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„Implicit theories of COVID-19, blame/social support and
the disease frequency.“

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Abstract

Background: Implicit theories are our assumptions about the malleability of certain attributes. They play a substantial role when it comes to developing health-promoting behavior or a healthy lifestyle. Unfortunately, implicit theories also affect individuals when they blame others for contracting illnesses, even more so, when people get sick multiple times. This phenomenon influences the debate around issues of the COVID-19 pandemic, as people are getting blamed for not taking the safety measures seriously or for vaccine refusal. This study examines the effect of implicit theories of COVID-19 and the disease frequency on blame attribution and social support.

Method: The study ($N = 292$) was a 2 (implicit theory of COVID-19: incremental vs. entity) x 2 (disease frequency of COVID-19: sick once vs. sick three times) between-subject-design. Implicit theories were manipulated using fictitious interview statements of experts and the disease frequency by a description of a person, who contracted COVID-19 once or three times.

Results: The analysis showed no effect of the implicit theories of COVID-19 condition on blame or social support or a mediation of blame and a moderation of the disease frequency on the relationship between the implicit theories and social support. Still, an effect of the disease frequency on blame and social support was found.

Conclusion: The present study provides first insights into the research area of an implicit theory of COVID-19 in connection with blame attribution and social support. It is also one of the first studies to look at an implicit theory of illness. In addition, implications for future studies are discussed.

Keywords: Implicit theories, Blame, Social support, COVID-19

Introduction

Since December 31, 2019, the COVID-19 virus is part of all our daily lives (WHO, o. D.) and has had a considerable impact on work life, life structure, social relations, as well as physical and mental health (Hussain, 2020). Furthermore, it has led to stigmatization and blaming in our society during the pandemic (Haas, 2020), particularly when it comes to the issue of vaccination. This occurs not only among strangers, but also among family and friends. People are getting blamed, as they contract COVID-19, for being careless or not making sufficient effort in implementing safety measures. Consequently, this has led to diminishing support and solidarity and a deepening divide in society. Thus, it seems even more important to seek those determinants or factors, which affect blaming or even social support in the context of the COVID-19 virus pandemic.

In health education or media, it is often stated that we can improve or influence our health by ourselves or rather, that health is something we are able to control (Dohle et al., 2020; Stroebe, 2011). This became apparent during the pandemic and the quarantine measures when people were told that they could reduce the risk of contracting COVID-19 if they stayed at home, washed their hands, reduced social contact and traveling, wore their masks, and got vaccinated.

One decisive factor or precondition for the regulatory processes, which are needed to remain motivated to keep up a healthy lifestyle or affect our health positively (Hofmann et al., 2008), are our implicit theories (Burnette et al., 2013). Implicit theories describe our assumptions about the malleability of certain attributes, such as our health, intelligence, or personality (Dweck, 1999, 2012, 2017; Molden & Dweck, 2006). People differ in their strengths of holding incremental (characteristics are developable and malleable) and entity (characteristics are mainly stable) theories (Dweck, 1999). A high incremental theory is often associated with positive outcomes, including a healthy lifestyle and health-promoting behavior (Bunda & Busseri, 2019; Schreiber et al., 2020; Thomas et al., 2019) which could also be important in the actual COVID-19 pandemic, when it comes to compliance with safety actions, health-promoting behavior or avoiding contraction of the COVID-19 virus. Having a stronger incremental theory, thus thinking that we can influence our health-promoting behavior and therefore the risk of contracting the virus, could have a positive effect

on a personal level. Zhang et al. (2021) were already able to prove that those who report a stronger incremental theory also reported more compliance with safety measures and believe in the severity of the COVID-19 virus. On the other hand, an incremental theory could also lead to negative effects on an interpersonal level, because thinking that certain attributes are under our control might also lead to increasing blame towards others if they do not manage to do the same (Burnette et al., 2017). This could also pertain to maintaining a healthy lifestyle or health-promoting behavior in the COVID-19 pandemic. Although an incremental theory of COVID-19 could have positive effects on a personal level, there could also be a counterpart, as we start blaming other people, if they do not manage to comply with the rules or avoid contracting the virus.

In the context of incremental theories and blame, Dohle et al. (2020) were able to prove in their study that an incremental theory of health leads to increased blame towards people suffering from a mental or physical illness, and consequently also to lower social support for those suffering from the illness.

Furthermore, research has also shown that people with an incremental theory can be even more reproachful towards themselves and harsh in comparison to people with a stronger entity theory, when it comes to continuous failure (Molden & Dweck, 2006). Ryazanov and Christenfeld (2018) found, that people with an induced incremental theory of empathy showed more blame when they were asked to imagine a person, who is continually failing to show empathy towards others, than people with an entity theory. However, this effect did not extend to single failure cases (Ryazanov & Christenfeld, 2018).

As there might be a chance to affect the blaming and social support towards people with COVID-19, this study will try to examine the effect the implicit theories of COVID-19 and the disease frequency have on blame and social support towards a person, who contracted COVID-19. Those insights are not only relevant for the ongoing pandemic but may be applied generally for future interventions in the health domain in order to reduce blaming and stigma towards people with an illness.

Theory and Hypotheses

Implicit Theories

Implicit theories are assumptions people make about their own and other individuals' characteristics, like health, intelligence, or personality (Dweck, 1999, 2008, 2012, 2017; Molden & Dweck, 2006; Ryazanov & Christenfeld, 2018). Generally, implicit theories are mostly categorized into two contrary assumptions (Dweck, 1999). First, what is referred to as entity theory, holding the belief, that characteristics are mainly stable and resistant to individual effort (Dweck, 1999). Second, an incremental theory, which refers to the belief, that we can indeed change those characteristics by ourselves (Dweck, 1999). People with a mindset based on a stronger incremental theory view characteristics and traits as malleable through effort, learning, and practice, which is why they are more likely to work on the improvement of the trait, even when making mistakes, compared to people with a stronger entity view (Dweck, 1975; Dweck et al., 1995). On the contrary, people with a stronger entity view, who often see their traits as change resistant, are more concerned about making mistakes, and attribute their abilities to their biology and genetics (Dweck, 1975, 2006; Keller, 2005). An entity and an incremental view are mainly perceived as endpoints of a continuum and individuals differ in their strengths, they hold an incremental or entity theory (Burnette et al., 2013; Burnette et al., 2020; Dweck & Leggett, 1988). Furthermore, the expression of an incremental or entity theory can vary, depending on the concrete attribute (Burnette et al., 2020). For example, the same person can hold an incremental theory of weight while they have more of an entity theory when it comes to intelligence (Burnette et al., 2020). Research states, that those assumptions about the malleability of certain characteristics are mainly stable over time but they can still be influenced by experimental manipulation and intervention (Burnette et al., 2020; Paunesku et al., 2015).

Implicit theories have been studied in various domains, including intelligence (Blackwell et al., 2007; Dweck, 1999, 2012, 2017; Hong et al., 1995; Molden & Dweck, 2006), personality (Dweck, 1999, 2012, 2017; Erdley & Dweck, 1993), empathy (Ryazanov & Christenfeld, 2018; Schuhmann et al., 2014), emotion (Tamir

et al., 2007), health (Dohle et al., 2020; Dweck, 1999, 2012, 2017; Molden & Dweck, 2006), mathematic skills (Good et al., 2008), morality (Chiu et al., 1997), and leadership ability (Burnette et al., 2010; Hoyt et al., 2012) or aging (Weiss et al., 2016). A high incremental theory is often associated with positive outcomes, including academic improvement (e.g., Yeager et al., 2016), increased empathy (Schuhmann et al., 2015), well-being (Dweck, 1999, 2017; Yeager et al. 2014), increased willpower (Job et al., 2010), self-regulation (Burnette et al., 2013), less aggression (Yeager et al., 2011) or even a healthy lifestyle (Bunda & Busseri, 2019; Thomas et al., 2019; Schreiber et al., 2020) and intentions to reduce unhealthy behaviors like smoking (Thai et al., 2020).

Recently, research has been taking a closer look at implicit theories in connection with health-related topics. Thus, Schleider et al. (2015) found that people with an entity theory of personality were more likely to develop psychological problems. In contrast, an incremental theory was associated with a buffering effect against negative life events (Beck, 1987). When it comes to an incremental theory about weight, participants reported increased endurance after diet reversals (Burnette, 2010) and a lower body mass index (John-Henderson et al., 2021). Moreover, an incremental theory of physical appearance was associated with higher reports of physical activity and higher training frequency (Lyons et al., 2015; Orvidas et al., 2018). In general, an incremental theory of health is associated with more health-promoting behavior, like physical exercise and healthy eating habits (Bunda & Busseri, 2019; Burnette, 2010; Burnette & Finkel, 2012; Ehrlinger et al., 2017; Thomas et al., 2019).

Implicit theories, blame, social support, and the disease frequency

On the other hand, it has been shown that an incremental theory is not always associated with positive outcomes, especially when it comes to health-related topics. In one study, participants with a higher incremental theory were more likely to state that they will start smoking in the future (Fitz et al., 2015). In another study, regarding implicit theories of weight, it was shown that an incremental theory, such as the belief that body weight is malleable due to effort, influences stigma and self-blame (Burnette et al., 2017). According to the stigma-asymmetry model, implicit theories

can lead to both – positive and negative outcomes when it comes to stigma (Burnette et al., 2017; Hoyt et al., 2017). Thus, if weight is presented as something fixed, like an illness, in the sense of the entity theory, it could lead to less or even more stigma and blame. Hoyt et al. (2017) named two fundamental psychological processes in that context. First, through the attribution theory, the weight would be considered genetically determined and thus may lead to less stigma and self-blame, as you cannot change your genes (Crandall & Reser, 2005). Second, the representation of certain attributes, like weight, as not changeable could at the same time lead to more stigma and blame, as it would be seen as a non-malleable characteristic of the specific person (Dar-Nimrod & Heine, 2011). Those either positive or negative effects can also occur with an incremental view on weight (Burnette et al., 2017; Hoyt et al., 2017). An incremental theory can decrease shaming via stronger offset efficacy attributions, which describes the condition when one is able to regulate or change the current status, for example weight, by themselves (Burnette et al., 2017). At the same time, it can also increase shaming via stronger onset responsibility attributions, which means the personal accountability for one's current status, like the actual weight (Burnette et al., 2017). This may be due to the fact, that, if weight is perceived as something which can be changed due to effort and is therefore under our own responsibility, it may lead to even more blame and stigma towards others, who do not manage to live up to those social expectations (Burnette et al., 2017). But an incremental view can also decrease stigma, as it may reduce essentialist thinking (Burnette et al., 2017). Essentialist thinking means seeing the devaluated trait as a fixed and intrinsic facet of one person (Haslam & Kvaale, 2015). Therefore, weight would, contrary to an entity view, not be seen as a fixed characteristic of one person.

