

SARS-Cov-2 and environmental protection: A collective psychology agenda for environmental psychology research



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ABSTRACT

While the virus SARS-CoV-2 spreads all over the world, most countries have taken severe measures to protect their citizens and slow down the further spread of the disease COVID-19. These measures affect individuals, communities, cities, countries, and the entire planet. In this paper, we propose that the tremendous consequences of the corona crisis invite environmental psychology to focus more strongly on research questions that address major societal challenges from a collective psychology perspective. In particular, we stress that the corona crisis may affect how people appraise – and potentially respond to – the looming climate crisis. By consistently pointing out systemic links and their human factor, environmental psychology can become central to a scientific agenda of a sustainable ‘post-corona society’. In order to provide a framework for future research towards a sustainable societal transformation, we build on the Social Identity Model of Pro-Environmental Action (SIMPEA) and extend its scope to understand people's responses following the corona crisis. The model allows predictions of previously not explicitly included concepts of place attachment, nature connectedness, basic psychological needs, and systems thinking. It may serve as a guiding framework for a better understanding of the transformation towards a sustainable future.

1. What is the current situation?

It is rare that an event affects virtually every human society on planet Earth. Climate change is certainly one of such events (Masson-Delmotte et al., 2018). In 2019, a new virus, SARS-CoV-2, infected people in China and then spread around the world since late 2019. This led to the ‘corona crisis’ – a pandemic that had, and continues to have, a huge impact on societies, economies, and public health systems. At the time of writing this article, countries such as Italy, Spain, France, the United Kingdom, the USA, Brazil, Russia, Switzerland, Germany, and Iran are severely affected. Billions of citizens are obliged to stay at home, while shops, cafés, bars, and other facilities of social interaction and goods consumption are closed. First estimates from economists point to a severe economic depression (for an overview, see Rabouin, 2020). As far as the ‘ecosystem Earth’ is concerned, there is some evidence that the corona crisis has positive effects in the short term, such as a reduction in carbon emissions (Le Quéré et al., 2020), but may have negative effects in the long run (e.g., in terms of reduced financial support for climate policy; Evans, 2020; Hein, Peter, & Graichen, 2020). These developments call for stronger climate change mitigation

policies, especially now.

However, the current corona crisis not only has implications for environmental issues, but is in fact inherently linked to them. Researchers have previously proposed scenarios and evidence that the deterioration of the Earth system increases the risk of pandemics like the current one (Curseu, Popa, Sirbu, & Stoian, 2010; Di Marco et al., 2020; Spangenberg et al., 2010, pp. 10-15). It has been argued that biodiversity loss might increase the risk for pandemics by increasing the contact to wildlife and zoonoses (Di Marco et al., 2020). In addition, climate change might lead to the further spread of existing infectious diseases, while re-emerging old infectious diseases pose a threat to humanity due to thawing of permafrost and the potential subsequent release of frozen pathogens (Parncutt, 2019; see also Wu, Lu, Zhou, Chen, & Xu, 2016). These potential linkages raise the question of whether the current corona crisis and fear of future pandemics could motivate people to support policies aimed at mitigating climate change and reducing biodiversity loss, especially when knowledge about these linkages increases (see also Vaughan, 2020).

For environmental psychologists who analyse sustainability issues, a key question is how the current situation can be used to understand pro-

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environmental behaviour and support for appropriate political measures. Throughout the world, many daily routines, opportunities, and processes have changed drastically, but it is yet unclear how they affect our interactions with other people and the environment. It has been argued that it depends on collective choices taken during and after the crisis which of a possible set of futures for our societies might become true: A recovery to the status quo, a collapse, or a transition towards a more sustainable and/or more digitalised society (Boons et al., 2020). This calls for a collective view on how people appraise and respond to the current and future crises, and ultimately, on their willingness to accept restrictions in the face of the climate crisis. In this paper, we argue that through the corona crisis, collective processes emerge that can lead to new appraisals of and responses to the climate crisis and related policy measures.

