eta_p^2 = .00$. Finally, there was no significant interaction between agency assignment and reference point on freedom threat, $F$ (1,176) = 0.02, $p = .889$, $\eta_p^2 = .00$.

Likewise, we found a significant main effect of agency assignment on negative emotions. Figure 2 illustrates how the COVID-19 agency condition had higher levels of negative emotions ($M$ = 2.82, $SD$ = 1.68) than those in the human agency condition ($M$ = 1.99, $SD$ = 1.33), $F$ (1, 174) = 13.62, $p < .001$, $\eta_p^2 = .07$. There was no significant main effect of reference point on negative emotions such that those in the self-reference group had the same level of negative emotions ($M$ = 2.40, $SD$ = 1.64) as those in the self-other reference group ($M$ = 2.35, $SD$ = 1.48), $F$ (1,174) = 0.17, $p = .682$, $\eta_p^2 = .00$. There was no significant interaction between agency and reference on negative emotions, $F$ (1,174) = 1.03, $p = .312$, $\eta_p^2 = .01$.

Rates of negative cognitions followed similar trends in Figure 3. There was a significant main effect of agency assignment on negative cognitions such that the COVID-19 condition had significantly higher levels of negative cognitions ($M$ = 3.53, $SD$ = 1.74) than those in the human condition ($M$ = 2.34, $SD$ = 1.45), $F$ (1,174) = 23.99, $p < .001$, $\eta_p^2 = .12$. Similarly, we found no significant main effect of reference point on negative cognitions such that those in the self-reference condition ($M$ = 2.84, $SD$ = 1.68) had the same level of negative cognitions as those in the self-other condition ($M$ = 2.95, $SD$ = 1.72), $F$ (1, 174) = 0.09, $p = .768$, $\eta_p^2 = .00$). Like the previous variables, there was no significant interaction between agency assignment and reference condition on negative cognitions, $F$ (1,174) = 0.00, $p = .980$, $\eta_p^2 = .00$.

Based on the given results, there was a significant difference when assigning agency to humans or COVID-19, but not a significant difference when setting self or self-other reference for all three measures of psychological reactance. For each psychological reactance measure, an interactive effect was not determined to be significant.

## Discussion

We predicted that we would replicate the Ma and Miller (2021) study saying that COVID-19 agency assignment should demonstrate increased psychological reactance in comparison to human agency. We found a significantly higher main effect of COVID-19 agency assignment on negative emotions, negative cognitions, and perceived freedom threat. We also found that self and self-other reference were not significantly correlated to psychological reactance for any of the above reactance factors. Therefore, our experiment supported the original hypothesis and replicated the Ma and Miller (2021) study.

Our study relates to many other similar findings previously discussed in the introduction. Since this was a successful replication, we see that our evidence converges with the Ma and Miller study. Our study also mirrors the outcomes of the McGlone et al. (2013) study, which found that agency-assigned messages for the H1N1 influenza virus increase perceptions of severity, intention to seek vaccination, and personal susceptibility compared to human agency assignment. Our study also relates to the research of Ball and Wozniak (2021) showing that physiological reactance can be a measure of perceived freedom threat, along with Dillard and Shen (2005) showing that reactance can be demonstrated through anger and negative cognitions in response to an unfavorable message. Similarly, our findings related to those of Dragojevic et al. (2014) who found that health messages assigning agency to HIV have higher fear, perceived threat, and perceived susceptibility than messages with human agency. This study, therefore, supported the idea of agency assignment having a significant influence on psychological reactance for multiple viruses.

Since our research supported the Ma and Miller (2021) study, we indirectly supported the theories they used to create their study. Since the COVID-19 pandemic globally threatens human

life, it is important that we understand the messaging that will warrant the desired response of psychological reactance and preventative behaviors to avoid infection. This study presents important contributions, as it extends previous work citing agency assignment as associated with increased psychological reactance.

Considering this, we can see that COVID-19 messaging responses should not be framed using human agency. COVID-19 preventative messaging is not nearly as effective when saying that people are responsible for the spread of the virus as compared to the virus being the active agent of concern. Other health messaging campaigns involving disease threats should use this information to acknowledge that threat agency tends to receive an increased negative response relative to human agency. Therefore, in a public health campaign, I would make sure to frame the messaging so that the virus or disease is the active agent over people because this seems to evoke higher dissonance and a larger physiological response.

