



Assessing the Efficacy of COVID-19 Fear Appeal Messaging in Promoting Adherence to
COVID-19 Preventative Measures and Their Effect on Anxiety

Billy Malone

20123183

Supervisor: Dr Fearghal O'Brien

B.A. (Hons) Psychology

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Abstract

Aims: This study aimed to investigate the impact of COVID-19 fear appeal messaging on participants' intentions to adhere to COVID-19 preventative measures and their anxiety levels. The study also sought to explore the potential unintended consequences of COVID-19 specific fear-based messaging. **Method:** Participants (N=28) were exposed to a fear appeal PowerPoint presentation and completed a COVID-19 attitudes questionnaire based on the Health Belief Model. Pre and post exposure anxiety levels were measured using the State-Trait Anxiety Inventory. Statistical analyses were performed to compare future intentions to adhere to COVID-19 preventative measures scores and anxiety scores before and after exposure to the fear appeal. **Results:** Exposure to the fear appeal presentation did not significantly increase intentions to adopt COVID-19 preventive measures. However, it did lead to a significant increase in anxiety levels among participants. **Conclusion:** COVID-19 fear appeal messaging had a limited impact on promoting adherence to preventative measures but significantly heightened anxiety levels. Balancing fear induction messages with efficacy information in health messaging is important. Future research should investigate defensive avoidance and include placebo groups to enhance understanding of fear-based health communication strategies. These findings inform the development of targeted and effective public health communication strategies.

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Introduction

This research project examined whether brief exposure to COVID-19 fear appeal messages with the aims of promoting adherence to COVID-19 preventative measures delivered through a power presentation influenced future intentions to adhere to COVID-19 preventative measures and self-reported anxiety levels in a sample of 28 healthy Irish adults. This section will discuss the relevant theory behind health messaging and appealing to fear to promote behaviour change as well as the various uses and applications of fear messaging and their varying rates of effectiveness.

The COVID-19 outbreak has had a profound impact globally, necessitating urgent measures to control its spread and protect public health. As of June 2023, it is estimated that there has been 146.6 million total COVID-19 Infections worldwide causing 7.5 million estimated hospitalizations and 921,000 estimated total deaths (Cases, Data, and Surveillance, 2020) because of this effective public health responses are imperative in educating individuals about the dangers of COVID-19 as well as empowering them to adopt recommended preventative measures. One of the most widely used strategies in promoting behaviour change towards safer health behaviours is the use of fear appeals in public health campaigns (Tannenbaum, 2015). Fear appeals are persuasive messages that emphasize the negative consequences of non-adherence to recommended behaviours and highlight the actions individuals can take to avoid these outcomes. Fear appeals have been previously studied for their efficacy in multiple health communication strategies such as safer driving messages (Lewis et al., 2007) smoking cessation messages (Kang & Lin, 2015) as well as addressing how to adopt safer health behaviour in public health matters such as the HIV outbreak (Dillard et al., 1996). However, previous research has indicated that fear appeals may not always be the most effective communication strategy and could potentially have unintended negative consequences

(Stolow et al., 2020). It is because of this that it is essential to investigate the efficacy of fear appeals specifically in promoting attitude and behaviour change towards adhering to COVID-19 preventive measures. This study also aims to explore the impact of exposure to fear appeals on self-reported feelings of anxiety among individuals exposed to these messages. By evaluating both the effectiveness of fear appeals in promoting behaviour change as well as their potentially negative influence on anxiety levels of those exposed to fear inducing messages, this research aims to contribute to the growing body of research on the use evidence-based communication strategies tailored to COVID-19 health behaviours as well as wider public health communication strategies which may contribute to the development of more effective strategies in the future. It is worth noting however, at the commencement of this study there has been limited research which specifically investigated the efficacy of fear appeals in the context of the COVID-19 outbreak.

Fear appeals

A fear appeal is defined as a persuasive message which uses fear as an influencer to take on the intended health message by promoting precautionary motivation and self-protective action (Dillard, 1996). Fear arousal promotes an unpleasant emotional state which is triggered by the perception of threatening stimuli (Rogers & Deckner, 1975). Fear appeals are structured into two parts. First the fear message attempts to arouse fear by presenting the recipient with a threat of severe negative outcomes which causes the respondent to feel susceptible to this threat. The second part of this process is presenting opportunities to mitigate these severe negative outcomes by recommending protective health measures. By showing that the uptake of these recommended health behaviours mitigates the fear appeals threat of severity, adherence by the respondent in engaging in these recommended health behaviours is promoted. This is referred to as response efficacy (Ruiter et al., 2014).

When the recommended health action (e.g., handwashing) is shown to be both easy to partake in and effective in mitigating the severity of the health threat, feelings of self-efficacy in avoiding the negative health outcomes increase which promotes further adherence to the fear appeals message (Witte et al., 2001). One of the more recent and widely used theories on fear appeals is Witte's Parallel Process Model (EPPM; Witte, 1998). According to the EPPM, when a person evaluates a fear appeal, two appraisals are formed, which will result in one of three outcomes. First an individual will appraise the severity of the threat in the fear message. If the severity of the threat is perceived as low the respondent of the fear appeal will ignore the intended message. However, when the fear message is appraised as severe individuals will begin to experience fear resulting in an increased motivation to take action to reduce their fear. A person's perceived efficacy of the recommended message, which is composed of self-efficacy and response efficacy, will determine whether a person takes action to control the implied danger of the message or to control their own levels of fear. Higher levels of perceived efficacy and self-efficacy is what leads an individual to consider the intended message of the fear appeal and adopt its recommended behaviours. Alternatively lower levels of perceived efficacy and self-efficacy will cause respondents to focus primarily on controlling their fear which leads to a rise in anxiety and panic amongst the respondent as now the respondent is left with greater amounts of anxiety and lower levels of self-efficacy to reduce these negative feelings through adopting the recommended health message this results in the respondent denying or avoiding the threat and adopting defensive behaviours (Witte, 1992). The EPPM emphasizes that the perceived threat of the fear message influences the strength of the response, and the perceived efficacy of the fear message forms the nature of the response. The EPPM focuses on how the threat and

efficacy factors work together and have a strong impact on the overall response to the fear message. The EPPM also importantly highlights the necessity of providing adequate information on the efficacy of the messages recommended response to shape a person's perception of efficacy (Witte & Allen, 2000).

Theoretical framework of the health belief model

This study is also grounded in the principles of the Health Belief Model (HBM). The health belief model was founded in the 1950s when US public health researchers began developing psychological models which were designed to enhance the effectiveness of health education and communication programmes (Rosenstock, 1966). The HBM was developed by social psychologists Irwin M. Rosenstock, Godfrey M. Hochbaum, S. Stephen Kegeles and Howard Leventhal. The HBM was originally established to understand and predict health related behaviours originally and to explain why people engage in or avoid taking on recommended health behaviours (Kigatiira, 2020).

There are 6 core components of the HBM (Rosenstock, 1974) which are (1) perceived susceptibility which is how people perceive their susceptibility to a health threat, (2) Perceived severity: How an individual perceives the severity and potential negative consequences of the health threat, (3) Perceived benefits: The perceived effectiveness and advantages of adopting recommended health behaviours mainly the reduction of susceptibility of the health threat, (4) Perceived barriers: The perceived disadvantages associated with adopting the recommended health behaviours and perceived obstacles which may hinder successful adoption of the recommended health behaviour, (5) Cues to action: External factors that influence individuals to take action towards preventive behaviours. (6) Self-efficacy: Individuals' beliefs in their own ability to successfully carry out the recommended

behaviours. These factors combine to influence the likelihood of taking on the recommended behaviour. High levels of perceived severity, susceptibility, and benefits along with high levels of cues to action and self-efficacy coupled with lower levels of perceived barriers will result in a person being more likely to adopt the recommended health message (Rosenstock, 1974, Sutton, 2001).

The primary aim of the Health Belief Model (HBM) was to gain an understanding into the factors that influence a person's decision-making processes related to health behaviours. It aimed to identify the main factors that shape people's beliefs, perceptions, and actions towards illnesses and threats to health as well as preventive measures in avoiding negative health outcomes, and the use of health care services (Orbell et al., 2013). By understanding these factors, the HBM aimed to facilitate the development of effective strategies and interventions for promoting health. The main goal of the HBM is to improve health outcomes by providing guidance for the development of evidence-based health promotion strategies (Griffin, 2011).

Efficacy of Fear Appeals in COVID-19 prevention Campaigns.

Fear appeals relating to public health have been used since the beginning of the COVID-19 pandemic. These appeals aim to persuade the public to engage in behaviours that can potentially minimize the spread of COVID-19 such as social distancing, wearing a mask and frequent handwashing (Pan et al., 2022). In the early stages of the COVID-19 outbreak mitigation measures the key measure was encouraging the public to “flatten the curve” and take on new mitigation measures to enable hospitals to meet the high demand of those infected with COVID-19 (Anderson et al., 2020).