2. Understanding large-scale effects of the corona crisis

The psychological effects of pandemics such as the corona crisis are not yet well understood. So far, there is only initial empirical evidence on the effects of the crisis on our psyche. In Germany, for example, the COSMO consortium has been collecting weekly waves of psychological responses since early March 2020 and finds increases in the perceived risk of the virus, concern about and fear of the virus, and concern about the economy and society as a whole (COSMO, 2020). At the same time, it reports high trust in the state and health authorities, and that the majority of German citizens accept the introduced restrictions (i.e., contact restrictions, closed amenities, travel restrictions; COSMO consortium, 2020). Studies from China, which assessed the consequences of strict quarantine measures, revealed a wide range of psychological distress including panic disorder and post-traumatic stress disorder symptoms (Qiu et al., 2020). Other research suggests that various psychological processes and concepts predict the adherence to so-called physical distancing measures – currently the most promoted measures to slow down the spread of the virus. These psychological predictors include empathy (Pfattheicher, Nockur, Böhm, Sassenrath, & Petersen, 2020) and social trust (Oosterhoff & Palmer, 2020) as well as the personality traits of honesty-humility and emotionality (Columbus, 2020; Zettler, Schild, Lilleholt, & Böhm, 2020). In a recently published overview, Van Bavel et al. (2020) have examined a plethora of relevant psychological predictors with the aim of addressing public health issues related to the corona crisis. In summary, they suggest that – among other things – collective identities, cooperation behaviour, solidarity norms, but also preparing people to identify misleading communication (e.g., in terms of conspiracy theories) can motivate them to act for the common good. This resonates with other work compiled by Jetten, Haslam, Reicher & Cruwys (2020), who argue that explaining the collective processes involved in responses to the corona crisis may benefit, in particular, from investigating social identity processes. Such processes may become particularly relevant for a post-corona environmental psychology that addresses global crises.

2.1. Differentiating the corona crisis from the climate crisis

The main question of our analysis is whether and how the corona crisis – despite its devastating consequences – can be helpful for understanding and even supporting a social-ecological transformation. Large parts of the population – across manifold countries – accepted the strict corona mitigation measures taken, or demand(ed) even stricter regulations. This is striking, given that similar restrictions would have been very unlikely before corona with regard to environmental crises that do share some characteristics. For example, the climate crisis and the corona crisis have in common that certain indicators change with exponential growth and a large collective (if not all humans) is affected. Both require drastic private and public measures, mitigation in terms of changing routines, and vulnerable groups are struck hardest. For both, large parts of the scientific community call for action.

Of course, there are important differences between the crises. Some would argue that the psychological distance to the climate crisis is much larger and, therefore, a lower (systemic) risk is perceived (Brügger, 2020). Others may suggest that climate change is characterised by stronger uncertainty (Capstick & Pidgeon, 2014; Etkin & Ho, 2007; Poortinga, Spence, Whitmarsh, Capstick, & Pidgeon, 2011; Whitmarsh, 2011). Many people might also hold the opinion that corona-related restrictions are only temporary, while lifestyle changes for climate crisis mitigation may be seen as continuous. People may experience different emotions because the climate crisis appears less urgent. It is also likely that people feel more collectively efficacious towards the corona crisis, given that feedback about (successful) mitigation is communicated almost on a daily basis. Finally, SARS-CoV-2 has very tangible consequences for individuals in risk groups (risk of death or severe illness) and immediate implications such as collapsing health care systems in an uncontrolled outbreak. The consequences of climate change, in turn, may not be perceived as tangible and urgent by many parts of the Western society – unlike corona, which hit Western societies with force.

At the peak of the corona crisis, the most important scientific and political task is to ensure a functioning public health system, namely, to save lives now. However, the long-term socio-political consequences of the pandemic require a research agenda that addresses how we as human beings cope with an altered socio-political environment. This requires a collective perspective on how people appraise and respond to climate change and other impending crises, following the massive societal changes brought about by the corona crisis. We propose a collective framework and research agenda, informed by a social identity perspective that entails interactions between individuals and their social environment.

2.2. The Social Identity Model of Pro-environmental action (SIMPEA)

Social identity is the part of the self that is derived from and defined by our membership in social groups (Tajfel & Turner, 1979). These groups guide group member's perceptions and actions by virtue of shared norms, beliefs, and goals. They allow individuals to fulfil motivations, for example with regard to self-worth or distinctiveness from others (Rosenmann, Reese, & Cameron, 2016), and can be seen as “psychological vehicles for social change or the resistance to social change” (Rosenmann et al., 2016, p. 204). Within environmental psychology, the social roots of pro-environmental behaviour have been increasingly acknowledged in recent years (Amel, Manning, Scott, & Koger, 2017; Bamberg, Rees, & Seebauer, 2015; Fielding & Hornsey, 2016). We believe that the Social Identity Model of Pro-Environmental Action (SIMPEA, Fritsche, Barth, Jugert, Masson, & Reese, 2018) in particular provides an appropriate framework for generating a ‘post-corona’ research agenda for understanding pro-environmental behaviour for several reasons. In a nutshell, the SIMPEA assumes that people's response to a crisis is subject to social group processes (Fritsche et al., 2018): People perceive societal crises through the lens of their social identity.