In any case, an incremental view does not always only lead to positive effects and the mentioned stigma-asymmetry model may also be important for the actual study. If the attribution of responsibility was found to be leading to more weight shaming (Burnette et al., 2017) it may also lead to stronger stigmatization of people, who contracted the COVID-19 virus. And although an incremental theory was found to also decrease shaming via efficacy attribution (Burnette et al., 2017) it may not apply to the situation of the pandemic. Efficacy attribution means the ability to regulate the current status (Burnette et al., 2017), which could be understood as

putting effort into avoiding contracting COVID-19 or at least acting compliantly during the quarantine if they contracted the virus, which would be difficult to observe by others.

The attribution theory already played a great role in the research field of implicit theories (Heider, 1958; Weiner, 1974, 1958, 2000). It postulates that individuals base their reactions to themselves and others to events on their causal attributions about the event (Dweck & Leggett, 1998). Dweck (2012) assumed, that people hold an implicit theory, which subsequently influences the attribution. This in turn may influence our expectations and reactions towards ourselves and others (Dohle et al., 2020). People with an incremental view of things set themselves goals, which they use as guidance, and every setback is used as information for possible improvement or to change strategies for goal achievement (Burnette et al., 2017). Contrarily, entity theorists are more likely to set themselves performance goals instead and see setbacks as proof of their lack of ability (Burnette et al., 2017). Entity theorists also show more of a stable trait attribution (Dweck, 1999). On the contrary, having a higher incremental theory, the belief in the malleability of certain attributes, leads to an attribution of controllability and the belief, that characteristics can be changed, which in turn leads to more blame attributions (Burnette et al., 2017).

As described above, having a higher incremental theory of health, seeing health as something controllable and malleable due to effort, has many benefits on an intrapersonal level (Dohle et al., 2020). On the other hand, an incremental theory of health can also lead to negative effects on an interpersonal level (Dohle et al., 2020). If we hold an incremental theory and apply this attribution of controllability also to others and those who do not manage to meet our expectations, it could lead to blame and less support for them (Burnette et al., 2017; Stroebe, 2011). This would also be in accordance with the theory of moral responsibility, which states, that the main factor of moral judgment is the belief, whether the actor could have known otherwise (Pizarro & Tannenbaum, 2012; Ryazanov & Christenfeld, 2018). Hence, as an incremental view is the belief, that an attribute is malleable, it should result in a stronger judgment towards “bad” behavior (Molden & Dweck, 2006; Plaks et al., 2009). Transferring this to the situation of the actual pandemic, an incremental theory may lead to more the stigma, as the risk of contracting the COVID-19 virus

may be perceived as controllable and therefore within the responsibility of the individual.

Research has already shown that an incremental theory of empathy was associated with higher blame when participants were asked to imagine a person, who shows low sympathy (Ryazanov & Christenfeld, 2018). Kammrath & Dweck (2006) found, that participants with an entity theory of personality were more accepting when it came to the faults of their dating partners in comparison to participants with an incremental view. Furthermore, participants with a higher incremental view of personality attributed the failure of their partners, when trying to change negative behaviors, to a lack of effort (Kammrath & Peetz, 2012). Dohle et al. (2020) proved in their study, that an incremental theory of health leads to increased blame towards people suffering from a mental or physical illness and therefore also to lower social support. Schreiber (2021) showed a significant effect of the implicit theories of health on blame and a significant association between the implicit theories of health, blame, and helping behavior, which means the willingness to support people who contracted an illness. This could also refer to expectations and health-promoting behavior in the COVID-19 pandemic.

Summing up, although there is a lot of research to date about implicit theories of health, research on implicit theories of illness, or specific illnesses, is rare. This applies particularly to health-promoting behavior and interpersonal effects. There are some studies regarding implicit theories of anxiety (Schroder et al., 2015; Sung et al., 2017), depression (Zimmermann, 2020), and pain (Higgings et al., 2014) but none of them deals with the topic of health-promoting behavior or the social aspects like blame attribution or social support. Thus, it would be highly important to have a closer look at implicit theories of illness or implicit theories concerning a specific illness, as results may differ if an implicit theory of health is simply generalized across the spectrum of all cases.

However, one study by Zhang et al. (2021) researched on implicit theories and their intrapersonal effects in the COVID-19 pandemic. They were able to show that holding an incremental theory leads to positive effects on an intrapersonal level, like maintaining health-related behavior or reducing the risk of contracting COVID-19 (Zhang et al., 2021). Another study by Zhang & Kou (2022), who examined the effect of an implicit theory of health on health-protective behaviors during the COVID-19

pandemic, could support those results. They found that those who have a higher level of incremental theory of health were more likely to engage in health-protective behaviors during the COVID-19 pandemic (Zhang & Kou, 2022). But no research was done on the interpersonal level and the social impact of an incremental theory of the COVID-19 virus, as it may lead to even more blame and consequently lower social support towards those people, who do not live up to those expectations or contract the virus.

Therefore, this study will try to expand the previous research by taking a closer look at the interpersonal effects of an implicit theory of COVID-19. Especially, as we rely most on our implicit theories in times of uncertainty or when experiencing stressful events, which refers perfectly to the ongoing pandemic and the threat to health and our economics (Burnette et al., 2013; Hong et al., 1999; Zhang et al., 2021). This led to the first hypothesis:

H1: A stronger incremental theory (in contrast to an entity theory) of COVID-19 leads to (a) higher blame attributions and (b) less social support towards a target person that got infected with COVID-19.

Furthermore, it was also shown in research that, although people with an incremental theory were found to be more forgiving than people with an entity theory when it comes to failure (Molden & Dweck; Plaks et al., 2009), this does not extend to continual failure (Ryazanov & Christenfeld, 2018). People with a higher incremental theory can be even more blaming towards themselves and harsh compared to people with a stronger entity theory when it comes to continuous failure (Molden & Dweck, 2006). One study by Niiya et al. (2010) showed that people with an incremental theory reported lower self-esteem when they showed continual failure in a task linked to self-esteem. Ryazanov & Christenfeld (2018) suggested, that people with a higher incremental theory may be unable to evaluate an attribute as non-malleable, even when they experience continual failure, as information that does not conform with their worldview gets aligned (Plaks et al., 2005; Plaks & Stecher, 2007; Xu & Plaks, 2015). Schreiber (2021) found that continuous failure and disease frequency, led to greater blaming towards the target people, who contracted an illness single or multiple times. This should also be valid for the situation of the actual

COVID-19 pandemic, as people already got infected with the virus multiple times and it consequently may also lead to more blaming and less social support towards them.

H2: Depicting a target person as getting infected with COVID-19 three times (versus once) leads to (a) higher blame attributions and (b) less social support towards the target person.

Moreover, Ryazanov and Christenfeld (2018) figured out, that people with an induced incremental theory of empathy showed more blame when they were asked to imagine a person, who is continually failing in showing empathy towards others, than people with an entity theory, but this effect did not extend to single failure cases. Therefore, the disease frequency should also play a role in the relationship between the implicit theories of COVID-19, blame, and social support. This leads to the subsequent hypothesis:

H3: The frequency of disease (sick once vs. sick three times with the COVID-19 virus) moderates the effect of the implicit theories of COVID-19 on (a) blame-attributions and (b) social support. It is expected that effects are stronger when the target person is depicted as getting infected three times.

Summarizing those research outcomes there should be an effect of the implicit theories of COVID-19 on social support, mediated by blame and the relationship between the implicit theories of COVID-19 should vary, depending on disease frequency.

H4: The effect of the implicit theories of COVID-19 and the frequency of disease on social support is mediated by blame-attributions.

Method

Design

The design applied in this study was a 2 (implicit theory of COVID-19: incremental vs. entity) x 2 (disease frequency of COVID-19: sick once vs. sick three

times) between-subject-design. The study was preregistered¹ and conducted via Qualtrics. Participants could take part through an online link² and were told that they would take part in a study regarding the risk of infection with the COVID-19 virus.

Afterward, participants were randomly assigned to one of the two conditions of the implicit theory of COVID-19 and told that they should read the following part of an interview statement by a researcher about the risk of infection with the COVID-19 virus carefully. They either got to read a statement, in which the risk was described as something that can be primarily changed and influenced by oneself (incremental theory) or as something, which is mostly influenced by others and chance (entity theory). The interview statements were fictitious (see Appendix C). Subsequently an attention-check (see Appendix E) was performed, consisting of three questions regarding the interview statements provided to check if they were read attentively. If the participants chose more than one wrong answer, their answers were excluded from further analysis. After the attention-check the participants had to respond to the manipulation-check (see Appendix E), to see if the preceding manipulation was successful and to measure their implicit theory of COVID-19.

Afterwards, the participants were again randomly assigned to one of the two conditions regarding the disease frequency of COVID-19. The participants were either asked to read a description of a person who has contracted the COVID-19 virus once or three times. The descriptions were again fictitious (see Appendix D). To check, whether the participants read the description they were assigned to carefully, they were asked how often the person in the description got infected with the COVID-19 virus and when they chose the wrong answer, their answers were again excluded from further analysis (see Appendix E). Participants then responded to the scales to measure blame and social support (see Appendix E).