Kigatiira (2020) conducted a case study in Kenya to assess the effectiveness of fear appeals in promoting COVID-19 preventative measures among motorcycle taxi operators in Nairobi County, locally known as boda boda riders during the beginning of the COVID-19 pandemic. The study used convenience sampling with a sample size of 17 respondents, each representing one constituency in Nairobi County. Phone interviews were conducted to collect data, considering their cost-effectiveness and compliance with social distancing measures during the lockdown. The study found that fear appeals, particularly the perceived threats of vehicle impoundment and loss of livelihood, influenced the adoption of preventative measures by boda boda riders. Participants expressed high levels of fear regarding the potential harm and lethal outcomes of COVID-19, motivating them to engage in behaviours like frequent hand sanitizing, mask-wearing, and limited passenger transport. Adhering to these measures was seen as a way to avoid fines, vehicle impoundment, and job loss. Participants also reported a sense of self-efficacy and recognized additional benefits of following COVID-19 preventative measures.

There are some limitations to the study, however. The small sample size and use of convenience sampling raise concerns about the generalisability of the study's findings. The selected participants may not fully represent the wider population of boda boda riders in Nairobi County. To enhance validity, future studies should include larger and more diverse samples. There is also no effect size reported for this study. This is a limitation of the research as it does not provide information on the magnitude of the studies observed effects. In future research reporting the effect sizes could strengthen the study's findings and contribute to a more comprehensive understanding of the efficacy of fear appeals in promoting preventative behaviours. The study provides insights into the effectiveness of fear appeals in promoting the

adoption of COVID-19 preventative measures and highlights the importance of appealing to perceived threats. It suggests the need for increased health communication strategies. However, the study's limitations, such as the small sample size and potentially non generalisable representation, of the wider sample should be considered. Future research should address these limitations to gain a better understanding of the impact of fear appeals in COVID-19 health messaging.

The present study

As research into the efficacy of fear appeals in COVID-19 public health messaging is relatively new this study aims to contribute to existing literature into COVID-19 public health messaging by testing the effectiveness of utilizing fear messages which promotes adherence to COVID-19 mitigation measures with the aims of contributing to the development of further COVID-19 and wider health communication strategies. Past research has found how fear based persuasive messaging can have unintended negative consequences. A study Sun et al. (2021) specifically examined the impact of fear appeals on young people's behavioural decisions regarding e-cigarettes. It was observed that fear appeals not only elicited fear but also unintentionally elicited anxiety and anger in the fear messages respondents. Fear appeals implemented in academic settings have been found to have unintended negative consequences of test anxiety in students (Putwain & Remedios, 2014). Despite the widespread use of fear appeals in public health communication their use has long been a polarizing issue with studies documenting that the use of fear inducing messages in public health campaigns may produce unintended consequences such as avoidant and defensive behaviours and increased feelings of anxiety (Ruiter et al 2014, Stolow et al., 2020, Witte & Allen, 2000). Considering past research of fear appeals promoting unintended anxiety in respondents this study aims to investigate whether fear inducing messages in the context of COVID-19 specific public health messaging

may similarly lead to unintended anxiety in respondents. Through understanding the potential adverse effects of COVID-19 specific fear messaging this research aims to contribute to the development of more effective health communication strategies which aims to strike a balance between utilizing appeals to fear and avoiding inducing excess anxiety in the fear messages respondents.

Research question 1: How effective is fear appeal messaging in promoting adherence to recommended COVID-19 health behaviours. Hypothesis for research question 1: COVID-19 fear appeals will promote adherence to COVID-19 mitigation measures.

Research question 2: What effect does fear inducing persuasive messaging have on respondent's emotional states, specifically anxiety. Hypothesis for research question 2: COVID-19 fear messaging unintentionally increases self-reported anxiety levels in respondents.

Methodology

Participants

The sample of this current study consisted of 28 participants (Males: $n = 14$; Females: $n = 14$) with 14 participants in the experimental group and 14 participants in the control group. The sample was recruited through a convenience sampling as well as snowball sampling consisting primarily of friends, family, and classmates. The study aimed to include a diverse range of participants from the general public. The only exclusion criterion was age, with individuals under 18 years not eligible to participate. The study aimed to achieve a desired statistical power of approximately 0.80 (or 80%) to detect a small-to-moderate effect size based on a meta-analysis of previous fear appeal studies (Tannenbaum et al., 2015, $d^- = 0.29$). Using G Power software, the analysis indicated that a total sample size of 100 participants was recommended to achieve the desired power, with 50 participants in both the control and experimental group, assuming equal sample sizes for both groups. Due to limitations of availability of participants within the desired time range, the study achieved the final sample size of 28 participants. Despite the smaller sample size, it was deemed acceptable for conducting the planned study. The researcher fully acknowledges the decreased statistical power and generalisability related with this sample size. Sensitivity power analysis using G Power software indicates the study has an 80% power to detect effects of Cohen's $d = 1.10$ or above at a significance level of $p = 0.05$. Therefore, the study is sufficiently powered to identify large differences between the control and experimental groups, contributing valuable insights into the efficacy of adherence promotion strategies based on fear appeals.

Materials

Fear Appeals PowerPoint Presentation:

To deliver the fear appeal message to the experimental group a brief PowerPoint presentation was developed to highlight the negative health outcomes of COVID-19 as well as the importance and health benefits of engaging in COVID-19 mitigation measures. The presentation included information on the negative health outcomes of COVID-19 focusing on COVID-19's negative symptoms and behaviours relating to the transmission of COVID-19. The presentation also focused on recommended health behaviours and self-efficacy actions the respondents could engage in to mitigate the risk of infection including hand sanitizing, wearing a mask and social distancing. The presentation utilized both text and graphic fear messages to increase the levels of perceived severity and susceptibility of COVID-19 including images of bacteria on work surfaces and images of individuals sneezing and coughing. The duration of the PowerPoint presentation was approximately 5 minutes. See appendix C for more information.

Attitudes Towards COVID-19 and COVID-19 Preventative Measures Scale

A self-report questionnaire, the Attitudes Towards COVID-19 and COVID-19 Preventative Measures Scale, was designed based on the components of the Health Belief Model (HBM) to assess participants' attitudes towards COVID-19 and its preventative measures. Existing validated questionnaires did not fully align with the specific focus and objectives of the study, necessitating the creation of a tailored questionnaire. For example, Niculaescu et al. (2021) applied the Health Belief Model (HBM) to immunity certificates, primarily examining perceived COVID-19 susceptibility and severity, benefits and barriers of using immunity certificates, and views on vaccination. Though this scale was informative and had similar objectives, the present study's primary focus on vaccination, as opposed to general feelings of

susceptibility, severity, and intentions to adhere to mitigation measures, warranted the development of a new scale specifically aligned with the present study's research aims.

Through a pilot study, the questionnaire's functionality and comprehensibility were assessed, along with the questionnaire's internal consistency. The Questionnaire demonstrated good internal consistency in the scale measuring perceived susceptibility ($\alpha = .735$), perceived severity ($\alpha = .865$), and future intentions to adhere to COVID-19 preventative measures ($\alpha = .911$). However, it is important to acknowledge that the attitudes towards COVID-19 scale had lower reliability (Cronbach's alpha = .572), but overall the scale was deemed reliable.

The first section focused on demographic information and asked participants for their gender, age, current vaccination status and if they have previously been infected with COVID-19. The second scale in this questionnaire was perceived susceptibility of contacting COVID-19. The questions in this scale asked participants to rate their concern and likelihood of being susceptible to COVID-19 on a scale from 1 to 5 with responses ranging from "not concerned" to "very concerned" and "not likely" to "very likely" all scored from 1 to 5 respectively. This scale consisted of 3 questions and responses were scored from 1 to 5 with higher scores indicating higher levels of perceived susceptibility of COVID-19. The third section of this scale was the perceived severity of COVID-19 scale. In this scale participants were asked to rate their perceived severity of contacting COVID-19 as well as the potential negative health outcomes from failing to engage in COVID-19 preventative measures. The responses were scored from 1 to 5 and ranged from "not severe" to "very severe" and "not likely" to "very likely". This scale consisted of 4 questions and responses were scored from 1 to 5 with higher scores indicating higher levels of perceived severity of COVID-19. The fourth scale in this questionnaire was the attitudes towards adhering

to COVID-19 and its preventive measures scale. Participants were questioned on the frequency in which they engage in various COVID-19 preventative measures which were routine sanitizing, frequent handwashing/sanitizing, social distancing, mask wearing in public spaces, and self-isolating when experiencing symptoms of COVID-19. Responses were scored from 1 to 5 and ranged from “never” to “always”. The scale consisted of 5 COVID-19 mitigation actions and respondents were asked to score from 1 to 5 how often they currently engage in these preventative measures. The final scale was the future intentions to adhere to COVID-19 preventative measures scale. This scale assessed participants intentions to adhere to COVID-19 mitigation measures in the future. Questions once again surveyed participants on their intentions to engage in various COVID-19 preventative measures but in future situations. The responses were scored from 1 to 5 and ranged from “not likely” to “very likely”.

