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## Tears evoke the intention to offer social support: A systematic investigation of the interpersonal effects of emotional crying across 41 countries<sup>☆</sup>

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## ABSTRACT

Tearful crying is a ubiquitous and likely uniquely human phenomenon. Scholars have argued that emotional tears serve an attachment function: Tears are thought to act as a *social glue* by evoking social support intentions. Initial experimental studies supported this proposition across several methodologies, but these were conducted almost exclusively on participants from North America and Europe, resulting in limited generalizability. This project examined the tears-social support intentions effect and possible mediating and moderating variables in a fully pre-registered study across 7007 participants (24,886 ratings) and 41 countries spanning all populated continents. Participants were presented with four pictures out of 100 possible targets with or without digitally-added tears. We confirmed the main prediction that seeing a tearful individual elicits the intention to support,  $d = 0.49$  [0.43, 0.55]. Our data suggest that this effect could be mediated by perceiving the crying target as warmer and more helpless, feeling more connected, as well as feeling more empathic concern for the crier, but

not by an increase in personal distress of the observer. The effect was moderated by the situational valence, identifying the target as part of one's group, and trait empathic concern. A neutral situation, high trait empathic concern, and low identification increased the effect. We observed high heterogeneity across countries that was, via split-half validation, best explained by country-level GDP per capita and subjective well-being with stronger effects for higher-scoring countries. These findings suggest that tears can function as social glue, providing one possible explanation why emotional crying persists into adulthood.

*C'est tellement mystérieux, le pays des larmes*  
 [It's so mysterious, the land of tears]  
 Antoine de Saint-Exupéry – Le Petit Prince

It was a common belief in Ancient Greece that weeping together creates a bond between people. Similarly, scholars have argued that emotional tears played a significant role in the evolution of humankind's solidarity and affiliation (Walter, 2006) and that crying fosters approach and support behavior in others (see Gračanin, Bylsma, & Vingerhoets, 2018, for a review). Recent empirical investigations have indeed yielded suggestive evidence that emotional tears increase affiliative intentions in observers (see Supplementary Table 1.1.1 for a non-systematic meta-analysis of the literature), fitting the hypothesis that emotional tears act as a *social glue* and facilitate attachment throughout the lifespan (Bowlby, 1982; Nelson, 2005; Radcliffe-Brown, 1922; Zeifman, 2012).

While culture may shape social behavior and perceptions differently, few attempts have investigated to what extent reactions to emotional tears vary across different cultures or contexts and how homogenous such effects might be (as is the case in most studies in psychology; Henrich, Heine, & Norenzayan, 2010; Rad, Martingano, & Ginges, 2018). The question is whether the signaling function of tears is more like that of yawning, a fairly universal and contagious expression argued to constitute an evolutionary basis of empathy (Provine, 2005), or more like that of smiling, a heavily context-dependent expression that can for example signal competence in some but low intelligence in other cultures (Krys et al., 2016). In the current project, we provide a comprehensive test of whether emotional tears increase self-reported support intentions<sup>1</sup> in observers, how this mechanism operates, and whether specific aspects, including gender and ethnicity of the crier, social context, or situational valence, promote or mitigate such an effect.

We introduce the *social-support* hypothesis, stating that emotional crying constitutes a fairly universal social signal that promotes social bonding and support intentions<sup>2</sup> in others. Affiliative responses to emotional tears have major implications for the well-being of the crier (Hendriks, Croon, & Vingerhoets, 2008a; Hendriks, Nelson, Cornelius, & Vingerhoets, 2008b) and for the establishment of social bonds (Walter, 2006). If the social-support hypothesis is correct, cultural differences in the strength of the effect are possible, but the effect itself should show relatively low heterogeneity across sampling locations, while also being largely independent of the characteristics of the target or the participant (such as gender or group identification). Through this project, we aim to provide significant new insights into the riddle of human emotional tears. Understanding why tears function the way they do is of vital interest to caregiver-infant relationships (i.e., developmental psychology), how the function differs (or not) is of interest to studies of human culture (i.e., anthropology/cultural psychology), how crying is used as an

affiliative cue is of interest to those studying both human (i.e., social psychology) and nonhuman animal relations (i.e., biology/behavioral ecology). In other words, the study of tears is vital across the human and biological sciences.

