

**Compliance with COVID-19 Guidelines at the Start of the
Pandemic: A Second Look**

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Abstract

Early investigations into compliance with public health guidelines for the COVID-19 pandemic suggested a variety of motivations: concern in general for those elderly vulnerable to infection (Pfattheicher, Nockur, Böhm, Sassenrath, and Petersen, 2020); concern for loved ones (affective empathy), and the extent to which compliance is a moral question (Christner, Sticker, Söldner, Mammen, and Paulus, 2020); concern for one's own risk of infection and general trust of the science (Plohl and Musil, 2021). The present paper seeks to address two questions from this disparate work: the validity of a short *ad hoc* scale of affective empathy, and a regression model to test the relative contributions of the previously identified motivators in predicting compliance with guidelines at the beginning of the pandemic. Tests of convergent and divergent validity against a widely used scale that measures affective and cognitive empathy (Reniers, Corcoran, Drake, Shryane, and Völlm, 2011) show the *ad hoc* scale is valid. Regression reveals that compliance with public health guidelines was effectively predicted by all the motivators, excepting said *ad hoc* scale.

Keywords: COVID-19, Affective Empathy, Public Health Compliance

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In the heat of the COVID-19 global pandemic, many different factors were studied to help governments further enforce people's compliance with safety protocols.

Initially, affective empathy was investigated against a one-item intent-to-distance scale (Pfattheisher et al. 2020). Pfattheisher et al. (2020) found that affective empathy, otherwise known as empathy for people most vulnerable to the virus, was a motivator for the intention to physical distance. This means that a participant's concern for those most susceptible to catching and being harmed by the virus directly affected their intent to socially distance.

Expanding the investigation from only empathy, Christner et al. (2020) looked into other factors like empathy for vulnerable loved ones, fear of punishment, and moral judgment against their six-item distancing behavior scale. Overall, Christner et al. (2020) found moral judgment (MJ), conceptually known as how morally relevant social distancing is considered, as the most important factor followed by empathy for loved ones (ELO). ELO as defined by Christner et al. (2020) is the concern for family and friends, with emphasis on those most vulnerable to COVID-19. The demonstrated importance of ELO complemented the finding of

Pfaffetherisher et al. (2020). Both studies highlighted the importance of empathy as a motivator for distancing.

Phlol and Musil (2021) followed these studies with their investigation that disregarded empathy in favor of testing other predictors against their compliance with the COVID-19 prevention guidelines scale. The Compliance scale was a self-generated study that addressed the 11 behaviors outlined by authority figures in the field of disease control (Phlol and Musil, 2021). Of the predictors, only COVID-19 risk perception (RP) and trust in science (TIS) directly predicted compliance (Phlol and Musil, 2021).

Recently, it has been questioned what can be learned by combining the individual variables outlined by each of these study. A replication was run to begin to explore the overlap between all of these variables (Householder 2023). In their replication, Householder 2023, found that affective empathy was a predictor of both intention to social distance and compliance with COVID-19 guidelines. Affective empathy is, therefore, suggested to be a predictor for complying with all COVID-19 guidelines, not exclusively social distancing.

Pffatheisher et al. (2020) explored affective empathy through their three-item Affective Empathy Scale (AES). This was a scale meant to measure a participant's concern for vulnerable others (Pffarheisher et al. 2020). Christner et al. (2020)

generalize the scale to an overall empathy measure. This creates an inconsistency in which construct, affective empathy or general empathy, is being measured with the scale.

Study 1 intended to address this concern by testing the validity of the AES as an affective empathy measure. The validity was examined by looking at the relationship between the AES and the Questionnaire of Cognitive and Affective Empathy (QCAE; Reniers et al. 2011). Specifically, convergent validity was examined through the relationship to the three Affective Empathy subscales. Divergent validity was examined through the relationship between the two Cognitive Empathy subscales. Theoretically, the AES should have a strong positive correlation with the three Affective Empathy subscales and little to no positive correlation with the two Cognitive Empathy subscales. The QCAE aimed to assess both cognitive and affective empathy through its 5 subscales (Reniers et al., 2011).

Study 2 intended to investigate the combined contributions of the previously listed predictors in motivating compliance with COVID-19 guidelines. We considered factors that have been found to be predictors for both social distancing as well as broader compliance with all 11 guidelines. From Pfattheisher et al. (2020) we used the AES to measure concern for vulnerable others. Additionally, the ELO scale and the MJ scale were used to measure empathy for vulnerable loved ones and the extent to

which social distancing is a moral concern respectively (Christner et al. 2020). Lastly, we used the TIS and RP from Phlol and Musil (2021). These factors were used to investigate the effects of participants' trust in scientific authority and understanding their risk of contracting COVID-19 respectively. For assessing the effect on COVID-19 mitigating behavior, we used the Compliance scale from Phlol and Musil (2021). By testing all the variables together in one sample, we expect to find insights into the most important factors to target during another global health emergency.