Two identical but separate questionnaires were given to the experimental and comparison group with the only difference being the inclusion of a consent form in the comparison group's questionnaire due to the remote data collection process within this group. The Future Intentions to Adhere to COVID-19 Preventative Measures scale was the scale that used to compare the differences in attitudes and intentions between the experimental and comparison groups and specifically assessed the likelihood of future adherence to COVID-19 preventative measures between participants exposed to the COVID-19 fear appeal PowerPoint and those who were not. This scale was of particular interest in evaluating the impact of the fear appeal on the experimental group's future intentions to engage in the recommended health message of the fear appeal. See appendix B for more information.

The State Trait Anxiety Scale Form Y-1

This study utilized the STAI Form Y-1, which is the most widely used version and consists of 20 items for assessing trait anxiety and 20 items for state anxiety. The State anxiety items include statements like "I feel at ease; I feel secure" and "I am worried," while trait anxiety items present respondents with statements from "I am calm, cool, and collected" to "I am a steady person." It is important to note that certain items (1, 2, 5, 8, 10, 11, 15, 16, 19, and 20) were reverse scored. For these items, higher scores indicate lower levels of anxiety.

Participants rate their level of agreement with each of the statements on a 4-point scale. Higher scores on the non-reversed items indicate higher levels of anxiety, whereas higher scores on the reverse-scored items indicate lower levels of anxiety (STAI, 2011).

Past reliability studies for this scale have consistently shown a strong internal consistency for the STAI with coefficients ranging from .86 to .95 (Spielberger et al., 1983). Test-retest reliability coefficients over a 2-month interval have shown moderate to strong stability, ranging from .65 to .75. In the present study, the test-retest coefficients ranged from .69 to .89, indicating good reliability ("The State-Trait Anxiety Inventory (STAI)," 2011). The construct and concurrent validity of the STAI have been well-established (Spielberger, 1989). Additionally, the internal consistency of the STAI scores within the present studies sample was assessed using Cronbach's Alpha, which yielded a high value of .974 for both the PreSTAS and PostSTAS scales. This indicates a strong internal consistency of anxiety measures within the study.

The State-Trait Anxiety Inventory (STAI) has been widely used in fear appeal studies, including Witte and Morrison's (2000) investigation of trait anxiety in response to HIV prevention messages. Their longitudinal study examined how trait anxiety influenced attitudes, intentions, behaviours, defensive avoidance, and perceived manipulation in respondents of HIV prevention fear appeals. By considering the

participants' different anxiety profiles, the study showed the complex nature of anxiety and how anxiety can impact an individual's processing of health messages. These findings have suggestions for tailoring HIV prevention messages and potentially further health communication messages such as COVID-19 to specific anxiety traits which can enhance the efficacy of targeted communication strategies. The use of the STAI in this present study was chosen due to its clinical applications, strong reliability, its straightforward and easy to understand design and scoring process as well as the form not requiring a health care professional to administer it among participants. The form was also public domain and free to use for the present study.

Hypothesis 1:

Exposure to fear appeals will promote adherence to COVID-19 mitigation measures. Participants were randomly assigned to either the experimental or comparison group. The experimental group was exposed to a fear appeal PowerPoint, while the comparison group was not. The primary outcome variable assessed was the "Future intentions to adhere to COVID-19 preventive measures" scale on the attitudes towards COVID-19 and its preventative measures questionnaire. An independent sample t-test was conducted to assess differences between both groups for this scale.

Hypothesis 2:

COVID-19 fear appeal messaging unintentionally increases self-reported anxiety levels in respondents. To test this hypothesis, the experimental group completed the State-Trait Anxiety Inventory (STAI) Form Y-1 before and after exposure to the fear appeal PowerPoint. The scores before and after exposure were compared using a paired samples t-test to assess whether anxiety levels increased after exposure to the fear messages.

Design:

The study employed a quantitative experimental design, using both within-subjects and between-subjects designs. Participants were randomly assigned to either the experimental or comparison group to mitigate bias within the group allocation. To achieve randomization the study utilized an online random number generator (Research Randomizer, n.d.) to ensure that each participant had an equal chance of being placed in either the experimental group or the comparison group enhancing the validity and reliability of the study's findings. The within-subjects design was employed to assess changes in anxiety levels before and after exposure to the fear appeal intervention within each participant. The between-subjects design allowed for a comparison of anxiety levels between the experimental group which received the intervention and the comparison group which did not.

Analysis:

For Hypothesis 1, an independent samples t-test was conducted to compare the "Future intentions to adhere to COVID-19 preventive measures" scores between the experimental and comparison groups. For Hypothesis 2 a paired samples t-test was used to compare anxiety scores before and after exposure to the fear appeal PowerPoint within the experimental group.

Procedure:

Participants were first recruited through convenience sampling via email, WhatsApp, phone calls and in person. Additionally snowball sampling was used where participants were encouraged to refer other potential participants that may have been interested in participating in the study. After recruitment, participants were allocated at random to either the experimental or comparison group using an online random number generator. Each participant completed the study individually with only the researcher present. Participants were scheduled to

participate in the study in 20-minute preassigned slots over the course of 7 days. The experimental group was exposed to the COVID-19 fear appeal PowerPoint, while the comparison group did not receive any exposure to a fear message. Measures, including the COVID-19 attitudes questionnaire scale were administered to both the experimental and comparison groups to compare their future intentions to adhere to recommended COVID-19 health behaviours. The State-Trait Anxiety Inventory Form Y-1 was administered to the experimental group to assess participants' and anxiety levels before and after exposure to the fear appeal message. Data was analysed using the appropriate statistical tests as described above.

Ethical Considerations

The research study was approved by the National College of Ireland's ethics committee and conforms to NCI's ethical guidelines and procedures for conducting research with human participants. The participants were not expected to encounter any immediate harm from participating in this study. However, as the use of fear appeals requires inducing mild amounts of fear in respondents' participants were informed of this aspect of the study via the studies information sheet provided to all participants prior to commencement of the study. All participants understood the nature of the study as well as their involvement and each participant were informed of their right to refuse participating in the study. Upon the studies termination all participants were debriefed on the studies aims as well as their involvement via the debrief form which contained contact information of the researcher as well as contact information for helplines such as Focus Ireland which may assist any participant that may have experienced any psychological distress from participation in the study. All participant's data was deidentified, encrypted and stored on the researcher's computer.

Results

Descriptive Statistics

Descriptive statistics were calculated to provide a detailed summary of the study sample and the studies variables of interest. A preliminary analysis of assumptions of normality for all continuous variables were conducted via the Kolmogorov-Smirnov test and the Shapiro-Wilk test to assess whether the data was normally distributed. The sample consisted of 28 participants ($n = 28$). The participants' ages in the study ranged from 19 to 49 years with an average age of 26.14 years ($SD = 8.797$). The study utilized descriptive statistics to assess the participants' demographic characteristics, including gender, age, vaccination status, and previous COVID-19 infection. The participants response scores on the various scales of the attitudes towards COVID-19 and COVID-19 preventative measures questionnaire were analysed. The perceived susceptibility of COVID-19 scale had a mean score of 14.57 ($SD = 3.676$) out of a total potential score of 15 for this scale. The perceived severity of COVID-19 had a mean score of 8.36 ($SD = 2.571$) out of a total potential score of 20. The attitudes towards COVID-19 had a mean score of 15.64 ($SD = 3.021$) out of a potential score of 25. The future intentions to adhere to COVID-19 preventative measures scale had a mean score of 20.00 ($SD = 5.692$) out of the highest potential score of 25. The PreSTAS scale assessed participants' self-reported levels of anxiety on the State- Trait anxiety inventory form y-1 before exposure to the COVID-19 fear appeal presentation with a mean score of 32.36 ($SD = 9.018$) out of a potential total score of 80. The PostSTAS scale measured participants' self-reported levels of anxiety on the STAI after exposure to the COVID-19 fear appeal presentation with an increased mean score of 34.93 ($SD = 11.111$). Please see Table 1 and Table 2.