## 1. The function of human emotional tears

Several theoretical approaches have attempted to explain the occurrence of human emotional crying.<sup>3</sup> First, Kottler (1996) emphasized the *interpersonal* effect of tears, as they constitute a request for help from other individuals. Similarly, Murube, Murube, and Murube (1999) theorized that tears, beyond functioning as a request for help, also serve as a signal for offering help, for example, in situations involving expressions of sympathy. Consistent with this, Provine, Krosnowski, and Brocato (2009) argued that emotional tears reliably signal sad feelings of the crier (see Cordaro, Keltner, Tshering, Wangchuk, & Flynn, 2016, for similar findings with regard to the acoustical attributes), and additional studies found that perceptions of sadness foster support behavior in others (Lench, Tibbett, & Bench, 2016). Interestingly, although mammals and certain bird species show distress vocalizations when being separated from a caregiver, humans seem to be unique when it comes to the production of emotional tears, a feature which is maintained throughout the lifespan (Vingerhoets, 2013). Second, work on *intrapersonal* effects focuses on processes within the individual and regards emotional crying as a form of catharsis, that based on empirical evidence, seems to depend primarily on the amount of social support received, the social situation, the mental health condition of the crier, and the reasons for crying (Bylsma, Vingerhoets, & Rottenberg, 2008). In this project, we do not focus on the possible intrapersonal effects but rather on the first function of tears having an interpersonal effect: a possible signal function that evokes social support intentions in those who see someone cry.

Related to such signal functions, people quickly form impressions of others based on facial expressions (Willis & Todorov, 2006). Thus, recent research has started testing the effect of visual tears on person perception. For example, Balsters, Kraemer, Swerts, and Vingerhoets (2013) found that participants were faster to judge subliminally presented tearful faces as sad and in need of support than similar faces without tears. Furthermore, there is support for the idea that emotional crying serves an attachment and bonding function, showing that individuals report stronger intentions to support tearful or crying individuals than their non-tearful counterparts emotionally (see Supplementary Table 1.1.1 for an overview of the published literature). A non-systematic literature review that we conducted indicates that this effect is substantial ( $d = 0.69$  [0.47, 0.90]).<sup>4</sup> However, and most

<sup>1</sup> With self-reported intentions we refer to what has been termed as *willingness* or *motivation* in previous studies – a subjective representation of how one intends to behave in response to a hypothetical scenario including an unknown individual. Others might call this *social scripts*, which would align with our definition.

<sup>2</sup> Social support has been typically divided into *emotional*, *instrumental*, and *informational* support (Wills, 1991). In the current project, we are primarily interested in emotional support as this is the most common response in situations of emotional crying and has been used in previous research (e.g., Hendriks & Vingerhoets, 2006).

<sup>3</sup> From a medical viewpoint, researchers typically distinguish among *basal tears*, *reflex* or *irritant tears*, and *emotional tears* (Vingerhoets, 2013). Basal tears originate from small glands under the eyelid and produce a tear film, while irritant and emotional tears originate from the same lacrimal gland located above the eye. Given the nature of our approach (i.e., presenting tearful faces showing *emotional* tears), we will mainly focus on emotional tears in the present project.

<sup>4</sup> Note that we also included unpublished studies in our overview. Still, it is possible that this estimate is overestimated due to publication bias. However, conducting a trim-and-fill analysis on our data revealed no systematic indication of publication bias (see Supplementary Material 1.3).

importantly, for the general test of the social-support hypothesis, there is high heterogeneity in these effect sizes (as indicated by the wide confidence interval). Reported effects range from rather large and substantial (e.g.,  $d = 2.40$  [2.19, 2.60]; Hendriks & Vingerhoets, 2006) to small (e.g.,  $d = 0.35$  [0.19, 0.51]; Küster, 2018b). A possible reason for this is that a varied set of methodologies and operationalizations have been used across different studies (see Supplementary Material, Fig. 1.2.1). Since there is currently no standardized stimuli set, the stimuli used in different studies differ considerably in how tears appear and are perceived.

The first priority is to use a large and diverse set of stimuli (different faces) to reliably test the social-support hypothesis. An illustrative example was provided by a recent set of studies: Van de Ven, Meijs, and Vingerhoets (2017) found that persons showing a tearful face were seen as less competent, while Zickfeld and Schubert (2018) found that they were not. It then turned out that the reduced set of stimuli that Van de Ven et al. had used was likely the main reason for the contradictory findings between these studies (Zickfeld, van de Ven, Schubert, & Vingerhoets, 2018). Similarly, the literature on crying reports other examples of conflicting findings (e.g., concerning the effect of gender of the crying person, as discussed later), but these might be limited to specific methods or context effects on why the target person is showing tears. Because context appears to play an essential role in explaining such contradictory findings, the main goal of this investigation is to test the social-support hypothesis by conducting a comprehensive study that considers the potential role of various contextual factors of emotional crying, using a large set of stimuli, in samples across the world.