**Limitations and Future Directions**

Based on the demographic data gathered, our samples are not representative of the human population. Similar to many studies, our sample reflects a very college-centric population of students attending UNC-Chapel Hill. Therefore, our external validity decreases tremendously as there is a selection bias, and we are not able to say that this sample is representative of the US or the world as a whole. This study was also a class project that was completed in a relatively short amount of time. The timeline of a few weeks compared to months of data collection and analysis poses a history threat to internal validity, which could’ve greatly impacted responses based on general attitudes toward the pandemic during that small period. Similarly, the participants of this study also have a very unique lens on the situation as they are all currently living through the repercussions of COVID-19. Because we are in the midst of the pandemic, people could be

influenced by how the virus has affected them personally, the current mandates being upheld, or any personal experiences that would increase our psychological reactance to the messaging regardless of the agency assignment.

For future studies, the statistics on the infographics used to depict agency assignment and self vs self-other references are very outdated as they were created at the beginning of the pandemic (see Appendix). These infographics need to be updated consistently with current data to be as contemporary and accurate as possible. It is also important to collect this data longitudinally to see how attitudes might change with possible unforeseen confounds. These attitudes might be very specific to the stage of the pandemic that we are currently in, and it would be beneficial to see if the effects of these messaging techniques are as consistent in the early and late stages of a pandemic as they currently are.

**Conclusions**

Ultimately, participants are more likely to react to COVID-19 messaging if the virus is framed as the active threat compared to people being framed as the source of the threat. More research is necessary to fully understand the psychological implications of these variables, but we can confidently say that COVID-19 viral agency compels people to take more preventative measures than if they were the active agents themselves. As we navigate current and future health crises, it is important to note the messaging that gets people's attention and sits with them enough that they are willing to adhere to preventative regulations and behaviors. Severe political, economic, and health implications are only increasing as the pandemic continues. Therefore, it is crucial to use this research to further understand how our rhetoric around the virus influences public opinions and actions to help decrease viral spread.

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**Figure 1**

*Bar Graph depicting Factorial ANOVA Effect of Agency Condition on Freedom Threat*

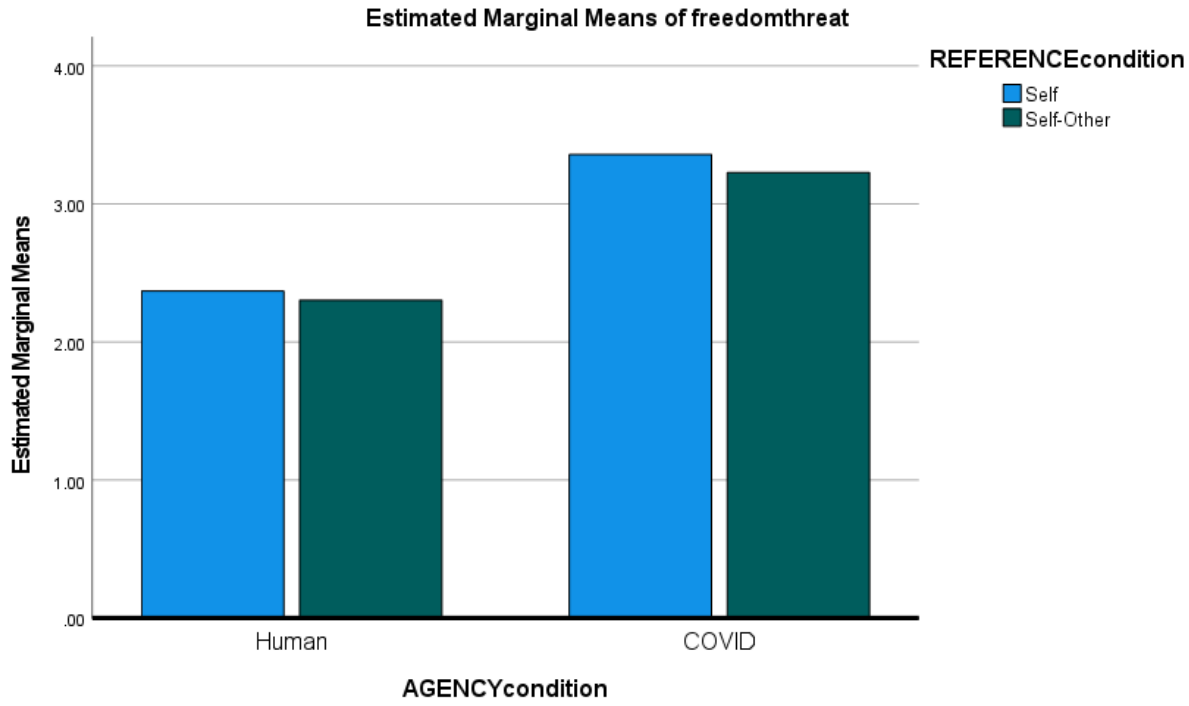


**Figure 2**

*Bar Graph depicting Factorial ANOVA Effect of Agency Condition on Negative Emotions*