Finally, the participants received the demographic questions and were asked how much effort and attention they invested into the study and whether they think their data should be used as a seriousness-check (see Appendix E). Participants were excluded from further analyses when they responded *no* to this last question. In the end, the participants were debriefed about the actual subject of the study.

¹ <https://aspredicted.org/~hdv3eyiyzr>

² https://univiepsy.qualtrics.com/jfe/preview/SV_a5a7G3jQMESf7tc?Q_CHL=preview&Q_SurveyVersionID=current

Participants

The sample size was determined before the data collection using G*Power (Faul et al., 2007). The calculation resulted in an optimal sample size of $N = 280$ ($f = .2$; $\alpha = .05$, $1-\beta = .9$, number of groups = 4 and $df = 1$). The recruiting was accomplished primarily in various social media groups. In total, 446 participants took part in the study in the beginning. 132 persons were excluded because they did not finish the study. 11 people were excluded because they did not pass the seriousness check and another 11 participants were excluded because they did not pass the attention checks. The remaining sample consisting of $N = 292$ participants was used for further analysis ($M_{\text{Age}} = 28.44$, $SD_{\text{Age}} = 9.04$; 77.1% female). 77.7% of the participants were students. 19.9% of the people have already been infected with the COVID-19 virus in the past.

Measures

Implicit theory of COVID-19 scale

To measure the implicit theory of COVID-19 the participants answered six items about their implicit theories of COVID-19 (e.g., “*You can't really change whether you get infected with the corona virus.*”). Items were based on the Implicit theory of health scale (Schreiber et al., 2020). Participants were asked to rate the given statements. Answers were given on a 6-point Likert scale (1 = *strongly disagree*, 6 = *strongly agree*). The measure was also used as a manipulation check, to see if the manipulation regarding the implicit theory of COVID-19 was successful in the respective groups. For further analysis, items 1,2, and 4 were recoded and the mean score over the six items was calculated. Internal consistency was high (Cronbach's $\alpha = .91$). Higher values represent a stronger incremental theory of COVID-19.

Blame

The variable blame was measured using four items (e.g., “*It's Alex own fault, that he got infected with the Corona-virus.*”). The items were based on research by Corrigan et al. (2003) and Mantler et al. (2003). Participants were instructed to state,

to what extent they would agree to the given statements on a 6-point Likert scale (1 = *strongly disagree*, 6 = *strongly agree*). Higher values represent a stronger blaming towards a target person that got infected with COVID-19. For further analysis, the mean score over the four items was calculated. Internal consistency was acceptable (Cronbach's $\alpha = .70$).

Social Support

Six items were used to measure social support (e.g., *"I would support Alex if he would ask for my help."*). Participants were instructed to state, how likely they would perform the following behaviors on a 6-point Likert scale (1 = *strongly agree*, 6 = *strongly disagree*). Higher values represent stronger social support towards a target person that got infected with COVID-19. For further analysis, the mean score across all six items was calculated. Internal consistency was high (Cronbach's $\alpha = .94$).

Control variables

Attention- and seriousness-check

The attention-check regarding the implicit theory of COVID-19 consisted of three questions, which were given to the participants after reading the part of the interview. The questions should be answered with either *yes* or *no*. An example is: "The researcher speaks about the risk of an infection with COVID-19.". Participants were then excluded if they choose the wrong answer more than once and their answers were not used for further analysis.

The attention-check regarding the disease frequency consisted of one question. After reading the fictitious description participants were randomly assigned to, they were asked how often the person in the description got infected with the COVID-19 virus. Participants were excluded if they chose the wrong answer, and their answers were not used for further analysis.

The seriousness-check at the end of the survey consisted of one item. Participants were asked how much effort and attention they invested into the study and whether they think their data should be used. The question should be answered

with either *yes* or *no*. Participants were excluded from further analyses when they responded *no* to this last question.

The subjective danger of an infection with the COVID-19 virus

As a control variable, the subjective danger of an infection with the COVID-19 virus was measured (e.g., *“How dangerous do you think it is to be infected with the corona virus?”*). Participants were instructed to state, to what extent they would agree to the given statement on a 6-point Likert scale (1 = *not dangerous at all*, 6 = *very dangerous*).

Previous infection with the COVID-19 virus

As a control variable, it was also measured if the participants already had contracted the COVID-19 virus to date (e.g., *“Have you ever been infected with the corona-virus?”*). The question should be answered with either *yes* or *no*.

Demographic variables

Participants were asked their age, sex, and whether they study or not.

Ethical aspects

It was necessary to withhold the purpose and content of the study from the participants. Participants were deceived about the true purpose of the study and were told, that the content was the risk of infection from COVID-19 to prevent them from recognizing the manipulation material as a manipulation. If participants were not deceived, the risk of the manipulation failing or getting socially desirable answers would have been higher. Furthermore, the part of interview statements, which were used as manipulation material for the implicit theory of COVID-19, were fictitious and made-up statements about the malleability of the risk of getting sick with COVID-19, which could lead to wrong assumptions.

However, participants were debriefed at the end of the survey. They were informed about the true purpose of the study and, that the interview statements were fictitious, and the actual state of the research shows, that we personally indeed can change the risk of getting sick with COVID-19.

Results

Preparatory analyses

In the beginning, it was checked if the randomization in the groups was successful. There were no significant differences between the groups of the implicit theories of COVID-19 and the groups of the disease frequency regarding sex, age, the subjective danger of an infection with COVID-19, and previous infections with COVID-19.

To test if the manipulation of the implicit theories of COVID-19 was successful and if participants in the entity condition had higher values in the entity theory and participants in the incremental condition had higher values in the incremental theory, a t-test was conducted. Results confirmed this, as participants in the incremental condition showed a stronger incremental theory of COVID-19 ($N = 150$, $M = 4.61$, $SD = 0.99$) compared to participants of the entity condition ($N = 142$, $M = 3.82$, $SD = 1.09$), $t(283.93) = -6.53$, $p < .001$, $d = 1.04$. Table 1 shows the correlations between all variables. There are significant positive correlations of the implicit theories with blame ($r[292] = .24$, $p[\text{two-sided}] < .001$) and the subjective danger of an infection with COVID-19 ($r[292] = .18$, $p[\text{two-sided}] = .002$). Furthermore, there was a significant negative correlation of blame with social support ($r[292] = -.32$, $p[\text{two-sided}] < .001$) and a significant positive correlation with the subjective danger of an infection with the COVID-19 virus ($r[292] = .24$, $p[\text{two-sided}] < .001$). All further correlations were not significant.

Table 1*Means, standard deviations and correlations between variables*

Variables	<i>N</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. Implicit theories	292	4.22	1.11	-				
2. Blame	292	3.05	1.11	.24**	-			
3. Social support	292	4.67	1.21	.01	-.32**	-		
4. Subjective danger	292	3.92	1.10	.18*	.24**	-.10	-	
5. Age	292	28.44	9.04	.04	.03	.33	-.02	-

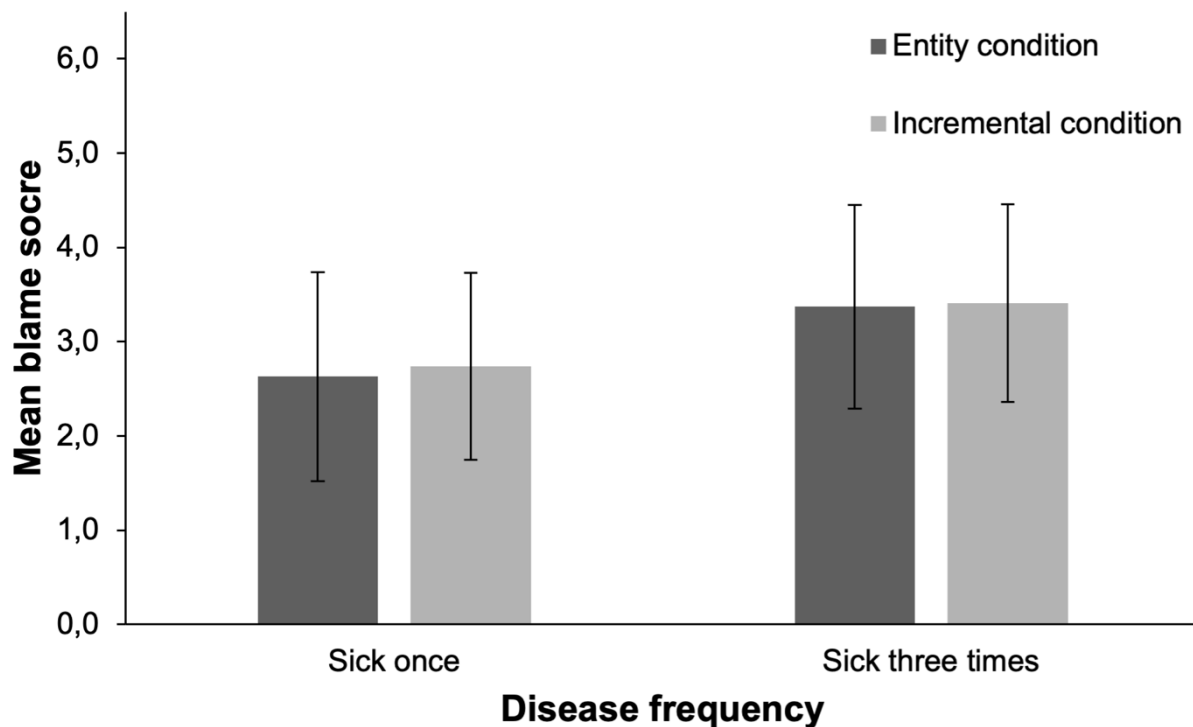
* $p < .01$, ** $p < .001$ **Analyses of the hypotheses**

At first hypotheses H1a, H2a, and H3a were tested using a 2x2-ANOVA with implicit theories condition (incremental vs. entity) and the disease frequency (three times vs. once) as independent variables and blame attribution as the dependent variable. All requirements of the ANOVA were checked before the analysis. H1a was to test, whether a stronger incremental theory, in contrast to an entity theory, leads to higher blame attributions. H2a was to test if the depiction of a target person as getting infected with COVID-19 three times (versus once) leads to higher blame attributions. H3a was to test if the disease frequency (sick once vs. sick three times with the COVID-19 virus) moderates the effect of the implicit theories of COVID-19 on blame-attributions. The main effect of the disease frequency was significant ($F[1, 283] = 35.98, p < .001, \eta^2 = .11$), while there was no significant main effect of the implicit theories of COVID-19 ($F[1, 283] = 1.58, p = .209, \eta^2 = .01$). There was also no significant interaction between the disease frequency and the implicit theories of COVID-19 ($F[1, 283] = 0.01, p = .944, \eta^2 < .001$). Thus, there was no moderation of the disease frequency on the effect of implicit theories of COVID-19 and blame. As shown in figure 1, descriptively, the blame scores are slightly higher in the incremental condition than in the entity condition in both disease frequency

conditions. All results were controlled for gender, student status, age, previous infection with the COVID-19 virus, and subjective danger of an infection with the COVID-19 virus.