More specifically, the SIMPEA predicts that the salience of social norms (i.e., rules that govern behaviour in groups and societies), collective efficacy beliefs (i.e., beliefs that we as a group can reach our goals), and identification with social groups (i.e., the emotional and cognitive bond to social groups) predict the appraisal of a crisis (i.e., is the crisis a relevant risk?) and the response to a crisis (e.g., supporting a policy, see Fig. 1). The appraisal of the crisis, in turn, results in emotions and motivations that again affect the social components. This cyclical conceptualisation of the model provides perhaps the first and most convincing argument for using the SIMPEA in order to understand how people will respond to and appraise climate change following the corona crisis. Second, the SIMPEA integrates individual and social responses to collective crises. It is deeply rooted in a strong social identity theory (SIT) tradition and provides a comprehensive set of predictions

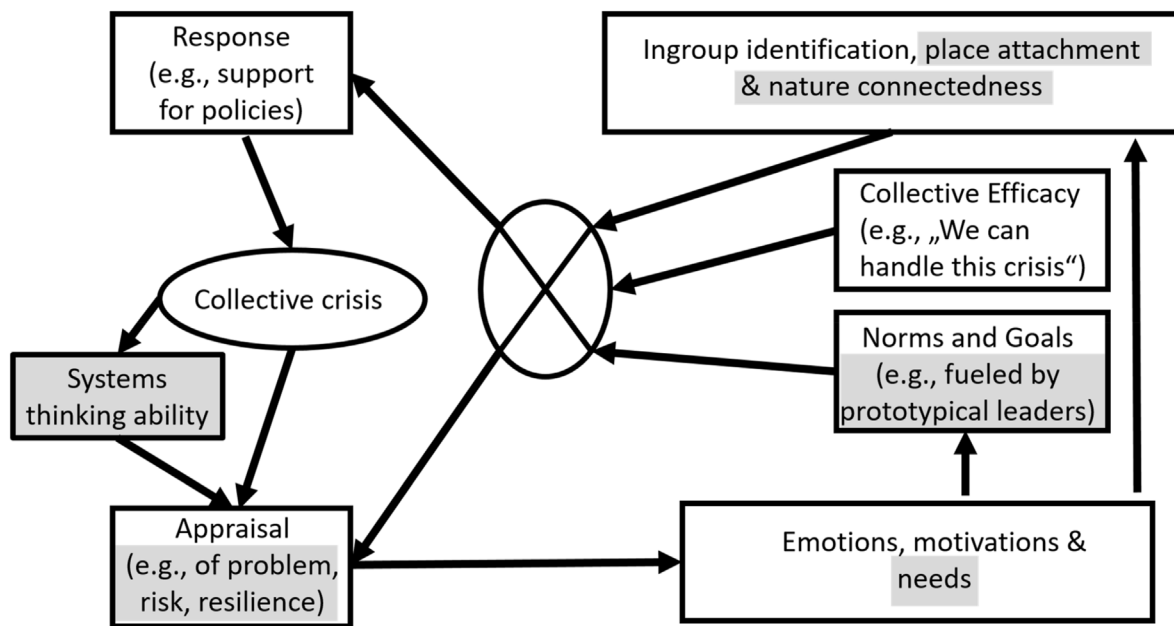


Fig. 1. The extended SIMPEA Model. Concepts with grey background are qualitative additions to the original model. The large encircled X in the centre depicts an interaction term. Figure adapted from Fritsche et al., 2018.

for how group processes affect appraisals of and responses to collective crises. Third, it allows flexibility with regard to the sources of some of its concepts. For example, it can accommodate different sources of motivations and emotions, and model group norms on different levels of identification. And fourth, most of its paths have been tested in previous research, with different social groups, providing support for the model (see Fritsche et al., 2018, for details). We will base our analysis primarily on an extended interpretation of the model that includes contextual and psychological factors that may emerge from the corona crisis. We will not reiterate all factors of the model that have been successfully tested earlier (Fritsche et al., 2018).

With regard to the corona crisis, the SIMPEA suggests that people perceive the crisis and appraise the situation as a risk, based on both individual and social factors, which results in certain emotions (e.g., fear, concern) and motivations (e.g., motivation to stockpile). These emotions and motivations are assumed to affect people's group identification (e.g., identification with a neighbourhood or a "#stayathome" movement) and the salience of social norms (e.g., people should follow the government's new rules of staying at home). Identification, salience of social norms, and group efficacy beliefs (i.e., the belief that we as a group or society can tackle the corona crisis) should then, according to the model, predict actual behaviour (e.g., one's own physical distancing behaviour).

Most importantly, however, a response can also be how people react to and appraise other crises. This is one of the key arguments of our analysis. The SIMPEA's cyclical nature allows to postulate that group processes as a function of the corona crisis may inform responses to other large scale crises – such as towards the climate crisis. The current changes of normality might provide a wedge for societal and political debates on these changes in the future: Based on the collective experience of the corona crisis, people might, for example, have realised that some behaviour changes such as slower mobility or reduced consumption also satisfy psychological needs or motivations (e.g., a need for competence satisfied through gardening or working in home office; see lower right of the SIMPEA; Fig. 1). These satisfied needs could result in the generation of new norms for a more sustainable/less resource intensive lifestyle (e.g., norms focusing on care rather than consumption), which in turn, together with a collective efficacy belief that we as society can handle such challenges, could motivate to act more climate-friendly. Prototypical and highly identified political decision makers

might strengthen such beliefs (see below).