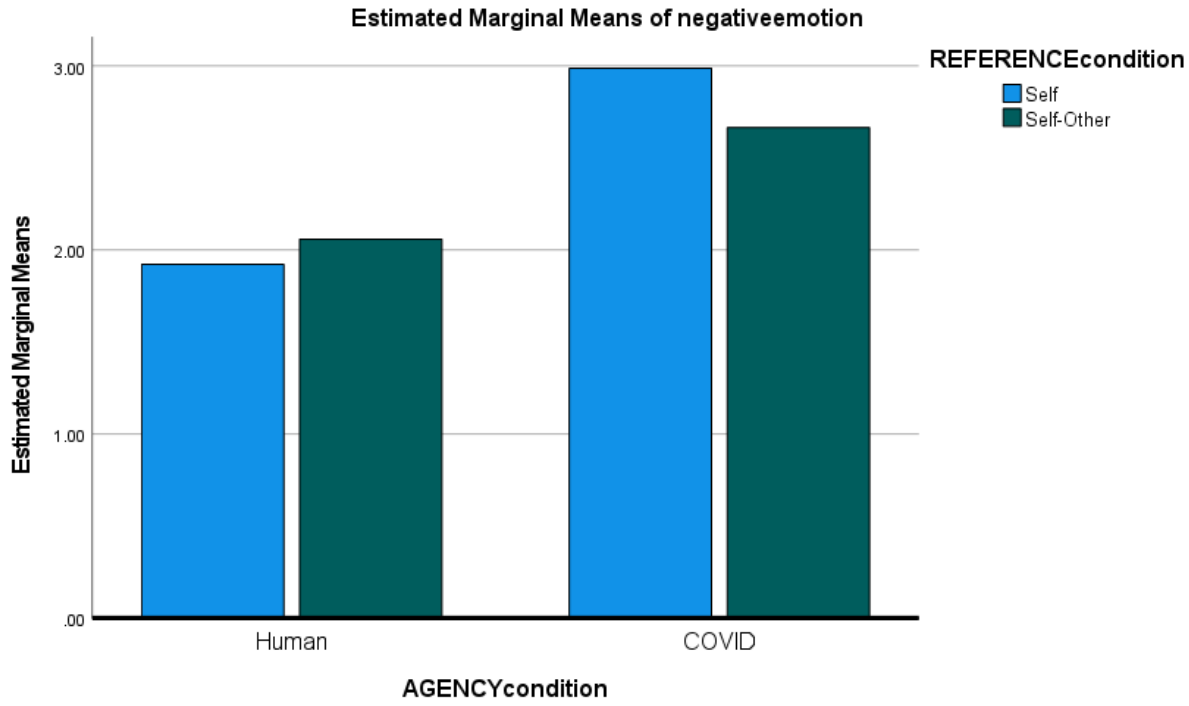
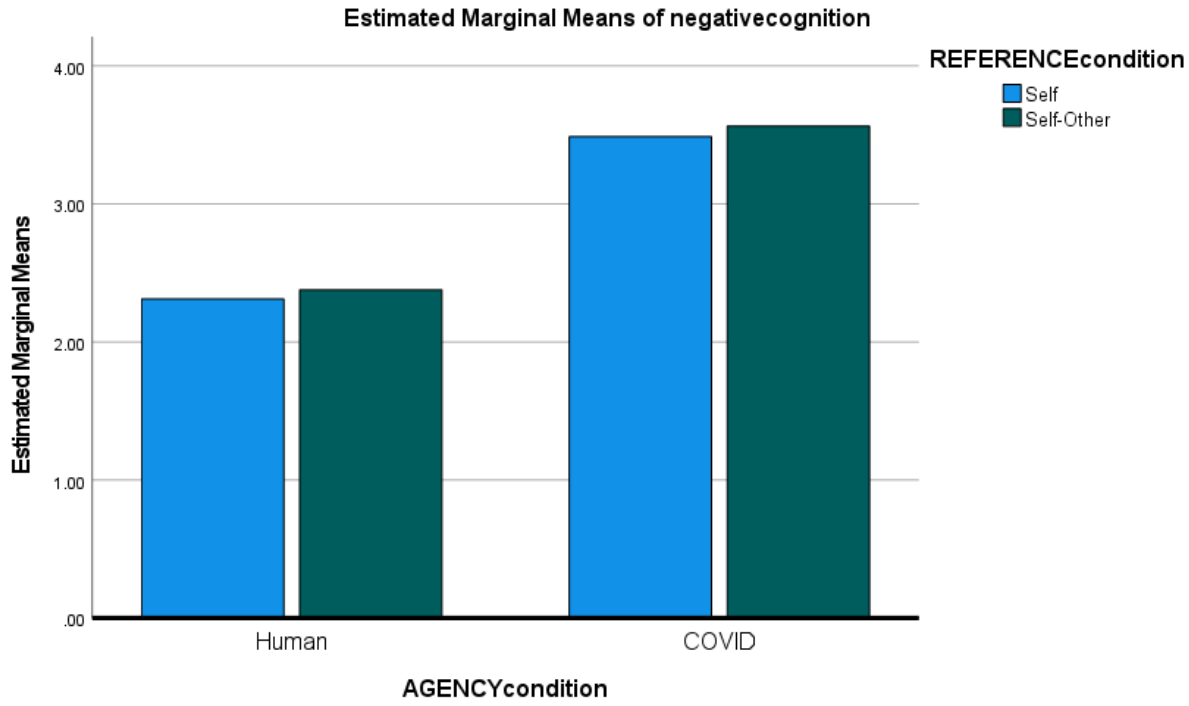