## 2. Mediating effects

In addition to the main effect of emotional tears eliciting self-reported support intentions in observers, the current study also focuses on possible mediating variables of this effect. Thus, the second important objective is to understand *why* tears lead to affiliative behavior.

### 2.1. Perceived warmth, helplessness, & connectedness

Vingerhoets, Van de Ven, and Van der Velden (2016) found that the tendency to approach tearful individuals is caused by the inferred helplessness or sadness of the crier, the crier's perceived friendliness or warmth, and how connected one feels to the crier (see Stadel, Daniels, Warrens, & Jeronimus, 2019; for a recent replication). Perceived helplessness showed the strongest effect, while perceived friendliness had a somewhat lower impact. Other studies have supported these findings with some exceptions (see Supplementary Material Table 1.1.2–1.1.4 for an overview). Therefore, a more systematic examination of the process is warranted, especially as this can help to illustrate potential context effects. For example, if we were to find fewer support intentions towards out-group members who display tears, is this because observers perceive outgroup-members to be less in need of support compared to in-group members or do observers perceive the same level of need but are just less inclined to help despite realizing they are in need?

### 2.2. State empathic concern/personal distress

Next to more cognitive evaluations or perceptions of the tearful target, the emotional state of the *observer* might mediate potential social support intentions. Previous theories have repeatedly discussed the possibility that (altruistic) support is mediated by two distinct pathways (Batson, Fultz, & Schoenrade, 1987): *empathic concern* or *personal distress*. Empathic concern refers to a compassionate feeling towards others in need, while personal distress refers to the unease and distress someone experiences upon seeing others in need. The empathic concern pathway has been described as a genuinely altruistic motivation as individuals provide support because they feel compassion or empathy. On

the other hand, the personal distress pathway refers to more egocentric motivations because individuals provide support in order to alleviate their own feelings of distress. Previous literature has theorized and provided first evidence that observing tearful individuals might lead to an increase in distress (Hendriks, Nelson, et al., 2008b; Hendriks & Vingerhoets, 2006) though this link has not been explored systematically. In our pilot study (Supplementary Material 2.8 - Main Pilot 4), we found that the social support effect was mediated by feelings of empathic concern but not personal distress.

## 3. Moderating effects

As mentioned above, there are indications that the social-support effect might also be influenced by contextual factors such as the crier's gender or group membership, among others. Therefore, the third objective of the present project is to investigate in which conditions tears evoke social support intentions. The most important prediction that we explain below is that some factors might strengthen or weaken the social-support effect of tears, but we never expect situations in which tears lead to fewer intentions to support than the control condition (i.e., the lack of tears).

### 3.1. Gender

Fischer and LaFrance (2015) reviewed evidence that women generally cry more than men. They attributed this finding to gender-specific social norms, social roles, and the situation, as well as the perceived intensity of the emotion. In some extreme situations such as funerals, norms may be more similar across the genders, or it may be more acceptable for men to shed tears (Fischer, Manstead, Evers, Timmers, & Valk, 2004). Furthermore, whereas male tears are typically thought to be shed in serious situations, female tears are thought to exist in both serious and more mundane circumstances (Labott, Martin, Eason, & Berkey, 1991). These findings suggest possible differences in responses to male and female tears. However, empirical findings have yielded a rather mixed picture. In some studies, participants showed more willingness to help and were more positive towards a crying woman than to a crying man (Cretser, Lombardo, Lombardo, & Mathis, 1982), while other studies found no difference (Hendriks, Croon, & Vingerhoets, 2008a; Zickfeld & Schubert, 2018), or even found the opposite effect such that crying men were perceived more positively (Labott et al., 1991). However, this might also depend on the gender of the observer, as a recent study suggests that willingness to support is lower when male observers are exposed to crying males, while female observers show no gender differentiation (Stadel et al., 2019). Thus, possibly gender effects (relating to the crier) interact with the social situation, the gender of the observer, and/or the specific situational valence. Notably, only a few of these studies directly tested the support intentions of observers but rather tested evaluations of the crying individuals. Despite the likely main effect of gender that women elicit more support intentions than men, if the social-support hypothesis is correct, both female and male tears should foster affiliation and support intentions in observers (though possibly moderated by social context and appropriateness, see later).