It is also important to bring the roots of policy acceptance into question, and we suppose that the current situation might constitute a "window of opportunity" (Geels, 2013; Schäfer, Jaeger-Erben, & Bamberg, 2012) for sustainability transformations. The current situation might not only offer a window of opportunity for individual climate-change related behaviour change. More specifically, it might open up windows for strong and collectively supported – and politically implemented – emission reductions. As Ferguson and colleagues state, "it is clear that understanding and harnessing the power of collective interests will be critical to successful efforts to address this important issue [of climate change]." (Ferguson, McDonald, & Branscombe, 2016, p. 150). However, governmental recommendations so far refrain from advising on the most effective actions individuals could take to mitigate climate change (Wynes & Nicholas, 2017). A window of opportunity could represent a normative frame for changing such recommendations. For example, if the corona crisis resulted in humanity working together more closely, climate negotiations could also benefit from a superordinate identity that encompasses different national groups (Batalha & Reynolds, 2012).

However, not only do we need to understand why people change their behaviour significantly or when people are open for corresponding policy measures. We also need to understand how humans and their personal and collective well-being (cf. Roy, Riley, Sears, & Rula, 2018) in general might be affected by these changes. This could inform politicians and change-makers how to best implement policies that lead to high reductions in environmental degradation while simultaneously securing and promoting well-being of people and their communities. Given how strongly basic psychological need satisfaction determines human well-being and motivation (e.g., Deci & Ryan, 2000) and also relates to pro-environmental behaviour (e.g., Cooke, Fielding, & Louis, 2016; Kasser, 2009), focusing on basic psychological need satisfaction may be imperative. The corona crisis might be a good starting point in researching psychological factors (such as basic psychological needs) that buffer against a drop in personal and collective well-being in times of dramatic behaviour change.

2.3. Extending the SIMPEA to understand the effects of the corona crisis

We suggest that the SIMPEA needs clarification and at least some

extension in order to understand the collective processes that may emerge from the corona crisis. First, we suggest that the model should include both social identities as belongingness and emotional attachment to social groups, but also place attachment as belongingness and emotional attachment to places. This may include places such as neighbourhoods or landscape sites, which might in turn be important to social groups or provide symbolic meanings shared among its members (Low, 1992; Scannell & Gifford, 2010). Similarly, we suggest to include attachment to nature (i.e., in terms of nature connectedness; Tam, 2013). From a SIT perspective, place attachment may be seen as a specific form of ingroup identification. However, frameworks such as the tripartite organizing framework of place attachment (Scannell & Gifford, 2010) suggest that social aspects represent only one part of the concept, besides, for example, physical aspects. Similarly, nature connectedness could be seen as an “identification with all nature” that includes the social groups of “all humans” and lower-level groups (e.g., based on nationality or neighbourhood). Yet, in the SIMPEA, connectedness to nature as well as place attachment have been explicitly described as not fully accounting “for group-level processes and collective self-definitions” (Fritsche et al., 2018, p. 249).

Second, we want to stress that social norm salience can be strongly increased by the media and policy makers. This is in line with the SIMPEA, however, clarifying the role of how these norms may emerge is useful. The corona crisis shows that leadership is pivotal to establish and maintain social norms. Research on leadership suggests that leader's prototypicality for a group (e.g., society) and their identification with the group (through projecting a sense of “we” and “us”) shape followership (Steffens, Schuh, Haslam, Perez, & van Dick, 2015; see also; Seyranian, 2014). Together with the role of media in collective behaviour (see Postmes & Brunsting, 2002), social norms may change rapidly, and thereby affect appraisals of crises.

Third, the SIMPEA could benefit from a specific definition of what kind of emotions and motivations result from crisis appraisals. Concerns about and changes of basic psychological need satisfaction (such as autonomy, competence, and relatedness, Deci & Ryan, 2000) may yield strong motivations. Concerns about one's own as well as other's health or climate change concerns (e.g., climate change anxiety, Clayton & Karazsia, 2020) may reflect other (collective) emotions than those that were previously modelled (e.g., guilt, anger, feelings of threat; Fritsche et al., 2018).

Finally, we postulate that the appraisal of the corona crisis does not only depend on the social processes mentioned before, but also on people's ability to engage in systems thinking (i.e., the ability to understand the dynamics of interconnected phenomena; see below). This ability may in turn affect appraisals of crises. Based on these clarifications, we suggest a broader understanding of the SIMPEA that explains appraisals of a crisis based on responses to a previous crisis. The extended model is depicted in Fig. 1.

In the following, we will exemplify research questions we derived from the SIMPEA and deem important for the overall goal of this article: To understand how the corona crisis affects collective appraisals of and responses to environmental crises.