Figure 1

Blaming scores for both implicit theories and disease frequency conditions



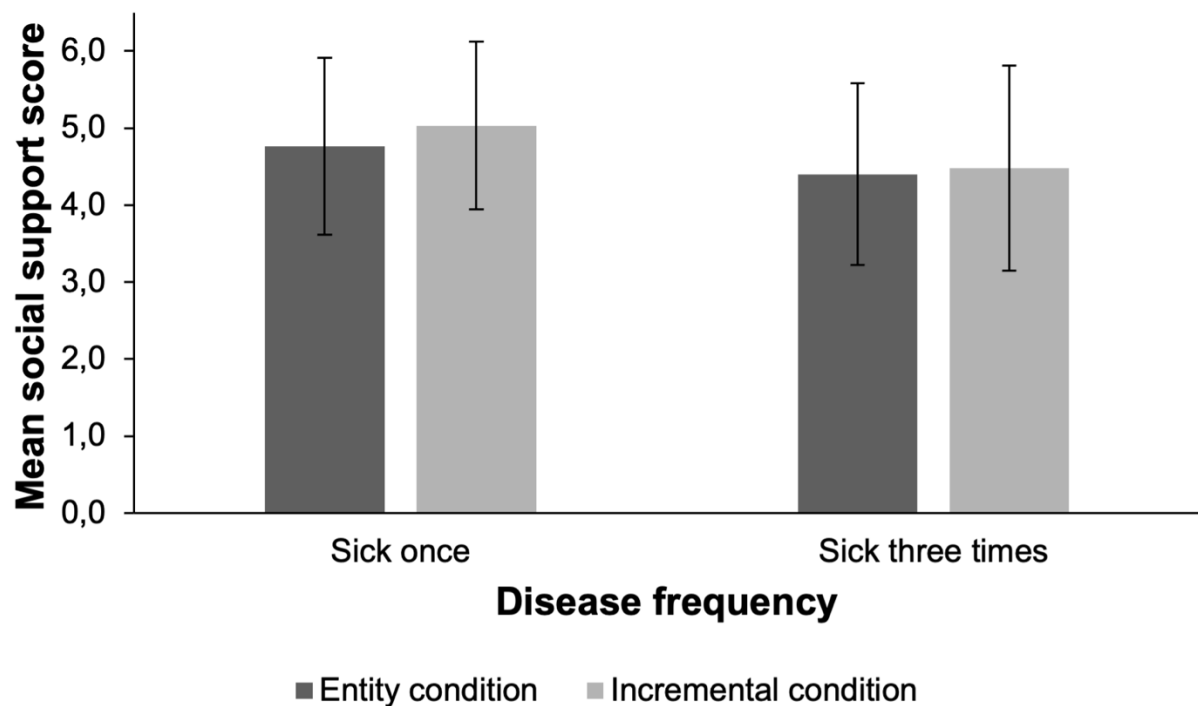
Note. 2x2 ANOVA using blame as the dependent variable and the implicit theories of COVID-19 condition and the disease frequency as independent variables. Error bars show standard errors.

Then hypotheses H1b, H2b, and H3b were tested using a 2x2-ANOVA with implicit theories condition (incremental vs. entity) and the disease frequency (three times vs. once) as independent variables and social support as the dependent variable. H1a was to test, whether a stronger incremental theory, in contrast to an entity theory, leads to less social support for the target person who contracted COVID-19. H2a was to test if the depiction of a target person as getting infected with COVID-19 three times (versus once) leads to less social support towards the target person who contracted COVID-19. H3a was to test if the disease frequency (sick once vs. sick three times with the COVID-19 virus) moderates the effect of the implicit theories of COVID-19 on social support. The main effect of the disease

frequency was significant ($F[1, 283] = 11.39, p = .001, \eta^2 = .04$), while there was no significant main effect of the implicit theories of COVID-19 ($F[1, 283] = 0.80, p = .373, \eta^2 < .01$). There was also no significant interaction between the disease frequency and the implicit theories of COVID-19 ($F[1, 283] = 0.53, p = .466, \eta^2 < .01$). Thus, there was no moderation of the disease frequency on the effect between implicit theories of COVID-19 and social support. As shown descriptively in figure 2, social support scores are higher with higher incremental scores in the disease frequency condition “sick once” but are nearly the same between the entity and incremental condition in the disease frequency “sick three times” condition. All results were controlled for gender, student status, age, previous infection with the COVID-19 virus, and subjective danger of an infection with the COVID-19 virus.

Figure 2

Social support scores for both implicit theories and disease frequency conditions

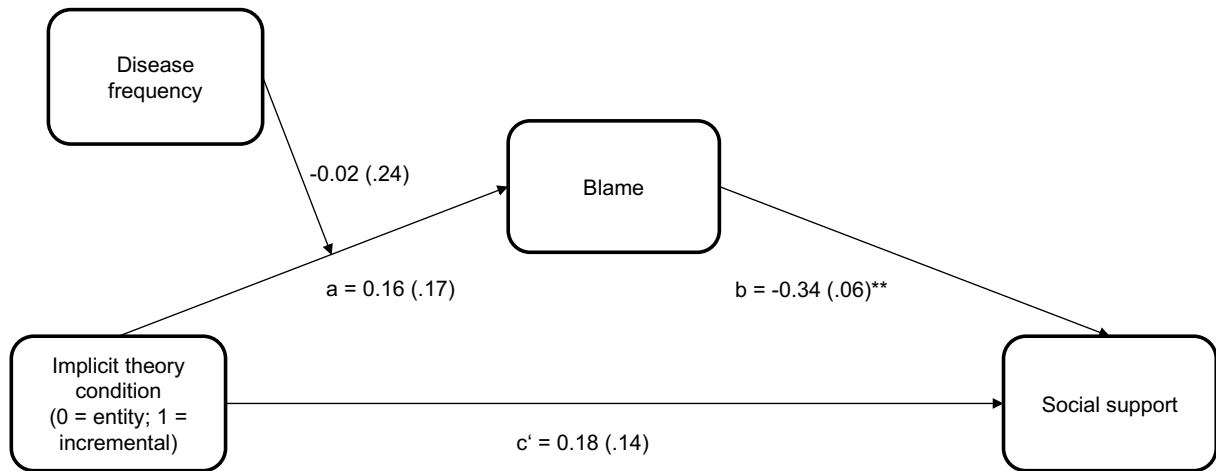


Note. 2x2 ANOVA using social support as the dependent variable and the implicit theories of COVID-19 condition and the disease frequency as independent variables. Error bars show standard errors.

To test whether blame attributions mediate the effect of implicit theories condition (incremental vs. entity) and disease frequency on social support (H4) a moderated mediation was performed, using PROCESS model 7 (Hayes, 2013;). Implicit theories of COVID-19 were used as predictor, social support as criteria, the disease frequency as moderator (0 = *sick once*, 1 = *sick three times*), and blame as mediator. All requirements of the mediated moderation model were tested before the analysis. Figure 3 illustrates the regression coefficients and standard errors of the model. The proportion of explained variance of the overall model was $r^2 = .12$. The analysis showed no significant effect from the implicit theories of COVID-19 on blame ($p = .352$) and there was no significant interaction between implicit theories of COVID-19 and the disease frequency for the a-path ($p = .945$). There was a significant effect on the b-path, from blame on social support ($p < .001$). The direct effect c' from implicit theories of COVID-19 on social support was not significant ($p = .179$). There was also no significant indirect effect of the implicit theory of COVID-19 on social support via blame, neither in the disease frequency "sick once" condition ($b = -0.05$, $SE = 0.06$, 95% CI = [-0.18, 0.06]) nor in the "sick three times" condition" ($b = -0.05$, $SE = 0.06$, 95% CI = [-0.17, 0.07]). Thus, no evidence for a moderated mediation was found. All results were controlled for gender, student status, age, previous infection with COVID-19, and subjective danger of an infection with COVID-19.

Figure 3

Mediated moderation model including the disease frequency as moderator and blame as mediator of the influence of the implicit theories of COVID-19 on social support.