### 3.2. Reason for shedding emotional tears (situational valence)

There is little theoretical or empirical research regarding whether individuals respond differently to tears shed for positive versus negative reasons. Positive tears or *tears of joy* occur in response to joyful, moving, or amusing events (Zickfeld, Seibt, Lazarevic, Zvezelj, & Vingerhoets, 2020), while negative tears occur mostly in response to distress, sadness, or anger. Hendriks, Croon, and Vingerhoets (2008a) found that positive crying was perceived as less appropriate and that participants indicated less willingness to support the crier in comparison to distress-related tears. However, a recent unpublished study failed to replicate this

finding (as presented in Zickfeld et al., 2018) and found no difference in warmth perception of individuals crying due to positive versus negative reasons. Due to the fact that individuals in negative situations are perceived as more helpless, it seems likely that in such situations, people offer more support than in positive situations (Murube et al., 1999). Yet, also in positive situations in which people shed tears, people seem to feel overwhelmed and somewhat less in control of the situation (Gračanin et al., 2018). Because of this, the social-support hypothesis predicts that, in both positive and negative situations, tears increase affiliation (and, therefore, also support intentions).

### 3.3. Social context & perceived appropriateness

Little consistent information exists on the importance of the social context for the perception of tears. Most studies focused on the perception of tears in work and family-related contexts (Fischer, Eagly, & Oosterwijk, 2013; Van de Ven et al., 2017). Findings generally show that men are evaluated less positively when shedding tears in a work context. In addition, individuals typically reported crying more frequently in private settings, such as at home or when they were alone with significant others (Vingerhoets, 2013). The question of the effect of tears occurring in a private versus a more public context may be especially important from a cross-cultural perspective, because evidence suggests that the perception of how appropriate the shedding of tears is perceived to be can play an important role in how it is responded to by others (Fischer et al., 2013). Emotional tears that are perceived as inappropriate would possibly reduce support intentions or even result in a backlash. Still, if the social-support hypothesis is correct, we expect tears to increase support intentions regardless of the degree of privacy of the social context (although when crying is seen as inappropriate in a specific context, this might create a distance from the target person that suppresses the strength of the effect).

### 3.4. Group membership

The crier's group membership might also have an impact on the perceiver, especially whether the crier belongs to the observer's in- or out-group. In the present project, we primarily focus on the subjective classification of the crier as part of one of the participant's social groups. Thus, participants might identify targets as part of their social groups based on various aspects such as appearance, gender, ethnicity, or background of the situation. Again, if the social-support hypothesis holds, tears should in general increase support intentions regardless of the group membership of the crier, though it might be moderated through exhibiting a preference for in-group members.

### 3.5. Trait empathy

Finally, trait empathy has been proposed as an important moderator in the perception of emotional tears (Lockwood, Millings, Hepper, & Rowe, 2013; Sassenrath, Pfattheicher, & Keller, 2017). Sassenrath et al. (2017) found that sadness evokes more helping behavior and that this effect is stronger with more perspective-taking. The social-support hypothesis again expects individuals to show a general intention to support tearful individuals, but this effect might be reduced for individuals low in trait empathy. Still, we think it is important to test whether the effect holds across the whole population or only for a specific group.

### 3.6. Culture

Next to individual-level moderators, culture-level moderators might play an important role whether tearful individuals receive support intentions (Van Hemert, van de Vijver, & Vingerhoets, 2011). For example, social support intentions might be moderated by whether

cultures endorse collectivistic values or show a high level of trust (Levine, Norenzayan, & Philbrick, 2001). In addition, gender differences may be stronger in cultures that show higher gender inequality and have a strong focus on masculine norms and values (Van Hemert et al., 2011). Due to the multitude of factors, we treat culture as an exploratory moderator in the present project. While we assume that some cultural norms or values moderate the social-support effect, we predict that it should be manifested across all countries.

In sum, several factors could mediate and moderate a possible affiliative function of emotional tears. Furthermore, where one of these components was examined, it is unclear how much the subsequent findings would hinge on the specific methods. Studies vary broadly across observed context or the stimuli used, which has resulted in sizable heterogeneity among the findings. The present project is the most comprehensive investigation of the bonding function of human emotional tears to date, including a total number of 7007 participants from 56 labs located on all populated continents (41 different countries).