Study 1

When searching for factors that predicted beneficial behavior during the COVID-19 pandemic, one of the first settled on was Affective Empathy. To test this, Pfattheicher et al. (2020) created the Affective Empathy Scale (AES). This is an *ad hoc* three-item measure that sought to measure concern for vulnerable others during the COVID-19 pandemic (Pfattheicher et al. 2020).

Being an *ad hoc* scale, a full understanding of the validity of the scale is lacking. Both Pfattheicher et al. (2020) and Christner et al. (2020) reported high Cronbach's alpha values of .81, showing that the scale has internal reliability. Additionally, when used in replications testing Pfattheicher et al. (2020)'s initial findings, the scale behaved as expected

(Householder 2023). Despite these supporting factors of the scale, the source paper was inconsistent in the use of affective empathy versus generic empathy (Pfattheicher et al. 2020). This inconsistency led to other researchers using the scale as a general empathy scale instead of an affective empathy scale as proposed (Christner et al. 2020). Additionally, the source paper derived the scale from a measure of moral judgment (Pfattheicher et al. 2020). We intend to test the validity of the scale to dismiss these questions.

To test the validity of this scale, we tested it against a previously established scale for both cognitive and affective empathy. This scale is the Questionnaire of Cognitive and Affective Empathy (QCAE) by Reniers et al. (2011). We hypothesize that the Pfattheicher et al. (2020) Affective Empathy Scale does test for affective empathy as previous research suggests, and therefore it should have a strong positive correlation with the affective empathy subscales of the QCAE: Emotional Contagion (ES), Peripheral Responsivity (PerR), and Proximal Responsivity (ProR) in the population. In addition, it should have no correlation or a weak positive correlation with the Cognitive Empathy subscales of the QCAE: Perspective Taking (PT) and Online Simulation (OS) in the population.

Methods

Participants.

Participants were recruited using Mechanical Turk and completed surveys using Qualtrics. 89 Participants were recruited and compensated with 50 cents upon completion.

Materials.

Participants were recruited using Mechanical Turk and completed surveys using Qualtrics.

From Pfattheicher et al. (2020) we are using the Affective Empathy Scale (AES). This is a three-item scale, with responses ranging from one to 5 for each item, where the scale score is calculated with the mean. A higher score on the AES means more concern for vulnerable others.

From Reniers et al. (2011) we are using the Questionnaire of Cognitive and Affective Empathy (QCAE). This is a 31-item scale made up of 5 subscales with response ranges from one to four. All items were composed of a four-point scale where a higher score means a greater expression for each of the subscale categories.

The first scale is the Cognitive Empathy Perspective Taking (PT). This is a 10-item scale with responses ranging from 10 to 40. The scale score is calculated by summing up the responses to each item. A higher score means a higher tendency to see things from the perspective of other people. The second scale is the Cognitive Empathy Online Simulation (OS). This is a 9-item scale

with responses ranging from 9 to 36. The scale score is calculated by summing up the responses to each item. A higher score means more consideration for others' perspectives when in online discussions. The third scale is the Affective Empathy Emotion Contagion (EC) scale. This is a four-item scale with responses ranging from four to 16. The scale score is calculated by summing up the response to each item. A higher score means more likely to pick up the emotions of those they interacted with. The fourth scale is the Affective Empathy Peripheral Responsivity (PerR) scale. This is a four-item scale with responses ranging from four to 16. The scale score is calculated by summing up the response to each item. A higher score means a higher emotional response to social events not involved in. The fifth scale is the Affective Empathy Proximal Responsivity (ProR) scale. This is a four-item scale with responses ranging from four to 16. The scale score is calculated by summing up the response to each item. A higher score means a higher emotional response to social events involved in.

Procedures .

Participants were recruited via Mechanical Turk and completed the survey in Qualtrics. Unbeknownst to them they were randomly assigned to complete either the AES or QCAE first. For the QCAE we gave the instruction asking about a typical day in the past two weeks. Prior to the AES, participants were asked to

think back to March 17, 2020, see (Householder, 2023). Each item was presented one at a time, where participants had to respond to the current item before they could move on to the next item. After participants completed each measure, they were debriefed and thanked.