Note. In the brackets, the standard errors of the unstandardized regression coefficients are indicated. ** $p < .001$

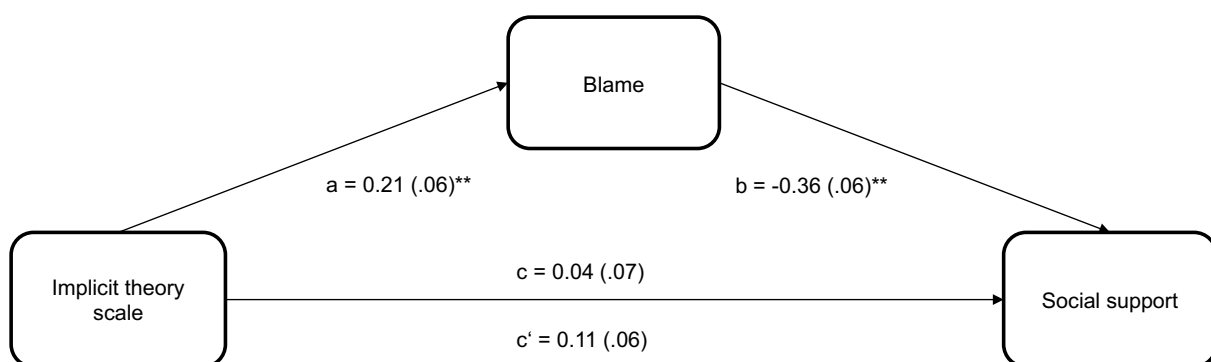
Exploratory analyses

Additionally, as the implicit theories of COVID-19 scale showed a significant correlation with blame ($p < .001$) and blame a significant effect on social support in the mediated moderation analysis ($p < .001$), a mediation analysis using PROCESS (Hayes, 2013; Model 4) was performed. The implicit theories of COVID-19 scale was used as predictor, social support as criteria, and blame as a mediator. All requirements of the mediated moderation model were checked before the analysis. Figure 4 illustrates the regression coefficients and standard errors of the model. The proportion of explained variance of the overall model was $r^2 = .13$. The analysis showed a significant indirect effect from implicit theories of-COVID-19 scale on social support via blame ($b = -0.07$, $SE = 0.03$, $95\% \text{ CI} = [-0.13, -0.03]$). Thus, blame mediated the relationship between the implicit theories of COVID-19 scale and social support. Further, there was a significant effect on the a-path from the implicit theories of COVID-19 on blame ($p < .001$) and a significant effect on the b-path from blame on social support ($p < .001$). However, there was no significant direct effect c' from the implicit theories of COVID-19 on social support ($p = .081$) and no significant total

effect c from the implicit theories of COVID-19 on social support ($p = .574$). All results were controlled for gender, student status, age, previous infection with COVID-19 and subjective danger of an infection with COVID-19.

Figure 4

Moderation model using blame as mediator of the influence of the implicit theories of COVID-19 scale on social support.



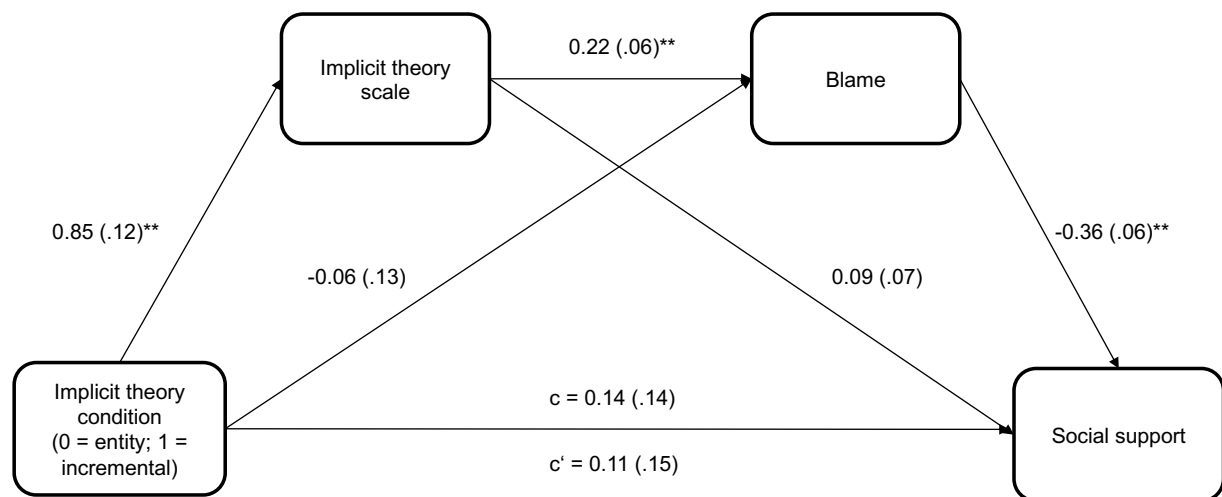
Note. In the brackets, the standard errors of the unstandardized regression coefficients are indicated. ** $p < .001$

Usually, as there was no direct significant effect of the predictor implicit theory of COVID-19 condition on the criteria social support, there is no need to perform a mediation analysis (Rucker et al., 2011). However, the implicit theory of COVID-19 scale showed a significant indirect effect on social support via blame and indirect effects can still be interesting. To test whether the relationship of the implicit theory of COVID-19 condition with social support would show up through the implicit theory of COVID-19 scale and blame, a serial mediation analysis using PROCESS (Hayes, 2013; Model 6) was performed. The implicit theories of COVID-19 condition was used as predictor, social support as criteria, and the implicit theories of COVID-19 scale and blame as mediator. All requirements of the moderated mediation model were checked before the analysis. Figure 5 illustrates the regression coefficients and standard errors of the model. The proportion of explained variance of the overall model was $r^2 = .13$. Analysis showed a significant indirect effect of the implicit theories of COVID-19 condition on social support via the implicit theories of COVID-

19 and blame ($b = -0.07$, $SE = 0.03$, 95% CI = $[-0.13, -0.02]$), but there was no significant indirect effect only via the implicit theories of COVID-19 scale ($b = 0.08$, $SE = 0.06$, 95% CI = $[-0.03, 0.20]$) or only via blame ($b = 0.02$, $SE = 0.05$, 95% CI = $[-0.07, 0.12]$). The total effect c from the implicit theories of COVID-19 condition on social support was not significant ($p = .322$). There was a significant direct effect of the implicit theories of COVID-19 condition on the implicit theories of COVID-19 scale ($p < .001$), but no significant direct effect on blame ($p = .631$) or social support ($p = .471$). The relationship between the implicit theories of COVID-19 scale and blame was significant ($p < .001$) but not between the implicit theories of COVID-19 scale and social support ($p = .186$). The effect of blame on social support was still significant ($p < .001$). All results were controlled for gender, student status, age, previous infection with COVID-19, and subjective danger of an infection with COVID-19.

Figure 5

Serial moderation model including the implicit theory of COVID-19 scale and blame as mediator of the influence of the implicit theory of COVID-19 condition on social support.



Note. In the brackets, the standard errors of the unstandardized regression coefficients are indicated. ** $p < .001$

No effect of the conditions of implicit theories of COVID-19 on social support or blame could be determined. But, as shown in table 1, there was a significant correlation between the implicit theories of COVID-19 scale and blame. Therefore, a

multiple linear regression was performed additionally, using the implicit theories of COVID-19 scale, the disease frequency (0 = *sick once*, 1 = *sick three times*), the subjective danger of an infection with COVID-19, and previous infection with COVID-19 (1 = *yes*, 2 = *no*) as predictors and blame as criteria. Blame showed a significant relationship with the implicit theories of COVID-19 scale ($\beta = .22$, $SE = .05$, $t[287] = 4.17$, $p < .001$), the disease frequency condition ($\beta = .33$, $SE = .12$, $t[287] = 6.29$, $p < .001$), the subjective danger of an infection with COVID-19 ($\beta = .17$, $SE = .05$, $t[287] = 3.22$, $p = .001$) and previous infection with COVID-19 ($\beta = .16$, $SE = .15$, $t[287] = 2.94$, $p = .004$). The proportion of explained variance of the overall model was $r^2 = .23$.

As blame showed a significant correlation with the disease frequency in the multiple regression ($p < .001$) and a significant effect on social support in the mediated moderation analysis ($p < .001$), a moderation analysis using PROCESS (Hayes, 2013; Model 1) was also performed. Blame was used as a predictor, social support as criteria, and disease frequency as a moderator. All requirements of the mediated moderation model were checked before the analysis. The proportion of explained variance of the overall model was $r^2 = .14$. As shown in table 2, the analysis showed no significant interaction between blame and the disease frequency, thus no evidence of a moderation could be found. Still, there was again a significant effect from blame on social support and a marginally significant interaction between the disease frequency and social support. All results were controlled for gender, student status, age, previous infection with COVID-19, and subjective danger of an infection with COVID-19.

Table 2

Parameters of moderation analysis with social support as criteria and the disease frequency as moderator

Predictor	<i>b</i>	<i>SE</i>	<i>t</i> (283)	<i>p</i>
Blame	-0.20	0.09	-2.19	.030
Disease frequency	0.27	0.42	0.64	.521
BlameXDisease frequency	-0.18	0.13	-1.38	.169

Discussion

The present study tried to examine the effect of the implicit theories of COVID-19 on blame attributions and consequently on social support. It also took a closer look at the role of the disease frequency in that context.

Research already proved, that an incremental theory of health leads to increased blame towards people suffering from a mental or physical illness and consequently also to lower social support (Dohle et al. 2020). Based on that, it was predicted, that a higher incremental theory of COVID-19 would lead to higher blame attributions towards a target person, who was depicted as contracting the COVID-19 virus (once vs. three times) and to less social support in comparison to a higher entity theory. The predictions could not be confirmed in the actual study, as an incremental theory of COVID-19 did neither significantly lead to higher blame attributions towards a target person, which was depicted as contracting the COVID-19 virus, nor did it lead to significantly less social support towards that person, in comparison to an entity theory.

The study also predicted that the disease frequency would moderate the effect of the implicit theories of COVID-19 on blame or social support, but no moderation effect could be found in the main analysis. Therefore, the results from Ryazanov and Christenfeld (2018) who found that people with an induced incremental theory of empathy showed more blame when they were asked to imagine a person, who is continually failing in showing empathy towards others, could not be supported. Also, blame did not significantly mediate the relationship between the implicit theories, blame, social support, and the disease frequency.