2.3.1. The corona crisis highlights specific social identities

“Viruses pay no attention to borders, race, nationality or gender. They are the shared enemy of all humanity. So it will be the shared enterprise of all humanity that finds a treatment and a vaccine that protects us.” *Leo Vadakar, Irish Prime Minister, 17th March 2020*

Social identification is a central component of the original and the extended SIMPEA (Fritsche et al., 2018). The pandemic is accompanied by identity-relevant processes such as less physical contact, the experience of a common fate, and the common threat caused by a “non-human other” (“virus”) to the human ingroup. At the same time, new social norms become apparent: people who still meet in groups (e.g., with friends) may be punished by other groups (e.g., state authorities,

neighbours) or contribute to the perception that only a part of the population carries the burden of mitigation efforts. Others may stand in the supermarket, following other group members who stockpile toilet paper or food. The crisis may affect people's identity continuity, as the loss of physical contact may be perceived or experienced as a loss of social identity (Jetten, Haslam, Haslam, Dingle, & Jones, 2014), and thereby reduce satisfaction of basic psychological needs (Greenaway, Cruwys, Haslam, & Jetten, 2016). From a social identity perspective (cf. Reicher, Spears, & Haslam, 2010; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987), the corona crisis may also activate different social identities that could motivate individuals to act in solidarity – or in egoistic and parochial ways (see Research question 1). Then, depending on the social norms that are salient within such groups, certain behaviours may become more or less likely. While this may be true for many situations, crises such as the corona crisis amplify and accelerate such processes, with swift changes of norms or relevance of particular social identities.

In terms of theory development, the corona crisis allows testing predictions of social identity with regard to identification with all humanity (cf., McFarland et al., 2019; Reese, Proch, & Finn, 2015). This concept that captures all humans as part of an ingroup is predictive of many pro-social and pro-environmental outcomes (for an overview, see McFarland et al., 2019; for relations with pro-environmental behaviour and policy support, refer to Batalha & Reynolds, 2012; Joanes, 2019; Loy & Reese, 2019; Renger & Reese, 2017; for related work on conflict resolution or responses to inequalities, see Wohl & Branscombe, 2005; Reese, Proch, & Cohrs, 2014). However, it has been criticised for not conforming to social identity theory as it does not pertain a salient outgroup (cf. Rosenmann et al., 2016). Others, on the contrary, argued that an outgroup as such may not be a prerequisite of meaningful group identification (e.g., Gaertner, Iuzzini, Witt, & Oriña, 2006; Jans, Postmes, & Van der Zee, 2012; Sani, Herrera, & Bowe, 2009). Research modelling “the virus” as a salient external threat to the group of all humans could address this concern, and test whether this salient threat could indeed spur an all human identification.

Similarly, the corona crisis could itself spur new identities, based on common behaviour or based on opinions (e.g., “the government is well-prepared”; Bliuc, McGarty, Reynolds, & Muntele, 2007). For example, at the beginning of the crisis, a “stay-at-home” identity as purported through the hashtag #stayathome in social network sites promulgated and implemented a behavioural norm of keeping distance and refraining from many daily routines. On the other side, one could also observe groups that formed through sharing disagreement with the restrictions, perceiving a common enemy in state regulations. It is also possible that some groups – up to the level of “us as all humans” – will start comparing with their former group selves, creating intergroup comparisons that may spur sustainable beliefs and actions (Ferguson, Branscombe, & Reynolds, 2011). From a SIMPEA perspective, various research questions emerge that would address the role of social identity in responses to the corona crisis – and how these responses may transfer to how people respond to the climate crisis.

Finally, we suggest that the corona crisis might alter people's collective efficacy (Fritsche et al., 2018). It is possible that the identity-related collective efficacy in the corona crisis (e.g., “we can overcome the crisis together”) spills over to collective efficacy in other domains such as the climate crisis. People might gain a stronger belief that they can face the climate crisis together after experiencing what is collectively and politically possible on a national, and ultimately, global scale. In the following, we outline research questions (RQ) inferred from the above reasoning:

- RQ1: How do we cope with the loss of physical contact with other people? Do we symbolically strengthen our bonds to members of our existing groups (e.g., by establishing online group chats to keep contact, developing new communication norms) or do we – even temporarily – shift our focus to other, situationally more relevant

social groups (e.g., immediate neighbourhoods or online communities)? Do these groups also relate to climate behaviour, and do groups in favour of or against restrictions share similar values and views across crises?

- RQ2: Is “the virus” a salient external threat to the group of all humans, which increases ingroup identification with all humanity? If so, can this result in stronger willingness for climate mitigation policies, as previous research consistently suggests? Can the corona virus elicit a feeling of “human collective efficacy” that could spur responses to climate change (cf. Hamann & Reese, 2020, for initial findings)?
- RQ3: How does online communication on restriction opinions (e.g., #stayathome) spread and construct new norms and opinion-based groups, and how can it affect support for future behaviour and environment-related policies? Previous studies on refugee attitudes, for example, show that pro-refugee online activity predicts subsequent solidarity with refugees on Twitter (Smith, McGarty, & Thomas, 2018), suggesting that identification with online-based movements may indeed motivate pro-environmental action.
- RQ4: Does the appraisal of a crisis depend on who (ingroup vs. outgroup member) communicates and decides which measures need to be taken? What role does it play whether leaders (i.e., political leaders) are seen as prototypical for one's group or whether they identify strongly with a group (cf., Steffens et al., 2015)? With regard to the SIMPEA, can leaders help fostering feelings of collective efficacy among group members?