Results

A correlation was run to look for a linear relationship between the AES (1-5; $M = 3.2$, $SD = 1.0$) and EC (4-16; $M = 9.9$, $SD = 2.9$). $r(87) = .87, p < .001$. As hypothesized, those with higher scores on the AES tended to score higher on the EC.

A correlation was run to look for a linear relationship between the AES (1-5; $M = 3.2$, $SD = 1.0$) and ProR (4-16; $M = 9.3$, $SD = 2.7$). $r(87) = .48, p < .001$. As hypothesized, those with higher scores on the AES tended to score higher on the ProR.

A correlation was run to look for a linear relationship between the AES (1-5; $M = 3.2$, $SD = 1.0$) and PerR (4-16; $M = 8.3$, $SD = 3.3$). $r(87) = .57, p < .001$. As hypothesized, those with higher scores on the AES tended to score higher on the PerR.

A correlation was run to look for a linear relationship between the AES (1-5; $M = 3.2$, $SD = 1.0$) and PT (10-40; $M = 20.7$, $SD = 7.1$). $r(87) = .56, p < .001$. Contrary to the hypothesis,

those with higher scores on the AES tended to score higher on the PT.

A correlation was run to look for a linear relationship between the AES (1-5; $M = 3.2$, $SD = 1.0$) and OS (9-36; $M = 22.5$, $SD = 7.7$). $r(87) = .15$, $p = .156$. As hypothesized, there was no linear relationship between AES scores and OS scores.

Discussion

To test the convergent validity of Pffatheicer et al. (2020)'s Affective Empathy Scale, scores were related to the measures of affective empathy in the QCAE: Emotional Contagion, Proximal Responsivity, and Peripheral Responsivity. These affective empathy subscales showed a positive relationship with the Affective Empathy Scale. As predicted, the Affective Empathy Scale assessed affective empathy.

The Affective Empathy Scale showed no correlation with one of the Cognitive Empathy scales, Online Simulation. Unexpectedly, the Affective Empathy Scales did correlate with the Perspective Taking scale, which is a Cognitive Empathy Scale. This can potentially be evidence of a false positive result due to the other evidence supporting its usage as an Affective Empathy Scale. Otherwise, it could be due to Perspective Taking being not directly the same as Affective Empathy, but related.

Study 2

For this study we investigated the previously confirmed factors in predicting changes to behavior due to COVID-19, presenting all possible predictors to a single sample at the same time. These factors are: Affective Empathy, Empathy for Loved Ones, Moral Judgement, Trust in Science, and Risk Perception (Pffatheisher et al., 2020, Christner et al., 2020, Phlol and Musil, 2021). To measure changes in behavior due to COVID-19, we are using the Compliance measure from Phlol and Musil (2021). This scale measures compliance with the 11 guidelines of the World Health Organization (Phlol and Musil, 2021). For this investigation, we predicted that Affective Empathy and Empathy for Loved Ones will have a strong positive linear relationship, due to the similar nature of these scales stemming from the concern for those other than oneself. This relationship will lead to collinearity, negating both factor's correlations with Compliance. Additionally, we predicted that Risk Perception and Moral Judgement will be the strongest predictors for Compliance, while Trust in Science will be a weaker predictor for Compliance.

Methods

Participants.

159 participants were recruited from Mechanical Turk and completed surveys using Qualtrics. Upon completion participants were compensated with 50 cents.

Materials.

Participants were recruited using Mechanical Turk and completed surveys using Qualtrics.

From Pfattheicher et al. (2020) we are using the Affective Empathy Scale, see study 1.

From Plohl and Musil (2021), we used the Risk Perception (RP) scale, the Trust In Science (TIS) scale, and Compliance with COVID-19 guidelines. The RP scale is a 6-item scale, with responses ranging from one to 7, where higher scores mean more concern about catching the virus; the scale score was the mean of the 6 responses. The TIS scale is a 14-item scale, with responses ranging from one to 5, where higher scores mean greater trust in the scientific community; the scale score was the mean of the 14 responses. The Compliance Scale was an 11-item scale, with responses ranging from one to four, with higher scores meaning more likely to comply with World Health Organization Guidelines; the scale score was the mean for the 11 responses.

From Christner et al. (2020) we used the Moral Judgement scale (MJ). This is a four-item scale with responses ranging from one to 5. The scale score is the mean of the responses. A higher score means that the participant felt more certain that performing social distancing was a moral question. We also used the Empathy for Loved Ones scale (ELO). This is a three-item

scale with responses ranging from one to 5. The scale score is the mean of the responses, where a higher score means more concern for vulnerable loved ones.