However, the effect of the disease frequency (sick once vs. sick three times) on blame and social support could be shown, as in the “sick three times” condition participants showed significantly more blaming and less social support towards the target person, who contracted the virus. This supports the previous research (Schreiber, 2021), which found that depicting a target person as contracting an illness multiple times led to greater blaming towards them.

Descriptively, it was shown that participants in the incremental condition showed on average higher blame scores in both disease frequency conditions than participants with a higher entity theory. Thus, on average, participants with a higher

incremental theory showed slightly higher blame towards the target person, who was depicted as contracting the COVID-19 virus once or three times, than participants with a higher entity theory. So, although a significant effect could not be found, there was still a certain tendency of the incremental theory of COVID-19 to be associated with higher blame attributions in comparison to an entity theory. This would be in accordance with the results of previous research, which found a positive effect of an incremental view on blame attributions (Dohle et al., 2020; Schreiber, 2021).

Although there is a difference to the results from Ryazanov & Christenfeld (2018), who found that people with an induced incremental theory of empathy showed more blame when they were asked to imagine a person, who is continually failing in showing empathy towards others, than people with an entity theory, but not towards a person who only failed once. But as the COVID-19 virus led to great stigmatization and blaming in our society (Haas, 2020) it may not be comparable to the topic of an implicit theory of empathy, as already people who contracted the virus once were blamed for not taking sufficient care. This is especially valid, as the scale, which was used to collect the data about blame attributions, was different from previous research. Participants were for example asked, whether virus contraction was the depicted person's own fault.

Furthermore, descriptively and on average, the social support scores were higher in the incremental condition with the disease frequency condition "sick once" in comparison to the entity condition but were nearly the same between the entity and incremental condition with the disease frequency "sick three times" condition. This means, that people with a higher incremental theory showed less social support towards the target person, when he contracted the virus three times, but not when he got sick only once in comparison to people with a higher entity theory. However, it may be that depicting the target person as getting sick with COVID-19 three times could seem unlikely and unplausible for the participants in the incremental condition, therefore leading to more blame and less social support, as getting sick could be prevented due one's effort. So, if one already contracted the virus three times, participants with a higher incremental view may perceive it as recklessness of the said person and therefore show less support. As research showed that people with a higher incremental view were found to be more forgiving (Molden & Dweck, 2006; Plaks et al., 2009) another interpretation arises: although participants in the

incremental condition showed more blame on average, they were still more forgiving and thus showing more support, at least in the sick once condition.

The question arises, why there is no significant effect of the implicit theory of COVID-19 condition on blame or social support, as there are some significant correlations and as the manipulation check was also successful. One possible explanation would be the stigma-asymmetry model (Burnette et al., 2017). Burnette et al. (2017) showed that an increment theory of weight can lead to both – positive and negative effects when it comes to stigma. It showed positive effects through the expectancy attribution, as it reduces essentialist thinking and therefore also blame and stigmatization (Burnette et al., 2017). At the same time, an incremental theory can increase stigma through responsibility attribution (Burnette et al., 2017). Thus, if the risk of contracting COVID-19 is seen as something which can be changed and is therefore under our own responsibility, it may lead to more blame towards people, who do not manage to avoid contracting the virus. At once an incremental view can also lower blaming, as the devaluated trait, contracting the virus, would not be seen as a stable facet of one person (Burnette et al., 2017). Further, if infected people act compliant during their quarantine by, for example, not going out, testing regularly, or avoiding social contacts, it may also lower the blaming. As participants in the actual study were asked, if they would support the target person, if he was in quarantine by, for example, going shopping for him, or if he asked for help, the prior assumption may apply. There is a possibility, that, although participants with a higher incremental theory, who showed on average more blame, at the same time showed still nearly the same social support as entity theorists, as they read about the conformity of the target person.

Moreover, in the sense of the theories of moral responsibility – which state, that the main factor of moral judgment is the belief, whether the actor could have known otherwise (Pizarro & Tannenbaum, 2012; Ryazanov & Christenfeld, 2018) - it is also possible, that the risk of contracting COVID-19, was, even by participants in the incremental condition, seen as not very predictable and therefore not under personal control, as infection levels were high. This could also be an explanation for the missing significant effects from the conditions on blame and social support.

One main difference between the previous studies (Dohle et al., 2020; Ryazanov & Christenfeld, 2018; Schreiber, 2021) and the present study must also be

noted. While the previous studies used the implicit theory of health scale, now an implicit theory of COVID-19 scale was applied, which may have also contributed to the differences in the results. People can differ in the way, they hold an incremental or entity theory, depending on the concrete attribute (Burnette et al., 2020). It may be, that people who hold more of an entity theory of health, show more of an incremental theory of illness and vice versa.

Still, some exploratory analyses were made, as there was a significant correlation of the implicit theories of COVID-19 scale with blame and as the manipulation of the implicit theories of COVID-19 was still successful. In the additional serial mediation analysis, an indirect significant effect of the implicit theories of COVID-19 condition via the implicit theories of COVID-19 scale and blame on social support was found. Hence, the condition only had an effect on social support through the serial mediation of the implicit theories of COVID-19 scale and blame. This means, that the higher the expression of the implicit theories of COVID-19 scale (with higher scores indicating more of an incremental theory) and blame, the stronger the effect of the condition on social support. Moreover, in the mediation analysis that was performed additionally, the implicit theories of COVID-19 showed a significant relationship with blame. Those outcomes would be in accordance with the results from previous research (Dohle et al., 2020; Ryazanov & Christenfeld, 2018; Schreiber, 2021), which could prove, that an incremental theory leads to or is associated with greater blame attributions.

In the additional analysis, the implicit theories of COVID-19 scale showed no significant direct relationship with social support, although after including blame as a mediator there was a significant indirect effect via blame. Hence, blame mediated the relationship between the implicit theories of COVID-19 scale, with higher blame scores related to lower social support scores. This would be in accordance with the first two hypotheses and with the results from Dohle et al. (2020), where an incremental theory of health led to increased blame towards people suffering from a mental or physical illness and consequently also to lower social support. As the implicit theories of COVID-19 scale was used instead of the condition, the results cannot be interpreted causally. Still, it can be supposed, that an incremental theory of COVID-19 has a negative effect on an interpersonal level and may lead to more blame and stigmatization towards infected people and consequently, via higher

blame attribution, to lower social support or the willingness to help. Hence, participants with an incremental view of COVID-19 see the risk of contracting the virus as malleable through avoiding risks and were therefore more judging or blaming towards the depicted person, who did not manage to avoid getting sick, which in turn influenced their willingness to support the depicted person.

In sum, those outcomes support the assumption, that an incremental theory does not only lead to positive effects on a personal level, like more health-promoting behavior in the COVID-19 pandemic which was previously shown in research (Zhang & Kou, 2022; Zhang et al., 2021) but it may also lead to negative effects on an interpersonal level in terms of more blame attributions and less support towards others who contracted an illness (Dohle et al., 2020). This relationship is even stronger when the depicted person contracted the virus multiple times.

Limitations

Some limitations of the present study must be noted. The sample in use is not representative of the population, as participants were mainly recruited via social media. Furthermore, a big part of the participants were students, female and the mean age was very low. Therefore, results should be interpreted with caution. Moreover, the mean of the implicit theory of COVID-19 scale was already high indicating an already high level of incremental theory in the sample. This could also be due to the fact, that a great part of the sample consisted of students who are well-educated and are therefore probably more likely to see the risk of contracting COVID-19 as changeable. Future research could try to replicate the present study with a representative sample, regarding sex, and education and use different ways of recruiting participants to increase the variance of the pre-existing implicit theories.

Moreover, as there no significant effect could be found, although descriptively a tendency could be observed, an even bigger sample size should be used in future studies, as power may have been too low in the actual sample, also due to the number of control variables used in the analysis.

In addition, the manipulation may have been too weak, or participants may have found it implausible. Prospective, one could try to focus more on the entity condition in the manipulation of the implicit theories of COVID-19, to achieve a more balanced relationship in the sample regarding the incremental and entity theory. One

way would be to increase the manipulation, by using stronger manipulation material. Participants could not only be asked to read a text, which should manipulate their implicit theory but also ask them to think about reasons, why, for example, the risk of getting sick with COVID-19 depends on others or on chance. Or participants could be asked to think about a person who contracted COVID-19, or generally an illness, three times in a row, to achieve a stronger blaming effect.

The study also had high dropout rates, as of the initial 446 people, only $N = 292$ completed the study. This could be due to the reading tasks, as participants may have found them too tedious or time-consuming. It may be that those people who completed the study had already been interested in the topic from the outset.

Not to forget that participants reported their blame attribution and social support through self-report measures, which could be distorted through an optimistic bias. This could have led to lower blame scores and higher social support scores in the sample.

Last, in a part of the additional analysis, the implicit theories of COVID-19 scale was used instead of the condition, therefore no causal interpretations of those outcomes are possible.

Implications and future research

First, future research should try to replicate the present study, by using a representative and even bigger sample.

Second, it is highly recommended to use an implicit theory of illness scale, when it comes to illness-related topics, as an implicit theory of health scale would probably lead to slightly contorted results.

No significant effect of the implicit theories of COVID-19 on blame and consequently social support could be found. Still, some practical implications can be given, based on previous research and the results in the present study. Regarding Hoyt et al. (2019), implicit theories are important when it comes to health campaigns in the weight domain. When promoting an incremental theory, it should not only be focused on the malleability of weight but also depict the effort and time it needs to achieve weight changes, as adverse effects like stigma and blame can be reduced in that way (Hoyt et al., 2019). As the present study could prove, that our implicit theories can be altered through manipulation, this could be used in future health

campaigns. When it comes to the health-promoting behavior in the COVID-19 pandemic, or generally looking at illnesses, health campaigns should try to focus on depicting ways to achieve health changes and be transparent about the effort it takes, instead of just promoting an incremental theory, which would lead probably to great effects on a personal level, but to more blaming and stigma on an interpersonal level.