For some of these research questions, it could be particularly useful to assess naturally-occurring daily communication in social networks such as Twitter, Instagram, Facebook, or their non-Western counterparts (e.g., Weibo). Such analyses are unobtrusive, allow the analysis of large datasets, and can be used to predict future communication behaviour, associated relevant themes, and the emotional tone of online communication (e.g., Merle, Reese, & Drews, 2019; Smith et al., 2018; for a “cookbook” on doing research with Twitter data, see Murphy, 2017).

2.3.2. The corona crisis highlights specific place identities

Related to social identification, place attachment is defined as a multidimensional construct, characterised by an emotional and cognitive bond “between individuals and their meaningful environments” (Scannell & Gifford, 2010, p.1; see also Devine-Wright, 2013; Lewicka, 2011). In their tripartite organizing framework of place attachment, Scannell and Gifford (2010) define it by person variables (e.g., individual experiences, cultural meanings), process variables (e.g., the role of affect or cognition), and place variables (e.g., geographic scale, social ties). In this framework, social aspects associated with a place are crucial for an attachment to that place. People attaching to a place see importance in the social bonds of that place (Kyle, Graefe, & Manning, 2005; see also Ramkissoon & Mavondo, 2014, 2015). In fact, place can become a symbol for a specific group, in particular when it comes to civic place attachment (i.e., place attachment to one's city, Vorkinn & Riese, 2001). People with strong place attachment integrate a place and its inhabitants into their self-concept so that any change to the place will likely affect their self and their relation to the place (Scannell & Gifford, 2010; Reese, Oettler, & Katz, 2019). As such, one could argue that some aspects of place attachment are overlapping with group identification. Adding place attachment explicitly to the SIMPEA could thus help addressing the specific differences and commonalities between place attachment and group identity in the context of pro-environmental action.

Place as a function of the corona outbreak is characterised by sudden changes in local and community accessibility, closure of routinely-used facilities, and a decline of direct physical contact. In affluent and highly globalised countries in particular, distances may now appear larger (at least for those usually depending on public transport) and

most people refrain from long-distance rides or flights. Closure of national borders and policy restrictions/recommendations serve as structural boundaries and norms. For example, as can be tracked live on the website “flightradar24.com”, international flights dropped from around 100,000 commercial flights a day in mid-February 2020 to 25,000 commercial flights a day in early May of the same year. Psychologically, the policy actions taken to reduce the risk of exponential numbers of corona infections thus affect many people's everyday lives including their surroundings to yet unknown extents. This change may be unusual for many people and may affect their place attachment. From previous research on place change, we know that place attachment seems to decrease particularly strongly after social features (i.e., aspects of community, social bonds) of a place are lost (Reese et al., 2019). There is also evidence that place attachment can be changed by large-scale disasters such as earthquakes (Zheng, Zhang, Guo, Zhang, & Qian, 2019). At the same time, place changes can be beneficial to a community when communicated convincingly (Devine-Wright et al., 2009). Moreover, people reporting high place attachment seem particularly fond of scientific evidence concerning their place, as shown in high correlations between place attachment and interest in scientific data (i.e., earth observation data regarding their region; Wullenkord, Heidbreder, & Reese, 2020). We believe that future research on place can strongly benefit from an integration of place into an extended SIMPEA model. The following research questions may shed light on the importance of place attachment following the corona crisis:

- RQ5: Does the corona crisis change place attachment? Does the crisis – through appraisals of the crisis – result in increased attachment to the local neighbourhood (e.g., due to spending more time in the immediate neighbourhood than before), or to decreased attachment (e.g., due to the drastic social and physical changes of place; see Reese et al., 2019)? Does it result in qualitative changes of place attachment (e.g., from civic to natural place attachment), and can these changes inform how place attachment might motivate climate mitigation behavior?
- RQ6: Does the corona crisis result in different or new forms of place attachment (e.g., bonding with others through online places; Choi, Kim, Sung, & Sohn, 2011)? Does stronger internet connectivity predict civic engagement and community involvement (Mesch & Talmud, 2010)? If so, on which levels (e.g., neighbourhood, global)?