Table 1*Table for frequencies – descriptive statistics for categorical variables*

Variable	Frequency	Valid%
Gender		
Male	14	50%
Female	14	50%
Group		
Comparison	14	50%
Experimental	14	50%
Vaccination Status		
Unvaccinated	1	3.6%
Vaccinated	11	39.3%
Vaccinated + Boosters	16	57.1%
COVID-19 Contact Status		
No	5	17.9%
Yes	17	60.7%
More than once	6	21.4%

Table 2*Table for descriptive statistics – continuous variables*

Variable	<i>M [95% CI]</i>	<i>SD</i>	<i>Range</i>
Age	26.14 [22.73, 29.55]	8.797	30
Perceived Susceptibility	32.36 [27.15, 37.56]	3.676	14
Perceived Severity	8.36 [7.36, 9.35]	2.570	7
Attitudes Towards Covid-19	15.64 [14.47, 16.81]	3.021	12
Future Intentions to Adhere to Preventative Measures	20.00 [14.02, 25.97]	5.692	15
Pre exposure STAI	32.35 [27.15, 37.56]	9.018	28
Post exposure STAI	34.92 [28.51, 41.34]	11.11	35

Inferential Statistics:**Hypothesis 1:**

Exposure to fear appeals promotes adherence to COVID-19 preventive measures. To test this hypothesis an independent samples t-test was conducted to further investigate the impact of exposure to fear appeals on future intentions to adhere to COVID-19 preventive measures. Prior to the commencement of this test the assumption of normality for the future intentions to adhere to COVID-19 preventative measures scale was assessed within each group using the Shapiro-Wilk test. The results showed that the data in both the control group (Shapiro-Wilk $W = 0.922$, $p = 0.234$) and the experimental group (Shapiro-Wilk $W = 0.933$, $p = 0.339$) were normally distributed. As the assumption of normality was met, the independent samples t-test was considered appropriate for comparing the means of "Future intentions to adhere to COVID-19 preventative measures" between the two groups. The control group and the experimental group were compared based on their scores on the Future Intentions scale with a higher score in this scale indicating a greater intention to adhere to COVID-19 mitigation measures. The mean score for the control group was 17.57 (SD = 4.13), while the mean score for the experimental group was 19.79 (SD = 3.62). The Levene's test for equality of variances indicated that the assumption of equal variances was met ($F(1,26) = 0.313$, $p = .581$). The independent samples t-test revealed no significant difference in future intentions between the control and experimental groups ($t(26) = -1.51$, $p = .072$). The effect size measured by Cohen's d was -0.57 which indicates a moderate effect size. Considering time constraints, analysis focused on the main hypothesis, which investigated the impact of exposure to COVID-19 fear messaging on future intentions to adhere to COVID-19 preventative measures. While the researcher acknowledges that comparing other scales between the

groups could have been informative, the studies' primary objective was to assess the specific hypothesis mentioned above. See Appendix F for more details.

Hypothesis 2: COVID-19 fear appeal messaging unintentionally increases anxiety among respondents. To test Hypothesis 2, a paired samples t-test was conducted to compare the scores of the experimental group on the State-Trait Anxiety Inventory (STAI) form Y-1 before and after exposure to the fear appeal presentation. Before conducting the paired samples t-test the assumptions of normality within the pre and post-exposure scores as well as the differences between the scores (STAS_change) were assessed using the Shapiro-Wilk test. The test results indicated that the data in both the 'PreSTAS' group (Shapiro-Wilk $W = 0.970$, $p = 0.874$) and the 'PostSTAS' group (Shapiro-Wilk $W = 0.970$, $p = 0.874$) and the differences in scores (STAS_change) (Shapiro-Wilk $W = 0.970$, $p = 0.874$) were normally distributed. Since all the assumptions for conducting the paired samples t-test were met conducting this test was deemed appropriate. The mean score on the STAI form Y-1 before exposure to the fear appeal was 32.36 (SD = 9.02) while the mean score after exposure to the fear appeal was 34.93 (SD = 11.11). The paired samples t-test showed a significant difference in mean scores on the STAI form Y-1 before and after exposure to the fear appeal ($t(13) = -3.098$, $p = 0.008$, one-tailed). The participants' mean anxiety scores on the STAI form Y-1 increased from 32.36 (SD = 9.02) before exposure to 34.93 (SD = 11.11) after exposure, signifying that exposure to the fear appeal presentation led to a significant increase in anxiety levels among the participants. The effect size measured by Cohen's d was 0.828 which shows a large effect. An effect size of 0.82 suggests that about 80% of the post-exposure scores are above the mean of the pre-exposure scores, indicating an increase of about 30% from what would be expected if the two groups were identical. See Appendix F for more details.

Discussion

The present study aimed to investigate the effectiveness of COVID-19 fear appeal messaging in influencing respondents' intentions to adhere to COVID-19 preventative measures. The study aimed to test this by exposing participants to fear appeal messaging via a PowerPoint presentation, and assessed how effective this messaging was in increasing respondents' future intentions to engage in COVID-19 preventive measures via a COVID-19 attitudes questionnaire developed from the health belief model. Additionally, the study investigated the impact of fear appeals on self-report anxiety levels among respondents as previous research has found increases in anxiety to be an unintended consequence of fear messaging. The study's purpose was to provide insights into fear-based messaging's potential role in promoting public health behaviours, specifically in the context of COVID-19 prevention as well as the effect the fear component of the health messaging has on respondents. Understanding these dynamics can inform the development of targeted and more impactful; health communication messaging in future health matters.

For the study's first hypothesis, exposure to fear appeals was hypothesized to promote adherence to COVID-19 mitigation measures. However, the results revealed that there was no significant difference in future intentions to adhere to COVID-19 preventive measures between the experimental and comparison groups. Despite a moderate effect size (-0.57) the difference did not reach statistical significance ($t(26) = -1.51, p = .072$). As a result, the hypothesis that exposure to the fear appeal PowerPoint would promote adherence to COVID-19 preventive measures was not supported by the data. The findings suggest that exposure to the fear appeal did not have a significant impact on participants' intentions to adopt COVID-19 preventive behaviours. For the study's second hypothesis, it was proposed that COVID-19 fear messaging would increase

anxiety levels among respondents. The findings provided strong support for this hypothesis, as there was a significant increase in anxiety levels among participants exposed to the fear appeal presentation. The paired samples t-test showed a significant difference in anxiety scores before and after exposure ($t(13) = -3.098$, $p = 0.008$, one-tailed) with a large effect size (-0.82). These results indicate that exposure to the fear messaging led to a considerable increase in anxiety levels among the participants. As a result the hypothesis that COVID-19 fear messaging would increase anxiety levels was accepted based on the statistical data and large effect size.

Tannenbaum's 2015 meta-analysis into the effectiveness of fear appeals discovered that fear motivated health messages were found to be more effective when they contained recommended health behaviours that were for one time use only compared to recommended health behaviours that are repeated. In the context of COVID-19 a single use health message would be to get vaccinated against COVID-19. However, in the present study the fear appeal presentation as well as the attitudes towards adherence to COVID-19 questionnaire focused primarily on recommended repeated health actions such as handwashing and disinfecting work surfaces as well as questioning the participants on their frequency of engaging in these behaviours. This may have contributed to the failure of the studies fear appeal in promoting adherence to COVID-19 preventative measures and further highlights the need to specifically adapt COVID-19 health messaging considering content and structure of the health message.

Tannenbaum's meta-analysis researched the effectiveness of fear appeals and examined the relevance of Terror Management Theory (TMT) which proposes that people are motivated to manage their fear of mortality by maintaining their self-esteem. In the

case of the present study and Tannenbaum's study TMT would predict that fear appeals mentioning death could motivate individuals to adopt recommended health behaviours (Greenberg & Arndt, 2012). Upon the development of the COVID-19 fear messaging in the present study it was decided to integrate COVID-19 mortality rates and graphic fear appeal imagery of tombstone next to infection and illness statistics into the fear appeal presentation. The intent was to motivate respondents to embrace the recommended health behaviours and reduce their mortality-related anxiety. However, the fear appeal's inclusion of death-related statistics and graphic based fear messaging didn't yield a significant increase in future intentions to adhere to COVID-19 preventive measures. This outcome seems to contrast with Tannenbaum's findings, where fear appeals mentioning death had an clear impact on behaviour.

One possible reason why the death focused messaging in the COVID-19 fear appeal presentation didn't work could be due to defensive avoidance (Witte & Allen, 2000). Defensive avoidance occurs when individuals consciously or unconsciously avoid fear-inducing messages, especially those that focus on mortality and death. Despite the intention to motivate respondents through fear, some individuals may engage in cognitive dissonance and defensive mechanisms to cope with anxiety and fear related to their own mortality as defensive avoidance resulting in the rejection of the recommended health message. Defensive avoidance of fear-based messaging was found to be more prevalent in health matters that were relevant to the respondent (Kesseled s et al., 2014). As COVID-19 potentially effects everyone and this study was conducted merely weeks after the cessation of the COVID-19 pandemic it's possible that some of the respondents of the fear messaging may have been displaying defensive avoidance and future studies should investigate the effect defensive avoidance has on COVID-19 fear appeals.

The Extended Parallel Process Model (EPPM) (Witte, 1992) underlines the importance of perceived threat and efficacy in influencing individuals' response to fear messages. By assessing anxiety levels before and after exposure to the fear appeal presentation the study aimed to assess the impact of COVID-19 fear messaging on the respondents' emotional states, namely anxiety. While the fear appeal presentation failed to promote adherence to the recommended health message the results indicate that COVID-19 fear messaging had a significant effect on the respondent's anxiety levels. As stated by the EPPM lower levels of response efficacy can result in avoidant and anxious behaviours from those exposed to the fear message. It is possible that the fear appeal presentation sufficiently lacked information on actions and behaviours which can mitigate the potential risks of COVID-19 therefore resulting in increased feelings of anxiety in the respondents. This indicates the importance of carefully considering how fear messages are used in public health communication. While fear appeals can be effective in motivating behaviour change in other cases, they can also lead to unintended negative consequences such as increased anxiety and defensive behaviours. Therefore, it is important to find a balance in fear messaging, ensuring that adequate information on the efficacy of the recommended response is provided along with the fear inducing persuasive messages to shape an individuals' perception of efficacy (Witte & Allen, 2000).