Moreover, it should be tried to depict the risk of contracting a virus as something, which we can personally change, but which is not always completely preventable, especially, when infection levels are high. This could help to decrease levels of blame, as even people with a higher incremental theory would therefore probably assume, that the risk of contracting a virus is not always that predictable and therefore not completely under our control.

Future studies could also conduct an experimental health campaign based on depicting the needed effort for health changes, to see if it affects blame and social support towards depicted people with an illness.

Conclusion

The present study provides first insights into the research area of implicit theories of COVID-19, the disease frequency, and blame attribution such as social support. More generally, it was also one of the first studies looking at implicit theories of an illness in connection with interpersonal effects.

No significant direct effect of the implicit theories on blame or social support was found. The effect of the implicit theories of COVID-19 was moreover not statistically significant moderated by the disease frequency or mediated by blame. Descriptively a certain tendency that an incremental theory of COVID-19 is positively associated with blame attributions and negatively with social support towards a target person, who was depicted as contracting the virus once vs. three times could be shown. Moreover, the disease frequency had a significant effect on blame and social support. Hence, a person receives more blame and less social support, if they get sick with the virus three times, in comparison to one time.

However, in the additional analysis an indirect effect of the condition of the implicit theories via the implicit theories scale and blame could be found, indicating less social support with higher implicit theories and blame values. In conclusion,

future health interventions could try to use the implicit theories of people to achieve health changes by not only promoting an incremental theory but also by being transparent about the effort it takes and how to achieve health changes.

It is highly recommended for future studies to use an implicit theory of illness or an implicit theory concerning a specific illness, as results may differ if an implicit theory of health is simply generalized across the spectrum of all cases.

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Appendix A: Pre-registration document

Implicit theories of COVID-19, blame/social support and the disease frequency.

1) Data collection. Have any data been collected for this study already?

No, no data have been collected for this study yet.

2) Hypothesis. What's the main question being asked or hypothesis being tested in this study?

H1: A stronger Incremental theory (in contrast to an entity theory) of COVID-19 leads to (a) higher blame attributions and (b) less social support towards a target person that got infected with Covid-19.

H2: Depicting a target person as getting infected with Covid three-times (versus once) leads to (a) higher blame attributions and (b) less social support towards the target person.

H3: The frequency of disease (sick once vs. sick three times with the COVID-19 virus) moderates the effect of the implicit theories of COVID-19 on (a) blame-attributions and (b) social support. It is expected that effects are stronger when the target person is depicted as getting infected three times.

H4: The effect of the implicit theories of COVID-19 and the frequency of disease on social support is mediated by blame-attributions.

3) Dependent variable. Describe the key dependent variable(s) specifying how they will be measured.

1. Blame

- *Four items will be used to measure blame on a 6-point Likert-scale*
- *The scale is an adaption of the research by Corrigan et al. (2003) and Mantler et al. (2003)*
- *(e.g., "It's Alex own fault, that he got infected with the Corona-virus.")*

2. Social Support

- *Six items will be used to measure social support on a 6-point Likert-scale*
- *(e.g., "I would support Alex, if he would ask for my support.")*

4) Conditions. How many and which conditions will participants be assigned to?

Two between-subject-conditions: Implicit theories (incremental vs. entity) x Frequency of disease (sick once vs. sick three times)

1. The participants will either be asked to read a part of an interview statement about the risk of getting sick with the COVID-19 virus characterized as something changeable, mostly influenceable by oneself (incremental) or as something which is mostly influenced by others and chance (entity).

2. The participants will either be asked to read a description of a person who has contracted the COVID-19 virus once or three times

As Manipulation-Check implicit theories of COVID-19 will be measured by an adaption of the measures by Dweck (1999) using 6 items on a 6-point Likert-scale (e.g., "You can't really change the risk of getting infected with the Corona-virus.").

5) Analyses. Specify exactly which analyses you will conduct to examine the main question/hypothesis.

- To test H1a-H3a a 2x2-ANOVA with implicit theories condition (incremental vs entity) and frequency of disease (three times vs once) as IVs and blame attribution as DV will be conducted.
- To test H1b-H3b a 2x2-ANOVA with implicit theories condition (incremental vs entity) and frequency of disease (three times vs once) as IVs and social support as DV will be conducted.
- To test whether blame attributions mediate the effect of implicit theories of COVID-19 and frequency of diseases on social support (H4) a (moderated) mediation will be performed, using PROCESS (Hayes, 2017).

6) Outliers and Exclusions. Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.

- As seriousness-check, participants will be asked how much effort and attention they invested into the study and whether they think their data should be used (yes vs. no). Participants will be excluded from further analyses when they responded „no" to this last question.
- As attention-check participants will be asked three questions regarding the part of the interview statement they were assigned to (e.g., "The researcher speaks about the risk of an infection with COVID-19", yes vs. no). Participants will be excluded when they choose the wrong answer more than once.
- As attention-check participants will be asked one question regarding the personal description they were assigned to (e.g., "How often did Alex get infected with the COVID-19 virus?", never vs. once vs. two times vs. three times). Participants will be excluded when they choose the wrong answer.

7) Sample Size. How many observations will be collected or what will determine sample size?

The calculation using G*Power (Faul et al., 2017) resulted in an ideal total sample size of 280 people by using F-Tests, ANOVA: Fixed effects, special, main effects and interactions with the following accuracy specifications: $f = .2$, $\alpha = .05$, $1-\beta = .9$, number of groups = 4 and $df = 1$.

8) Other. Anything else you would like to pre-register?

(e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?)

Control variables

- *The subjective danger of an infection with the COVID-19 virus (e.g., “How dangerous do you think it is to be infected with the corona virus?”)*
- *Previous infection with the COVID-19 virus (e.g., „Have you ever been infected with the corona-virus?”)*

9) Name. Give a title for this AsPredicted pre-registration

Implicit theories of COVID-19, blame/social support and the disease frequency.

Finally. For record keeping purposes, please tell us the type of study you are pre-registering.

Master thesis

Appendix B: Ethics-checklist

		Yes	No
1.	Will the study involve persons who cannot consent to participate (for example, persons under the age of 18, persons who are not legally able to consent)?		x
2.	Will the study involve persons belonging to a particularly vulnerable group (for example, clinical samples, people with learning disabilities, people in hospital or prison settings)?		x
3.	Is it necessary for people to participate in the study without being informed about their participation at that time or without giving their consent (for example, in non-open observation)?		x
4.	Is it necessary that people participating in the study are not fully informed about the purpose and content of the study? (Note: the full information does not mean the disclosure of the hypotheses, but refers to the purpose and course of the study. For example, incomplete or incorrect information is given when a cover story is needed to address the questions)	x	
5.	Is it necessary for people to be actively deceived about the content and purpose of the study?	x	
6.	Is it necessary to ask the subject questions that are of an intimate nature or are perceived to be stigmatizing (such as illegal or deviant behavior)?		x
7.	Can the participants expect the study to result in psychological stress, fear, fatigue, pain or other negative effects that go beyond what is expected in everyday life?		x
8.	Are medications, placebos or other substances given to participants in the study?		x
9.	Are the participants in the study undergoing any invasive or potentially harmful procedures?		x
10.	Are personal data that cannot be processed in an anonymous fashion collected (for example, video/audio recordings of participants)? If yes, which data: Are the subjects informed about this? ☐ yes ☐ no Can the subjects ask for this information at any time, before the deletion/destruction of the data? ☐ yes ☐ no		x
11.	Is the participant paid a financial allowance that clearly exceeds an average of 15 euros per hour? If so, what is the amount? For what reason is it necessary to pay this amount per hour for participation?		x

Appendix C: Manipulation material: Implicit theory of COVID-19

Material for the entity condition

DiePresse

13.12.2021 um 08:00
von **Olivia Kaltenbrunn**

Alfred Schönberger: „Das Risiko, sich mit Corona zu infizieren, wird wesentlich durch die Handlungen unserer Mitmenschen und dem Zufall bestimmt!“

Das Max-Planck-Institut führte über den gesamten Zeitraum der COVID-19 Pandemie Studien zum Virus durch. Folgendes Statement wurde am 12.12.2021, von dem Forschenden Alfred Schönberger des Max-Planck-Instituts, zum Infektionsrisiko von COVID-19 während eines Interviews mitgeteilt:

„.....In den mittlerweile über 2 Jahren in der Corona-Pandemie wurde mehr als klar ersichtlich, dass das Risiko, sich mit dem Corona-Virus zu infizieren, nicht nur von unserem eigenen Verhalten abhängt, sondern zu einem wesentlichen Teil von unserer Umwelt und dem Zufall beeinflusst wird! Der Einfluss unserer Umwelt ist dabei größer, als wir zuerst vermutet haben. So kann man sich immer an Vorsichtsmaßnahmen halten, geimpft und getestet sein und sich dennoch anstecken. Beispielsweise, wenn der Freundeskreis oder Familienmitglieder sich nicht regelmäßig testen lassen und man sich bei ihnen ansteckt. Oder wenn man einkaufen geht und sich zufällig eine infizierte Person vor oder hinter einem in der Schlange befindet. Oder auch, wenn Arbeitskolleg:innen trotz dessen, dass sie sich nicht fit fühlen, zur Arbeit kommen und so andere anstecken. Das Risiko, sich mit Corona zu infizieren, wird also wesentlich durch die Handlungen unserer Mitmenschen und leider auch dem Zufall bestimmt!...“

Material for the incremental condition

DiePresse

13.12.2021 um 08:00
von **Olivia Kaltenbrunn**

Alfred Schönberger: „Wir können das Risiko, uns mit Corona zu infizieren, durch unser eigenes Handeln am meisten beeinflussen!“

Das Max-Planck-Institut führte über den gesamten Zeitraum der COVID-19 Pandemie Studien zum Virus durch. Folgendes Statement wurde am 12.12.2021, von dem Forschenden Alfred Schönberger des Max-Planck-Instituts, zum Infektionsrisiko von COVID-19 während eines Interviews mitgeteilt:

„...In den mittlerweile über 2 Jahren in der Corona-Pandemie wurde mehr als klar ersichtlich, dass das Risiko, sich mit Corona zu infizieren, zu einem großen Teil von uns selbst abhängt und beeinflusst wird! Natürlich spielt auch unser Umfeld und unsere Umwelt eine Rolle, jedoch liegt es in unserer eigenen Hand, das Infektionsrisiko zu minimieren. Beispielsweise, indem man sich impfen und testen lässt und nicht zur Arbeit geht, wenn man sich nicht fit fühlt. Indem man sich weniger mit Leuten trifft und wenn, dann im Freien, da so das Risiko minimiert wird. Aber auch, indem man aktuell auf Reisen verzichtet, weniger Veranstaltungen besucht, sich an Vorsichtsmaßnahmen wie Masken, Sicherheitsabstand, das Vermeiden von Stoßzeiten etc. hält. Wir können also das Risiko, uns mit Corona zu infizieren, durch unser eigenes Handeln am meisten beeinflussen!....“

Appendix D: Manipulation material: Disease frequency of COVID-19

Material for the “Sick once” condition

Alex ist 25 Jahre alt und studiert BWL. Seine Freizeit gestaltet er gerne sehr aktiv, indem er viel mit Freunden unternimmt, Bouldern und Wandern geht, Tanzunterricht nimmt und an den Abenden feiern geht. Seit Beginn der Pandemie fällt es ihm sehr schwer, auf sein Freizeitprogramm zu verzichten. Seit Beginn der Pandemie hat er sich einmal mit Corona angesteckt.

Material for the “Sick three times” condition

Alex ist 25 Jahre alt und studiert BWL. Seine Freizeit gestaltet er gerne sehr aktiv, indem er viel mit Freunden unternimmt, Bouldern und Wandern geht, Tanzunterricht nimmt und an den Abenden feiern geht. Seit Beginn der Pandemie fällt es ihm sehr schwer, auf sein Freizeitprogramm zu verzichten. Seit Beginn der Pandemie hat er sich dreimal mit Corona angesteckt.

Appendix E: Overview of all used variables

Table 4

Overview of all measured variables

Construct	Item(s)	Response format	Source
Attention-check implicit theories of COVID-19	Der Forschende spricht über das Infektionsrisiko mit dem Corona-Virus.	Auswahl: Ja, Nein	
	Der Forschende stammt vom Max-Planck-Institut.		
	Der Forschende spricht über die Auswirkungen und Spätfolgen des Corona-Virus.		
Implicit theories of COVID-19	Ob man sich mit dem Corona-Virus ansteckt, kann man nicht wirklich verändern. (revers)	6-stufige Likert-Skala: 1 = <i>Stimme überhaupt nicht zu</i> 6 = <i>Stimme voll und ganz zu</i>	Dweck, 1999; Schreiber, 2020
	Das Risiko, sich mit dem Corona-Virus anzustecken, kann man nicht sonderlich verändern. (revers)		
	Das Risiko, sich mit dem Corona-Virus anzustecken, lässt sich bedeutsam verändern.		
	Um ehrlich zu sein glaube ich, dass man das Risiko sich mit dem Corona-Virus anzustecken, nicht wirklich verändern kann. (revers)		
	Die Wahrscheinlichkeit, dass man sich mit dem Corona-Virus ansteckt, lässt sich wesentlich verändern.		
	Man kann das Risiko, sich mit dem Corona-Virus anzustecken, deutlich verändern.		
Attention-check disease frequency	Wie oft hat Alex sich mit dem Corona-Virus angesteckt?	Auswahl: Ja, Nein	
Blame	Alex ist schuld daran, dass er mit dem Corona-Virus infiziert wurde.	6-stufige Likert-Skala:	Corrigan et al.

	Ich glaube, es ist seine eigene Schuld, dass Alex sich mit dem Corona-Virus infiziert hat.	1 = <i>Stimme überhaupt nicht zu</i>	(2003); Mantler et al. (2003)
	Alex hat es nicht verdient, dass er sich mit dem Corona-Virus infiziert hat.	6 = <i>Stimme voll und ganz zu</i>	
	Alex sollte sich nicht dafür schuldig fühlen, dass er sich mit dem Corona-Virus infiziert hat.		
Social support	Ich würde für Alex einkaufen gehen, wenn er sich in Quarantäne befindet.		
	Ich würde Alex unterstützen, wenn er nach meiner Hilfe fragen würde.		
	Ich würde Alex meine Unterstützung anbieten, falls er sie benötigen würde.	6-stufige Likert-Skala: 1 = <i>Stimme überhaupt nicht zu</i>	
	Ich würde für Alex Dinge erledigen, die er nicht machen könnte, wenn er sich in Quarantäne befindet.	6 = <i>Stimme voll und ganz zu</i>	
	Ich würde mich darum kümmern, dass Alex während der Quarantäne alles Zuhause hat, was er braucht.		
	Ich würde Alex Dinge vorschlagen, die er während der Quarantäne machen könnte.		
Sex	Ich würde mich darum kümmern, dass Alex während der Quarantäne alles Zuhause hat, was er braucht.	Auswahl: weiblich, männlich, freie Auswahl	
Age	Ich würde Alex Dinge vorschlagen, die er während der Quarantäne machen könnte.	Dropdown-Auswahl (18 bis 99)	
Student status	Studieren Sie?	Auswahl: Ja, Nein	
	Falls Sie studieren, bitte geben Sie Ihr Studienfach an.	Freie Auswahl	
Previous infection with the COVID-19 virus	Haben Sie sich selbst schon mal mit dem Corona-Virus infiziert?	Auswahl: Ja, Nein	

Subjective danger of an infection with the COVID-19 virus	Für wie gefährlich halten Sie eine Ansteckung mit dem Corona-Virus?	6-stufige Likert-Skala: 1 = <i>Gar nicht gefährlich</i> 6 = <i>Sehr gefährlich</i>
Seriousness check	Ihrer ehrlichen Meinung nach, sollten wir Ihre Daten in unserer Auswertung berücksichtigen? (Ihre Antwort hat keinen Einfluss auf Ihre Chancen in der Verlosung.)	Auswahl: Ja, Nein

Appendix F: Abstract

Background: Implicit theories are our assumptions about the malleability of certain attributes. They play a substantial role when it comes to developing health-promoting behavior or a healthy lifestyle. Unfortunately, implicit theories also affect individuals when they blame others for contracting illnesses, even more so, when people get sick multiple times. This phenomenon influences the debate around issues of the COVID-19 pandemic, as people are getting blamed for not taking the safety measures seriously or for vaccine refusal. This study examines the effect of implicit theories of COVID-19 and the disease frequency on blame attribution and social support.

Method: The study ($N = 292$) was a 2 (implicit theory of COVID-19: incremental vs. entity) $\times$ 2 (disease frequency of COVID-19: sick once vs. sick three times) between-subject-design. Implicit theories were manipulated using fictitious interview statements of experts and the disease frequency by a description of a person, who contracted COVID-19 once or three times.

Results: The analysis showed no effect of the implicit theories of COVID-19 condition on blame or social support or a mediation of blame and a moderation of the disease frequency on the relationship between the implicit theories and social support. Still, an effect of the disease frequency on blame and social support was found.

Conclusion: The present study provides first insights into the research area of an implicit theory of COVID-19 in connection with blame attribution and social support. It is also one of the first studies to look at an implicit theory of illness. In addition, implications for future studies are discussed.

Keywords: Implicit theories, Blame, Social support, COVID-19

Appendix G: Zusammenfassung

Hintergrund: Implizite Theorien sind Annahmen über die Veränderbarkeit bestimmter Eigenschaften und sind essenziell für das Aufrechterhalten eines gesunden Lebensstils. Jedoch wirken sich unsere impliziten Theorien auch auf die Schuldzuschreibung aus, im Sinne dessen, andere für die Ansteckung mit Krankheiten verantwortlich zu machen. Umso mehr, wenn Menschen mehrfach erkranken. Dies spielt auch in der aktuellen COVID-19 Pandemie rund um die Sicherheitsmaßnahmen und die Impfung eine Rolle. Die vorliegende Studie untersucht den Effekt der impliziten Theorien über COVID-19 und der Krankheitshäufigkeit auf Schuldzuschreibungen und soziale Unterstützung in dem Kontext der Pandemie.

Methode: Die Studie ($N = 292$) nutzte ein 2 (implizite Theorie über COVID-19: inkrementell vs. Entität) x 2 (Krankheitshäufigkeit von COVID-19: einmal krank vs. dreimal krank) between-subjects Design. Die impliziten Theorien wurden mit fiktiven Interviewaussagen von Experten und die Krankheitshäufigkeit durch eine Beschreibung einer Person, welche ein- oder dreimal an COVID-19 erkrankte, manipuliert.

Ergebnisse: Die Analysen zeigten keinen signifikanten Effekt der impliziten Theorien über COVID-19 auf Schuldzuweisung sowie soziale Unterstützung. Weiter konnte auch kein medierender Effekt von Schuldzuweisung oder moderierender Effekt der Erkrankungshäufigkeit auf die Beziehung zwischen impliziten Theorien und sozialer Unterstützung nachgewiesen werden. Jedoch zeigte sich ein Effekt der Krankheitshäufigkeit auf Schuldzuweisung und soziale Unterstützung.

Schlussfolgerung: Die vorliegende Studie gibt erste Einblicke in das Forschungsgebiet der impliziten Theorien über COVID-19 im Zusammenhang mit Schuldzuschreibung und sozialer Unterstützung. Zudem ist es eine der ersten Studien, die sich mit einer impliziten Krankheitstheorie befasst. Darüber hinaus werden Implikationen für zukünftige Studien diskutiert.

Schlagwörter: Implizite Theorien, Schuldzuweisung, Soziale Unterstützung, COVID-19