2.3.3. The corona crisis highlights connectedness to natural surroundings

The closing of most public places may lead to more and more people going for walks, preferably in natural environments such as parks or forests (Sueddeutsche Zeitung, 2020). While this observation may only hold for those people who can afford this behaviour and have access to such places, it opens up various research questions that can ultimately inform future policy making for a sustainable societal transformation. In affluent countries in particular, one could argue that spending time in nature may have an impact on the appreciation of nature and pro-environmental action (Otto & Pensini, 2017), and provide a collectively shared experience. Spending more time in the outdoors instead of at office buildings or in shopping malls may increase connectedness to nature (i.e., a cognitive and emotional bond to nature and natural surroundings; see Tam, 2013, for an overview). This, in turn, may result in stronger climate-related actions and political support for keeping nature intact (Mackay & Schmitt, 2019). From a SIMPEA perspective, the following research questions capture whether nature connectedness may be a socially shared identification with nature:

- RQ7: To what extent can nature provide relief to the consequences of physical distancing and health-related anxiety? Is it possible that this relief is associated with an increased collective resilience (Cohrs, Christie, White, & Das, 2013), such that the shared experience of nature alters collective appraisals of climate change? Can experiencing health benefits of nature help to foster support to

protect this very nature?

- RQ8: Will nature connectedness *decrease* in consequence of the corona crisis, because “the virus” threatens us and evokes fear of nature? In other words, is it possible that people – psychologically – construct an intergroup situation between us (humans/mammals) and them (viruses)?

As argued above, understanding human's relation to other humans, to nature, and connectedness to both will affect pro-environmental behaviour and public health. These interactions between nature and humans are complex and, in order to understand them better, may require a more systemic perspective on these relations. This is why we suggest to include systems thinking as an additional factor into the SIMPEA.

2.3.4. The corona crisis fosters our ability for systems thinking

A lot of information – primarily transmitted through media – about the corona crisis addresses systemic knowledge and understanding. It shows maps and videos with the growing global distribution of infections, graphs and data with non-linear scales, provides insights into the societal complexities of a lockdown, or delineates the fact that even with sudden and harsh restrictions, corona cases would increase for another two to three weeks. In psychology, systems thinking is described as a “cognitive paradigm that involves an implicit tendency to recognise various phenomena as a set of interconnected components that interact with one another to make up a dynamic whole” (Davis & Stroink, 2016, p. 577). It allows perceiving and understanding complex systems, and is understood as a worldview that includes beliefs and assumptions about the world (Thibodeau, Frantz, & Stroink, 2016). According to those and other researchers, systems thinkers are better able to acknowledge systemic processes and show greater understanding of complex ecological-economic-social systems. The more people are willing or able to think in a systems thinking manner, the stronger are their pro-environmental beliefs, climate change beliefs, and pro-environmental attitudes (Ballew, Goldberg, Rosenthal, Gustafsson, & Leiserowitz, 2019).

In other words, people with systems thinking abilities may be more prone to support a societal transformation towards sustainable lifestyles and policies. From an optimistic perspective, this systemic knowledge may be improved through the corona crisis and respective information provided through media. Specifically, many news and media outlets, including social media, constantly report and explain information that refers to systemic processes. For example, understanding exponential rather than linear growth is one aspect of systems thinking (Meadows, 2008). The threat of SARS-CoV-2 has been continuously described as an exponential or logistic growth phenomenon. Continuously presenting such data on the CO₂ concentration, combined with information what should be done about it, could be one useful consequence in future climate communication. The idea of a tipping point is also part of a systems analysis, and has repeatedly been addressed in the media with regard to the corona crisis. For the climate crisis, such tipping point information could also be used, taking into account what we know about the planet's boundaries (Rockström et al., 2009). It has become evident in the corona crisis that not only the scale of change (how many people will become infected) but also the rate of change (how fast people will become infected) is crucial, which is why many virologists repeatedly suggested to “flatten the curve”. A public health system may accept gradual change, but would suffer with rapid changes, which would result in a tipping point of crashing a public health system (World Health Organization, 2020). Third, systems thinking includes the ability to realise delays between cause and effect (so-called systems inertia; Meadows, 2008). This is another phenomenon that has been purported repeatedly: We will receive higher and higher numbers even days or weeks after a lockdown, because SARS-CoV-2 has been in many people's bodies without them noticing. Only after some considerable delay, the long-term effects and infection numbers become visible. If

this understanding of delay and effect with regard to climate change increased, this could possibly strengthen pro-environmental appraisals and responses.

With these observations, it is likely that people's appraisal of the corona crisis and other (environmental) crises differs as a function of systems thinking. Therefore, we included systems thinking as a potential predictor of these appraisals into the SIMPEA model (see Fig. 1). Some potential research could address the following questions:

- RQ9: Does the repeated confrontation with systems-related information during the corona crisis increase the ability to engage in systems thinking related to climate change? If so, does this affect the appraisal of climate change information? How does systems thinking relate to understanding the interconnections between deteriorating environments, health, climate change, and one's own behaviour? How can we improve systems thinking abilities in a society?