**Figure 3**

*Bar Graph depicting Factorial ANOVA Effect of Agency Condition on Negative Cognitions*



# Appendix

## Human Agency and Self-Reference

In this study, you will be presented with a COVID-19 warning message that will include risk information and prevention guidelines from the Centers for Disease Control and Prevention (CDC) and World Health Organization (WHO). Please read each statement carefully as you may be quizzed on the content. Afterwards, you will respond to a few short surveys relating to the message you have seen. Please note that some of the information provided may not be up-to-date (number of cases, vaccine information).

**Human Agency and Self-Other Reference**

In this study, you will be presented with a COVID-19 warning message that will include risk information and prevention guidelines from the Centers for Disease Control and Prevention (CDC) and World Health Organization (WHO). Please read each statement carefully as you may be quizzed on the content. Afterwards, you will respond to a few short surveys relating to the message you have seen. Please note that some of the information provided may not be up-to-date (number of cases, vaccine information).

**Virus Agency and Self-Reference**

In this study, you will be presented with a COVID-19 warning message that will include risk information and prevention guidelines from the Centers for Disease Control and Prevention (CDC) and World Health Organization (WHO). Please read each statement carefully as you may be quizzed on the content. Afterwards, you will respond to a few short surveys relating to the message you have seen. Please note that some of the information provided may not be up-to-date (number of cases, vaccine information).

**Virus Agency and Self-Other Reference**

In this study, you will be presented with a COVID-19 warning message that will include risk information and prevention guidelines from the Centers for Disease Control and Prevention (CDC) and World Health Organization (WHO). Please read each statement carefully as you may be quizzed on the content. Afterwards, you will respond to a few short surveys relating to the message you have seen. Please note that some of the information provided may not be up-to-date (number of cases, vaccine information).

**Dependent Variables**

Please indicate your degree of disagreement or agreement with the following statements.

| | 1. Strongly disagree | 2 | 3 | 4 | 5 | 6 | 7. Strongly agree |
|---|---|---|---|---|---|---|---|
| The message threatened my freedom to choose | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| The message tried to make a decision for me | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| The message tried to manipulate me | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| The message tried to pressure me | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Please indicate your degree of feeling with the following statements.

| | 1. None of this feeling | 2 | 3 | 4 | 5 | 6 | 7. A great deal of this feeling |
|---|---|---|---|---|---|---|---|
| Please indicate the extent to which you felt irritated while reading the COVID-19 message | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Please indicate the extent to which you felt angry while reading the COVID-19 message | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Please indicate the extent to which you felt annoyed while reading the COVID-19 message | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| | 1. None of this feeling | 2 | 3 | 4 | 5 | 6 | 7. A great deal of this feeling |
|---|---|---|---|---|---|---|---|
| Please indicate the extent to which you felt aggravated while reading the COVID-19 message | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Please indicate your degree of disagreement or agreement with the following statements.

| | 1. Strongly Disagree | 2 | 3 | 4 | 5 | 6 | 7. Strongly Agree |
|---|---|---|---|---|---|---|---|
| The message tried to strain the truth | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| The message was overblown | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| The message was exaggerated | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| The message tried to manipulate my feelings | ○ | ○ | ○ | ○ | ○ | ○ | ○ |