Procedures.

Participants were recruited via Mechanical Turk and completed the survey in Qualtrics. Unbeknownst to them they were randomly assigned to complete the scales in different orders. Prior to their responses, participants were asked to think back to March 17, 2020 (Householder 2023). Each item was presented one at a time, where participants had to respond to the current item before they could move on to the next item. After participants completed each measure, they were debriefed and thanked.

Results

A linear regression was run to test for a predictive model of Compliance using: AES, ELO, RP, TIS, and MJ. See table 1 for descriptive statistics and collinearity.

Table 1.

Descriptive Statistics and Inter-Item Correlation for the Model of Compliance.

	<i>M</i>	<i>SD</i>	AES	ELO	RP	TS	MJ
Compliance	2.9	.7	.06	.72**	.40**	.80**	.54**
AES (1-5)	3.2	1.0		-.04	-.10	.01	-.07
ELO (1-5)	3.5	.8			.79**	.88**	.77**
RP (1-7)	5.1	1.3				.50**	.85**
TIS (1-5)	3.5	.9					.59**
MJ (1-7)	4.0	1.5					

** $p < .01$

There is a successful model; $F(5,153) = 57.84$, $p < .001$, $MSe = .18$, $R^2 = .65$. Four of the five variables are positive predictors of Compliance (ELO, RP, TIS, MJ); only AES fails to contribute to the model. See Table 2 for the model specifics.

Table 2.

B weights, Statistical Significance, Correlation, and Partial Correlations of Predictors.

	<i>B</i>	Sig.	<i>r</i>	<i>r_{partial}</i>
Constant	.946			
AES	.038	.268	.06	.09
ELO	.335	.033	.72	.17
TIS	.348	<.001	.79	.26
RP	-.212	.002	.40	-.24
MJ	.139	.003	.54	.24

Discussion

All the factors showed a positive linear relationship with Compliance with COVID-19 Guidelines except for the Affective Empathy Scale. Previous research has shown a correlation with Compliance with COVID-19 Guidelines, therefore it can be inferred that the collinearity with the Empathy for Loved Ones has decreased most of the correlation (Pffatheisher et al., 2020, Householder, 2023). It is reasonable to infer that the collinearity with Affective Empathy is the source of the sharp decrease in correlation for the Empathy for Loved Ones Scale. The decrease in all of the correlations after running the regression suggests that all of these factors are strongly associated with one another. While all factors are associated with each other, because all the factors are still present, it is shown that they all have their own effect on Compliance. An unexpected result shown from the linear regression is the presence of risk perception as a suppressor variable. This comes from an unaccounted variation in error variance.

General Discussion

The three-item Affective Empathy Scale created by Pffathiesher et al. (2020) was tested against the Questionnaire of Cognitive and Affective Empathy by Reiners et al. (2011). Tests of the convergent and divergent validity provided support for the overall validity of the scale. This added validity

negates any concerns about the scale's usage in previous research. Going forward, research into pandemic response motivators may utilize this scale for understanding concern for vulnerable others.

All but the Affective Empathy Scale was shown to be predictors of Compliance. Previous research has supported the use of Affective Empathy as a predictor for Compliance with COVID-19 guidelines (Householder 2023). Taking these factors into account, Affective Empathy is useful when presented alone, but when presented in a group its effect is limited. All other variables tested: Moral Judgment, Empathy for Vulnerable Loved Ones, Trust in Science, and Risk Perception, showed associations with Compliance. These results support the claim that previous research should have been more encompassing in testing multiple previously established predictors. The small partial correlations additionally showed that many of these factors intertwine, meaning it is reasonable to infer a higher score on one of these scales will lead to a higher score on the others. While these correlations are present, they are not strong enough to focus solely on one of the factors to induce compliance. Therefore, in the event of another public health emergency, it is important to focus on all factors to achieve the greatest results.

Limitations.

One limitation of both studies was that data were collected via survey. Survey data can be problematic due to being prone to socially desirable responses. However, the previous investigations into each of the variables were also conducted with surveys, therefore to expand on those studies, we choose to follow the same methods. A secondary limitation of the study is asking participants to think back to March 2020. It is unknown whether participants accurately thought back to that time period. However, in the case of study two, the variables Trust in Science and Risk Perception behaved similarly in the present time as they did during the initial time period. From this behavior, we can ascertain that participants were at least partially able to recall back to that time period.

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