2.4. Towards a sustainable societal transformation

The previous sections focused on how a collective perspective on the consequences of the corona crisis could inform individual's and group member's behaviour towards the climate crisis. Tying together the strands of research we delineated above, we think that the following question seeks answer:

- RQ10: How does the experience of behavioural restrictions affect our future routines and our social bonds? What are the negative and positive consequences of restriction policies for people's need satisfaction and well-being? Will restrictions change our identity and thereby frustrate needs (when we feel dispatched from groups) or increase need satisfaction (when we build new social ties; Greenaway et al., 2016)?

Scientific analyses have to take into account the often unspoken social inequalities in many societies. It is a highly privileged position to decide by yourself whether you would like to work less. Recent reports on the strategic decisions of huge consumer brands in the textile industry, for example, suggest that hundreds of thousands workers will lose their jobs in sweat shops in the course of the corona crisis (Clean Clothes Campaign, 2020). These developments call for interdisciplinary research and swift, informed political decision making.

- RQ11: How do people cope with individual and (inter)national economic consequences of corona? Do people see this as an opportunity or as a risk for changes in the current economic systems? Will and if yes how will people act in solidarity? Will they engage in political protests? Will this depend on which social groups they belong to (e.g., heavy consumers vs. sufficiency-oriented consumers)? Can a more sufficiency-oriented lifestyle emerge and stabilise after the corona crisis? Or does the crisis backfire and release rebound effects, e.g. increases in consumption levels, after the “end” of the corona crisis and the return to normality?

RQ11 may at first glance only indirectly relate to the SIMPEA. However, recent collective movements such as “Fridays-for-Future” or “Extinction Rebellion” oppose normative, neo-liberal economic beliefs. At this intersection, new and potentially conflict-laden identities can emerge from the corona crisis, too – with group norms that differ starkly between the groups, but with similar feelings of efficacy. As previous research on political ideology suggests (e.g., McCright & Dunlap, 2011), such opposing groups will fundamentally differ in their appraisal of the climate crisis.

During the corona crisis, many people experience unusual situations or environmental conditions, for example, less traffic in metropolitan areas coupled with actual (and an experience of) increased air quality.

People experience that many meetings they usually travel to can be conducted remotely. Moreover, people may decide (or are forced) to work less and have therefore more time with beloved ones, in the outdoors, cooking, or cultivating crops, activities that usually affect both well-being and the ecological impact beneficially (Kasser, 2017). These may be utopian visions in many areas in the world, but it is up to scientific inquiry now to study whether the experiences made are questioned, reflected on, and could possibly lead to transforming societies.

- RQ12: Are people willing to continue some of the behavioural patterns triggered by the corona crisis? Have they experienced benefits of a more sufficiency-oriented lifestyle? Which role do leaders and societal actors play (i.e., politicians) in garnering support for such alternative lifestyles and consequently, economic systems? Would citizens follow prototypical and highly identified (with which reference group?) leaders proclaiming a society that moves away from an economic growth mindset? Would people be willing to actively engage for economic alternatives – such as a basic income – through collective action? How can concepts such as frugality, voluntary simplicity, or sufficiency orientation be integrated more succinctly into environmental psychology theorising (see also Buhl & Acosta, 2016; Speck & Hasselkuss, 2015)? With regard to the SIMPEA, these concepts could be seen as stronger ecological social norms that go beyond commonly promoted concepts of sustainability (i.e., mainly efficiency), that are yet only salient and relevant in comparably small groups.

3. Summary and conclusive remarks

In this paper, we outlined a framework for understanding how the corona crisis potentially affects people's appraisals of and responses to the climate crisis – and whether the corona crisis impact can be useful for future societal transformation policies. Building on the SIMPEA (Fritsche et al., 2018), we argued that the corona crisis might have direct and indirect effects on people's behaviour through various social identity processes. Derived from an updated version of the SIMPEA (Fig. 1), we presented a set of potential research questions that we believe could strengthen environmental psychology as a relevant field for societal transformations.

Saying that, we also want to stress that an analysis of psychological responses to the corona crisis has to take into consideration that such crises may further increase pre-existing social and income inequalities. While measures and restrictions are relatively similar across countries, the health and economic consequences for people in affluent countries are less severe than those in less affluent countries. Similarly, people with a lower socio-economic status will likely experience more health and economic risks than people with a higher socio-economic status (Fisher & Bubola, 2020; Thompson, 2020). As researchers from a European context – from one of the most affluent countries in the world, Germany – we will and cannot claim completeness or universality of the proposed analysis. We hope, however, that it will motivate and stimulate future research from various backgrounds and discussion from different perspectives. At the brink of corona, a potentially larger crisis – the climate crisis – currently looming in the background, requires societal transformation, ideally on a global and collective scale. We see this paper as an invitation to discuss how environmental psychology will develop during and after corona, and how our field can build on its strengths when it comes to explaining and responding to societal and global phenomena – and drastic systemic changes.

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Declaration of competing interest

None.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.jenvp.2020.101444>.

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