Research into Stolow et al.'s (2020) study into the potential ineffectiveness and unintended consequences of COVID-19 specific fear appeals offered more potential reasons for the results of the present studies hypotheses. They state the difficulties of tailoring a health communication message which achieves a balance between messages of perceived susceptibility and severity as well as self and response efficacy. Fear appeals have been found to have several unintended consequences such as denial,

avoidance, depression, and anxiety (Kok et al., 2017; Stolow et al., 2020). They also state their concern for how COVID-19 specific fear appeals may not be effective in promoting recommended health behaviour explaining that the use of COVID-19 fear appeals during high stress health events like pandemics may unintentionally be leading respondents into reactionary and backlash behaviours which may put additional stressors on pandemic time restrictions and health communication. They went on to critically appraise components of COVID-19 fear messaging they deemed as problematic. Offering an example of COVID-19 fear messaging which used an image of a mass burial ground which aimed to persuade respondents to take on the recommended health action of washing their hands. They criticise this method of fear messaging to be ineffective as this particular fear appeal does not offer information on efficacy statements for example explain how to properly execute the steps of correct hand washing or offering up an explanation as to why exactly a person should wash their hands to mitigate COVID-19 exposure or directing a person to the necessary resources (i.e., soap and water) to carry out the recommended health action. While the COVID-19 fear messaging in the present study did contain information as to why a person should carry out health actions such as handwashing, the fear appeal presentation did not contain information on the various steps of effective handwashing and relied more on inducing feelings of perceived susceptibility. As mentioned, the fear appeal presentation used imagery of a tombstone to invoke feelings of perceived severity however in this case there was no accompanying efficacy statements within this slide just COVID-19 infection and mortality rate statistics. The present study also did not direct participants to where they could engage in these actions, such as handwashing, where the study was being conducted. This may have resulted in the failure of the present studies fear appeal messaging in

influencing participants to adopt the recommended health behaviour. Potentially problematic components of the present studies fear appeal messaging may also have contributed to the rise of anxiety among the participants. It may have also been possible that the format of the fear appeals in the present study being a PowerPoint presentation meant that potentially perceived susceptibility and severity statements were too far spaced apart from efficacy statements on other slides. In future studies the delivery method of the fear messaging should aim to correct this potential limitation as well as seeking to achieve a desired balance of appeals to perceived susceptibility and severity as well as self and response efficacy to ensure a greater uptake of the recommended health message as well as potentially reducing unintended anxiety in respondents.

Limitations, Strengths, and Future Research:

One of the key limitations of the present study is the small sample size. The present study is powered to detect large effect sizes but not smaller ones. Therefore, the present study's findings may not be representative of the larger population. Weaker statistical power may have contributed to the failure of the COVID-19 fear appeal PowerPoint to increase future intentions to adhere to COVID-19 preventative measures in the experimental group due to smaller effects not being picked up. In future research I would increase the studies sample size to be powered to detect small effects and increase the generalisability of the study's findings. The present study may have been limited by its reliance on self-report measures for assessing anxiety levels in participants. Although the use of the STAI form was chosen due to its strong reliability, its comprehensive design and not requiring a health care professional to score it research has found the use of self-reported measures to introduce response bias (Bauhoff, 2014). The participants may not have accurately recalled their present feelings of anxiety or may have chosen more socially desirable answers (Bound et al., 2001). Future

research would address this limitation by introducing a more objective measure of anxiety either in place of the STAI or alongside it.

Due to time constraints and a limited sample the present study was also limited by not introducing a placebo group. Introducing a placebo group into the present study would have acted as a control group that would have allowed the study to isolate specific effects of the fear appeal PowerPoint from any of the possible effects that would have been caused by exposure to any sort of intervention not necessarily related to COVID-19 fear messaging. The absence of a placebo group in the study made it more difficult to establish a direct causal relationship between the fear appeal intervention and the study's findings (Huneke et al., 2020). The introduction of a placebo intervention would have allowed for assessing anxiety levels between placebo and experimental group and assessing any differences between groups therefore making it easier to assess the extent to which the fear appeal intervention in the experimental group caused a rise in anxiety (Babel et al., 2018). In future studies a placebo group would be introduced alongside the experimental and comparison group to isolate the specific effects of COVID-19 fear messaging. The placebo group intervention should be structured as an informational presentation on the nature of COVID-19 and its transmission however in this case not relying on fear inducing messages to increase perceived severity and susceptibility.

The study benefited from its focus on COVID-19 specific fear appeals, which allowed for a targeted examination of the use of COVID-19 specific fear messaging, especially as the study was conducted only weeks after the cessation of the pandemic. Kok et al. (2017) and Stollow et al. (2020) suggest that fear appeals may not always be effective in promoting adherence to the recommended health behaviour and could lead to unintended consequences, such as increased anxiety in respondents. In the context of

COVID-19, where fear and uncertainty were widespread, the fear appeal messaging might have intensified anxiety levels among participants, as is seen from the significant increase in anxiety scores after exposure to the fear appeal presentation. Stolow et al. (2020) had a particular focus on the ineffectiveness of COVID-19 fear appeals and stated how they may be more effective in worsening people's anxiety more than promoting behaviour change which further aligns with the findings of the present study. The use of various scales developed from the Health Belief Model to measure attitudes towards COVID-19, perceived susceptibility, and perceived severity of COVID-19 added strength to the study's analysis. These scales provided a comprehensive assessment of participants' responses to the fear appeal messaging, allowing for a greater understanding of their impact on public health behaviour. The study addressed a gap in the literature by examining the effects of fear appeal messaging on intentions to adhere to COVID-19 preventative measures. The future intentions scale provided insights into participants' willingness to take precautionary actions, which are critical for public health communication strategies during a pandemic. The study also addressed the effect of COVID-19 fear messaging had on anxiety, in this case showing that COVID-19 fear messaging did more to arouse anxiety in participants more than any cause any behaviour change. These findings contribute to COVID-19 and wider health communication strategies.

Conclusion:

In conclusion, this study examined the impact of COVID-19 fear appeal messaging on respondents' future intentions to adhere to preventative measures and their anxiety levels. Although the fear appeal presentation did not significantly influence intentions to adopt preventive behaviours it significantly increased anxiety levels. This highlights the importance

of balancing fear induction with efficacy information in health messaging. Future research should explore defensive avoidance and include placebo groups to deepen our understanding of fear-based communication during pandemics. These findings contribute valuable insights for the development of targeted and impactful public health communication strategies.

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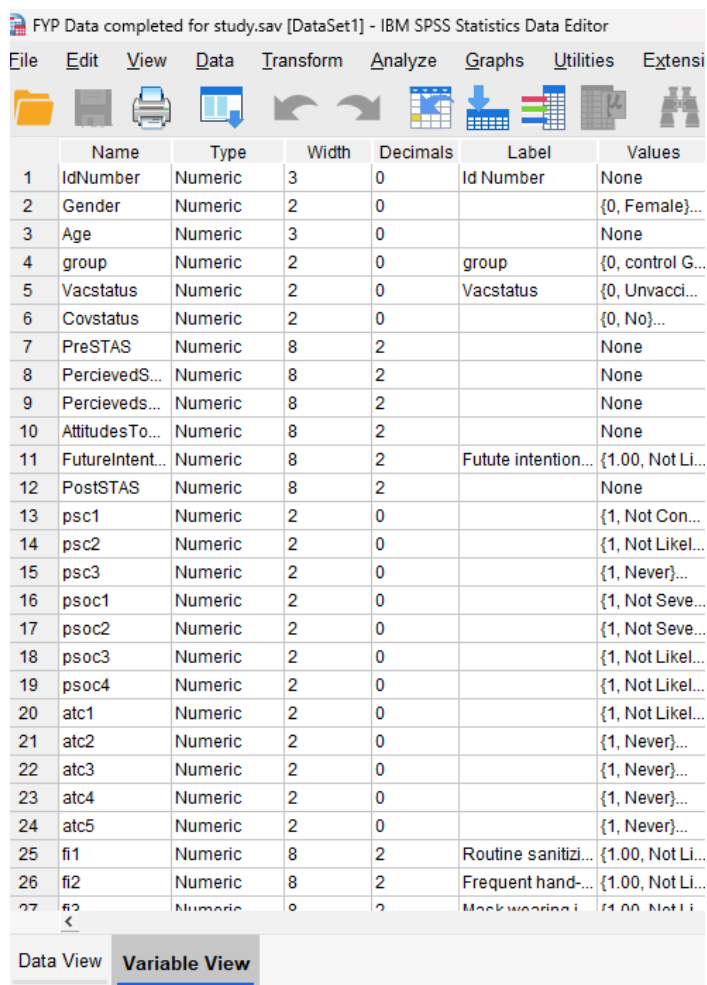
Appendices

Appendix A

Evidence of SPSS data and output. Full data file available upon request.

FYP Data completed for study.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Graphs Utilities Extensi



	Name	Type	Width	Decimals	Label	Values
1	IdNumber	Numeric	3	0	Id Number	None
2	Gender	Numeric	2	0		{0, Female}...
3	Age	Numeric	3	0		None
4	group	Numeric	2	0	group	{0, control G...
5	Vacstatus	Numeric	2	0	Vacstatus	{0, Unvacci...
6	Covstatus	Numeric	2	0		{0, No}...
7	PreSTAS	Numeric	8	2		None
8	PercievedS...	Numeric	8	2		None
9	Percieveds...	Numeric	8	2		None
10	AttitudesTo...	Numeric	8	2		None
11	FutureIntent...	Numeric	8	2	Futute intention...	{1.00, Not Li...
12	PostSTAS	Numeric	8	2		None
13	psc1	Numeric	2	0		{1, Not Con...
14	psc2	Numeric	2	0		{1, Not Likel...
15	psc3	Numeric	2	0		{1, Never}...
16	psoc1	Numeric	2	0		{1, Not Seve...
17	psoc2	Numeric	2	0		{1, Not Seve...
18	psoc3	Numeric	2	0		{1, Not Likel...
19	psoc4	Numeric	2	0		{1, Not Likel...
20	atc1	Numeric	2	0		{1, Not Likel...
21	atc2	Numeric	2	0		{1, Never}...
22	atc3	Numeric	2	0		{1, Never}...
23	atc4	Numeric	2	0		{1, Never}...
24	atc5	Numeric	2	0		{1, Never}...
25	fi1	Numeric	8	2	Routine sanitizi...	{1.00, Not Li...
26	fi2	Numeric	8	2	Frequent hand-...	{1.00, Not Li...
27	fi3	Numeric	8	2	Mask wearing i...	{1.00, Not Li...

Data View **Variable View**

Paired Samples Test										
		Paired Differences					Significance			
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	One-Sided p	Two-Sided p
					Lower	Upper				
Pair 1	PreSTAS - PostSTAS	-2.57143	3.10618	.83016	-4.36488	-.77797	-3.098	13	.004	.008

Paired Samples Effect Sizes						
		Standardizer ^a	Point Estimate	95% Confidence Interval		
				Lower	Upper	
Pair 1	PreSTAS - PostSTAS	Cohen's d	3.10618	-.828	-1.427	-.205
		Hedges' correction	3.30100	-.779	-1.343	-.193

Appendix B

Attitudes Towards COVID-19 and COVID-19 Preventative Measures Questionnaire

The following questions relate to your personal beliefs and attitudes towards COVID-19 and COVID-19 preventative measures.

Each set of questions is divided into 4 categories, perceived susceptibility of COVID-19, Perceived severity of COVID-19, Attitudes towards adhering to COVID-19 preventative measures and Current intentions to adhere to COVID-19 preventative measures.

Please tick the box that best describes your current attitudes and beliefs relating to each question on the scale from 1 to 5.

Demographic Questions:

1. Gender

Please choose one.

- Male
- Female
- Other

2. Age in Years

Please write age in years

3. Current Vaccination Status

Please choose one.

- Unvaccinated
- Vaccinated
- Vaccinated +Booster Vaccinations

4. Have you contracted COVID-19 before?

Please Choose One

- No
- Yes
- More than once

Perceived Susceptibility of COVID-19

Please tick one box for each question that best conforms to your current perceptions of how susceptible you are to contracting COVID-19

5. How concerned are you about contacting COVID-19?

Please Choose One

- Not Concerned
- Barely Concerned
- Not Sure
- Concerned
- Very Concerned

6. How likely do you think you are to catch COVID-19

Please Choose One

- Not Likely
- Not Very Likely
- Not Sure
- Likely
- Very Likely

7. How often do you feel you need to engage in COVID-19 preventative measures to avoid contracting COVID-19?

Please Choose One

- Never
- Not Often
- Sometimes
- Often
- Always

Perceived Severity of COVID-19

Please tick the box that relates to your current perceptions of COVID-19 and its consequences and severity.

8. How severe do you feel COVID-19 and its negative consequences are?

Please Choose One

- Not Severe
- Not Very Severe
- Not Sure
- Severe

- Very Severe

9. How severe do you feel the potential risks and consequences of not engaging in COVID-19 preventative measures are? (e.g., handwashing, wearing a mask in public areas.)

Please Choose One

- Not Severe
- Not Very Severe
- Not Sure
- Severe
- Very Severe

10. How likely do you think it is that you would contact COVID-19 from failing to adhere to COVID-19 preventative measures?

Please Choose One

- Not Likely
- Not Very Likely
- Not Sure
- Likely
- Very Likely

11. How likely do you think it is that someone you know would contact COVID-19 from failing to adhere to COVID-19 preventative measures?

Please Choose One

- Not Likely
- Not Very Likely
- Not Sure

- Likely
- Very Likely

Attitudes Towards Adhering To COVID-19 Preventative Measures

How often do you engage in the following COVID-19 Preventative Measures? Please tick the box that best conforms to your current attitudes towards COVID-19 preventative measures.

Each answer ranges from never to always.

12. Routine sanitizing of work surfaces or items such as your mobile phone

Please Choose One

- Never
- Not Often
- Sometimes
- Often
- Very Often

13. Frequent handwashing/sanitizing?

Please Choose One

- Never
- Not Often
- Sometimes
- Often
- Very Often

14. Social Distancing

Please Choose One

- Never
- Not Often

- Sometimes
- Often
- Very Often

15. Mask Wearing in public spaces

Please Choose One

- Never
- Not Often
- Sometimes
- Often
- Very Often

16. Self-isolating when experiencing potential symptoms of COVID-19

Please Choose One

- Never
- Not Often
- Sometimes
- Often
- Very Often

Future Intentions to Adhere to COVID-19 Preventative Measures

How likely are you to engage in the following COVID-19 preventative measures in the future?
Each question ranges from not likely to very likely.

17. Routine sanitizing of work surfaces or items such as your mobile phone

Please Choose One

- Never
- Not Often
- Sometimes
- Often
- Very Often

18. Frequent handwashing/sanitizing?

Please Choose One

- Never
- Not Often
- Sometimes
- Often
- Very Often

19. Social Distancing

Please Choose One

- Never
- Not Often
- Sometimes
- Often
- Very Often

20. Mask Wearing in public spaces.

Please Choose One

- Never
- Not Often
- Sometimes
- Often

- Very Often

21. Self-isolating when experiencing potential symptoms of COVID-19

Please Choose One

- Never
- Not Often
- Sometimes
- Often
- Very Often

22. If you have not received a COVID-19 vaccination how likely are you to receive one in the future?

Please Choose One

- Not Likely
- Not Very Likely
- Not Sure
- Likely
- Very Likely

23. If you have received a COVID-19 vaccination how likely are to receive further COVID-19 booster shots in the future?

Please Choose One

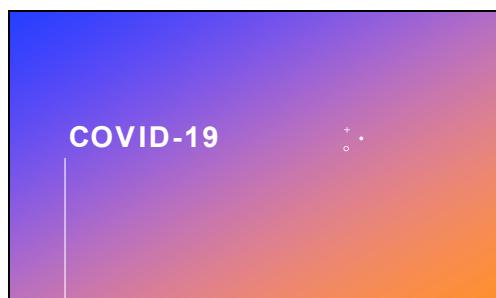
- Not Likely
- Not Very Likely
- Not Sure
- Likely
- Very Likely

Appendix C

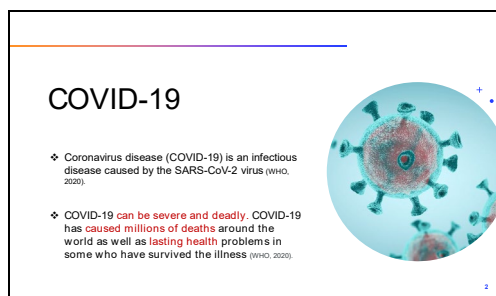
COVID-19 Fear Appeal PowerPoint Presentation

(WHO Coronavirus (COVID-19) Dashboard, n.d.)

Slide 1



Slide 2



Note. COVID-19 is an infectious disease caused by the SARS-CoV-2 virus.


The coronavirus cells latch on to receptors of healthy cells using its spiky surface proteins. This typically occurs in the lungs.

COVID-19 **can be severe and deadly**. COVID-19 has **caused millions of deaths** around the world as well as **lasting health** problems in some who have survived the illness.

Slide 3


Transmission of COVID-19

❖ COVID-19 can be spread in two main ways.



The infographic is titled 'Transmission of COVID-19'. It features a central yellow circle with the text 'COVID-19 mainly spreads from person to person'. Below this, it says 'But it can also be left on objects and surfaces...'. The infographic includes illustrations of a person coughing into their elbow, a person touching a laptop and mouse, and a person touching a door handle. At the bottom, it states 'So if you touch something contaminated and then touch your face or another's face, you might all fall ill.' There is a small number '3' in the bottom right corner of the infographic.

Slide 4




The slide contains two photographs. The top photograph shows a man in a white shirt coughing into his right elbow. The bottom photograph shows a man in a green shirt sneezing, with a spray of droplets visible in the air.

❖ Directly, through contact with an infected person's body fluids (for example, droplets from coughing or sneezing) (gov.ie, 2022).

4

Slide 5




- "Indirectly, through contact with surfaces that an infected person has coughed or sneezed on and which are, therefore, contaminated with the virus" (Gov.uk, 2022).
- COVID-19 could be on a surface which we touch then enters our body when we touch our eyes, mouth or nose. (NHS, 2020).
- This gives COVID-19 passage to the mucus membranes in our throats which incubates for 2 to 14 days which can then result in symptoms and negative outcomes.

Slide 6

How can COVID-19 affect our health?

Symptoms of COVID-19 include:


- Cough
- Fever
- Fatigue
- Body aches
- Shortness of breath and breathing difficulties
- Chills
- Diarrhea
- Vomiting



Slide 7

Severe symptoms of Covid-19

- ❖ Some cases of COVID-19 can have severe negative outcomes on our health including loss of life.
- ❖ Zhou et al's 2020 study investigated patients who were hospitalized with COVID-19 to compare the details between patients whose symptoms were not fatal and patients who passed away from COVID-19




APR14/21 | Volume 10, 2021 | <https://doi.org/10.1155/2021/3556662>

Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study

Fei Zhou, MD ¹, Ting Yu, MS ¹, Ronghui Du, MD ¹, Guangbin Fan, MS ¹, Ying Liu, MS ¹, Zhifei Liu, MD ¹, et al.

Show all authors ⁺ Show footnotes

Published: March 11, 2021 • DOI: <https://doi.org/10.1155/2021/3556662> 

Slide 8

Findings:
 The study investigated the cases of 191 people hospitalized with COVID-19 in Wuhan, China. They found that:

- ❖ 28% of the patients passed away from COVID-19.
- ❖ 26% of the patients were admitted to ICU and 78% of those admitted to ICU passed away.
- ❖ Apart from respiratory issues a combination of a number of other symptoms can cause major health problems which can be fatal




Slide 9

	COVID-19 Deaths (n=54)	COVID-19 Survivors (n=137)
Sepsis	100% (54)	42% (58)
Respiratory failure	98% (53)	36% (50)
Acute respiratory distress syndrome (ARDS)	93% (50)	7% (9)
Heart failure	92% (28)	12% (16)
Septic shock	70% (38)	0
Blood coagulation issues	50% (27)	7% (10)
Acute cardiac injury	59% (32)	0.7% (1)
Acute kidney injury	50% (27)	0.7% (1)
Secondary infection	50% (27)	0.7% (1)
Low protein blood levels	37% (20)	1.5% (2)
Acidosis (body fluids are too acid)	30% (16)	0.7% (1)

Drugs.com (2022). (Zhou et al., 2020)

Slide 10

Preventative Measures:
 How can we **protect** ourselves and **mitigate the risks** of COVID-19?



Slide 11

COVID-19 Preventative Measures: *what actions can we take?*

- ❖ Socially distance 2 meters apart.
- ❖ Wash hands often and in the proper manner.
- ❖ Sanitize hands regularly to remove potential traces of COVID-19 from your hands.
- ❖ Cover coughs and sneezes with tissue or your sleeve, was hands afterwards.
- ❖ Wear a mask when in a crowded public setting, especially indoors.
- ❖ Sanitize work areas before use when in public spaces
- ❖ Keep up to date with Covid Vaccines




Appendix D

Consent Form

Title of Study: Assessing the Efficacy of COVID-19 Fear Appeal Messaging in Promoting Adherence to COVID-19 Preventative Measures and Their Effect on Anxiety

I.....agree to voluntarily participate in this research study. I

understand the purpose of the study. I have had the nature of the study explained to me in writing and I have had the opportunity to ask any questions relating to my involvement in the study. I

understand my right to withdraw my participation in the study at any time without penalty. I

understand that my participation in the study will involve me completing a self- report Likert scale relating to my own feelings towards COVID-19 and its preventive measures. I understand that I may

be lectured on the dangers of COVID-19 prior to commencement of my participation in the study. I

understand that I will not benefit directly from my involvement in this study. I understand that all

data I provide to this study will be kept confidential. I understand that my consent form and any

data submitted will be kept by the researcher until the termination of the study. I understand that under freedom of information legislation I am entitled to access any of my provided information.

.....

.....

Signature of Participant

Date

I understand that the participant is providing informed consent to participate in this study.

.....

.....

Signature of Researcher

Date

Appendix E

Participant Information and Debrief Document

Participant Information and Debriefing Document

Title of Study: Assessing the Efficacy of COVID-19 Fear Appeal Messaging in Promoting Adherence to COVID-19 Preventative Measures and Their Effect on Anxiety.

Firstly, I'd like to thank you for your participation in this study. Below is general information and a debrief on the nature of this study as well as the purpose and aims of the study and the

purpose of your involvement. If you have any further questions, you are free to ask the researcher.

What is this study about?

This study aims to test how effective the use of fear appeals is in arousing attitude and behaviours change in individuals exposed to the fear appeal. A fear appeal is a persuasive message which uses fear as an influencer. The study aims to see if fear appeals are effective in promoting changes in attitudes and behaviours related to COVID-19 preventative measures such as hand washing and social distancing. However, as fear appeal messaging aims to evoke fear in the viewer to influence behaviour change, it is possible you may feel small amounts of anxiety during this study. As a result, the researcher will also be assessing the participants self-reported anxiety levels.

What is the purpose of this study?

The purpose of this study is to test the efficacy of appealing to fear in promoting behaviour change towards COVID-19 preventative measures and adopt recommended health behaviours. This is of importance as COVID-19 is continuing to spread globally however public attitudes towards engaging in preventative measures are seen as less important now due to less exposure to appealing to fear via public health strategies. The study aims to understand the effectiveness of fear as a motivator and to inform public health communication strategies aimed at reducing the spread of COVID-19 and in influencing individuals to adopt safer behaviours.

The research question asks whether the implementation of a fear appeal intervention can influence the adherence of COVID-19 measures. The hypothesis is the implementation of fear appeal intervention will cause adherence to COVID-19 mitigation measures. The study also aims to assess whether a rise in anxiety will occur to participants after the exposure of the fear appeal as research suggests that fear appeals may produce anxiety in viewers as an unintended consequence.

Who can take part in this study?

You can take part in this study if you are over the age of 18.

Do I have to take part?

You do not have to take part in this study. All participation in this study is strictly voluntary. There are no consequences of not taking part in this study. If you decide to participate in this study, you are free to withdraw your participation at any time by simply informing the researcher of your willingness to withdraw your participation. Any data you have provided to this study can be withdrawn prior to the full written completion of this study.

What will my involvement be in this study?

You are being asked to view a very brief presentation on COVID-19 relating to the nature of the virus, its negative effects and how an individual can engage in behaviors which will reduce the risk of exposure to COVID-19. Both prior to and after you have viewed this slide show you will be asked to self-complete the State-Trait Anxiety Inventory (STAI) to assess anxiety levels before and after exposure to the fear appeal. Upon commencement of the COVID-19 fear appeal presentation you will be asked to complete an attitude towards COVID-19 questionnaire.

Are there any risks related to my involvement in this study?

You will not experience any direct risks from participating in this study. However, the nature of this study is assessing the effects of using fear as a persuasive tool. As past literature has shown, such studies may cause participants mild amounts of anxiety, particularly relating to COVID-19. As COVID-19 is still a relatively new illness that has devastated the lives of many people in recent years if you feel you would currently be negatively affected by participating in such a study, please do not feel the need to participate.

Will my data be confidential?

All data collected will be de-identified and it will not be possible to identify a participant

based off their responses beyond the demographic questions which ask for input of gender and age. All responses to the questionnaire and scale will be fully anonymized. All collected data will be stored in a password protected file on the researcher's computer. You can withdraw your data at any point before the completion of the study upon which you will not be able to withdraw any submitted data. All collected Data will be held in accordance with the NCI data retention policy. Deidentified data may be archived in an online data repository for potential further use of secondary data analysis.

What will my data be used for?

The results of this study will be submitted to NCI and presented for my final dissertation. Data from this study will also be used in a future presentation outlining the procedure and results of the study.

Who to contact for further information on this study.

If you have any further questions or concerns relating to this study as well as your participation in it, please feel free to contact the following.

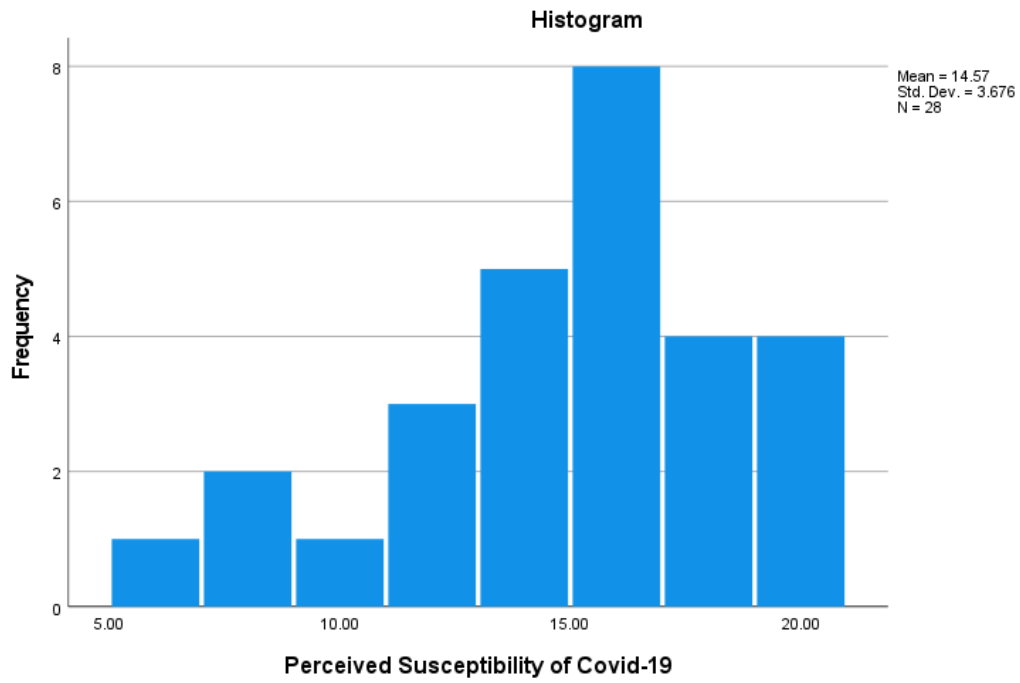
Researcher: Billy Malone x20123183@student.ncirl.ie

Project Supervisor: Fearghal O'Brien fearghal.OBrien@ncirl.ie

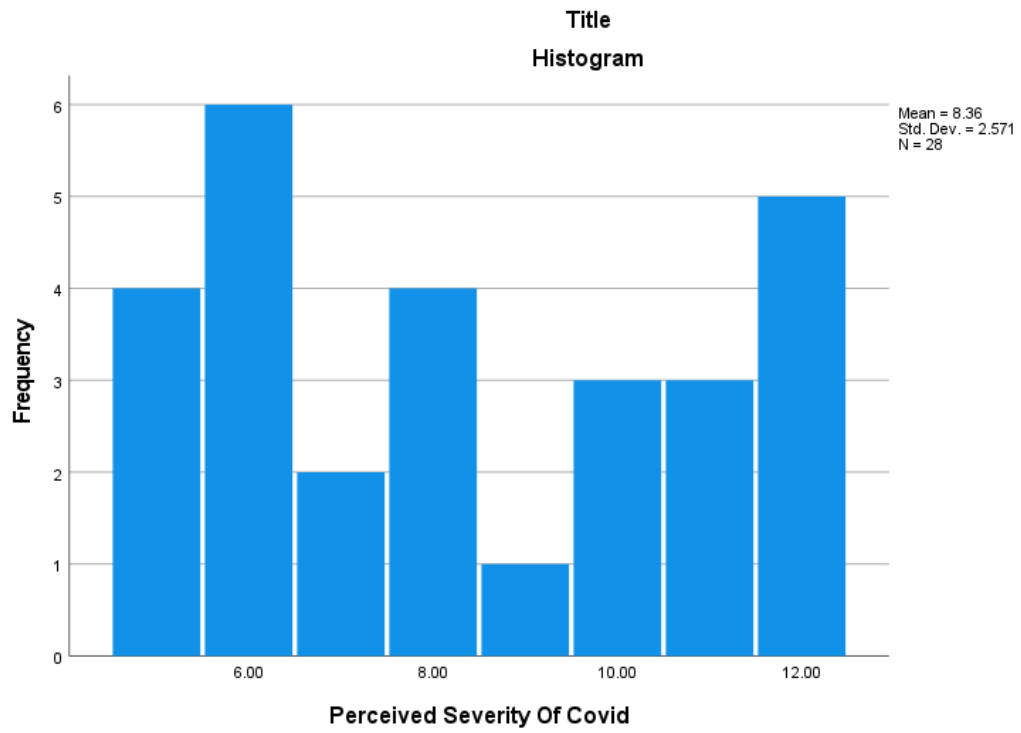
Aware.ie Freephone 1800 80 48 48

Appendix F

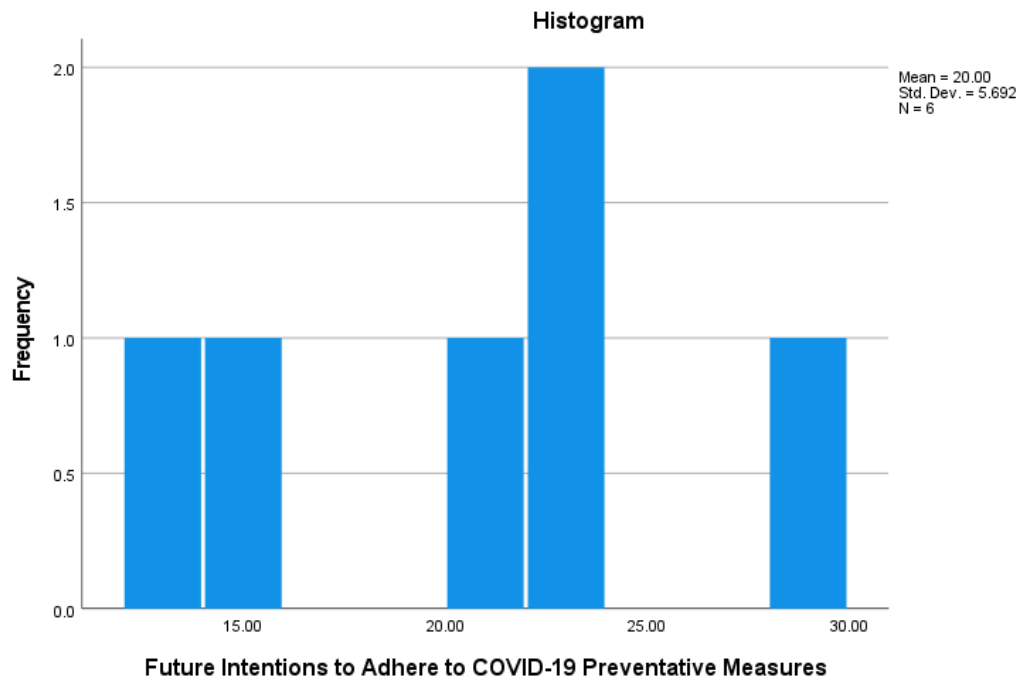
Histogram for Perceived Susceptibility of Covid-19



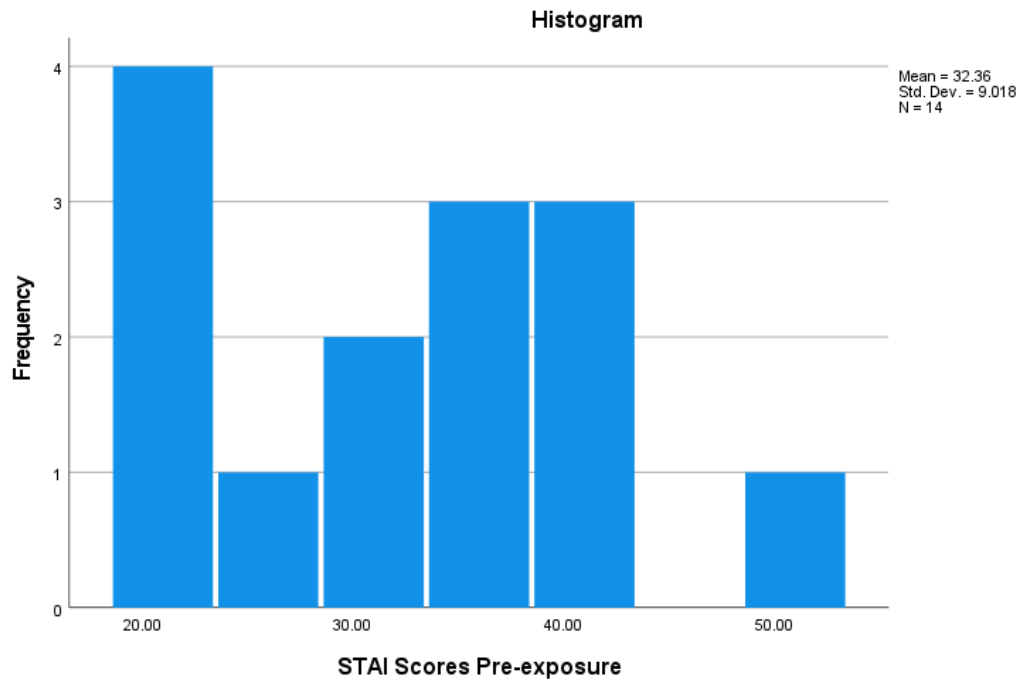
Histogram for Perceived Severity of Covid-19



Histogram for Future intentions to Adhere to COVID-19 Preventative Measures



Histogram for STAI Scores Pre-exposure



Histogram for STAI Scores Post-exposure