In general, the social-support hypothesis predicts a main effect that individuals who shed a tear prompt more intentions of support behavior than individuals who are not shedding tears. As reviewed above, this effect might firstly be mediated by several variables, including the perceived warmth, connectedness to, and perceived helplessness of the target and the experienced, empathic concern or personal distress of the observer. Second, we expect the main effect to be moderated by several aspects, including the perceived appropriateness of shedding tears in that given situation, the gender or group membership of the crier, the social context, and trait empathy. However, the social-support hypothesis would argue that the main effect will not be moderated in a disordinal fashion, such that crying individuals evoke less affiliative intentions in contexts that are perceived as inappropriate. The effect could be reduced but is not expected to exist as an effect of practical importance in the opposite direction, such that crying individuals in a perceived inappropriate context receive less support intentions than individuals with a neutral expression.

### 3.7. From behavioral intentions to actual behavior

It is important to note that the present project does not assess actual support behavior directly, which would be the most valid test of our hypothesis if properly controlled. Instead, we employ reported person impressions and self-reported support intentions in response to (non)-tearful fictitious targets as our main dependent variables. There are many reasons why we do not assess actual behavior in the current project, and why we think that measuring subjective self-reported intentions in response to a hypothetical situation is important and valuable as a first comprehensive investigation. First, if there is no effect across cultures on self-reported intentions to hypothetical situations, then there is likely no effect on actual behavior in the real world. While we are aware of the gap between self-reported intentions and actual behavior (Sheeran & Webb, 2016), no systematic studies on the variability of the effect on self-reported intentions across non-Western countries exist. Thus, the results of our projects can be taken as a first indicator on the universality of the social-support effect on actual behavior (Van Kleef, 2016). Second, actual support behavior needs to be controlled properly, reducing the feasibility of including the proposed mediators and moderators. Focusing on actual behavior would reduce the understanding of the limits of the social-support effect as this has not been tested systematically. Third, our non-systematic literature review shows that the effect of self-reported intentions in response to hypothetical scenarios is rather strong. Similarly, the reviewed studies that focused on more behavioral measures such as subliminally presented stimuli or approach/avoidance movements (Balsters et al., 2013) or studies presenting real crying individuals (Hill & Martin, 1997) have found comparable effects with respect to the studies focusing on self-

reported support intentions. Another key reason is that reports on support intentions are cost-effective and allow us to measure support without using, for example, deception across many different samples.

Measuring actual behavior is very relevant also because culture might moderate the intention-behavior link. Still, what is crucial for our testing of the theory is that we predict that the effect of tears on support intentions is a universal phenomenon, but we do not disagree that there are situational (or cultural) circumstances that might moderate the relation between intentions and behavior. In our view, studying actual behavior should follow the current project rather than replace it.

In the present project, we tested our main effect by employing a standard paradigm presenting either pictures of individuals showing a neutral expression or the same pictures with tears added digitally that has been successfully applied in past studies. Based on the social-support hypothesis, which states that emotional tears serve an attachment and bonding function in humans, we made the following predictions:

#### 4. Hypotheses

1. Participants will report more willingness to support tearful individuals than individuals not showing tears.

1b. Support intentions will be higher in negative situations than in the positive ones and lowest in neutral situations. Still, we expect tears to increase support intentions in all these situations. Thus, we do not expect an interaction between the occurrence of tears and situational valence.

2. The effect of tears on willingness to support is mediated by perceived warmth, perceived helplessness, and perceived connectedness. Tearful targets will be perceived as warmer, more helpless, and participants will feel more connected towards them in contrast to non-tearful targets. In turn, perceptions of warmth, helplessness, and connectedness will result in more intentions to support the target.

2b. The effect of tears on willingness to support is mediated by felt empathic concern but not personal distress of the observer. Perceiving tearful targets evokes more experienced empathic concern, which results in more intentions to support the target.

3. An interaction effect of the occurrence of tears and situational valence on perceived warmth, helplessness, and connectedness. In *matching* conditions, crying in a negative or positive situation and not showing tears in a neutral situation will be perceived as more appropriate, which in turn increases perceived warmth, perceived helplessness, and perceived connectedness.

4. An interaction between social context and the occurrence of tears. We predict less strong intentions to support in a public context than in a private one for tearful faces, while this difference is smaller for non-tearful targets.

5. A target gender effect on willingness to support, with participants, on average, indicating greater intentions to support crying female targets than male ones.

5b. An interaction effect between target gender and gender of the participant on willingness to support. Female participants will, on average, provide greater intentions to support female and male targets, while male participants are expected to only do so for female targets only.

6. A main effect of trait empathy on support intentions. Higher scores on empathy are related to increased intentions to support the targets. However, we still expect tears to increase support for people low on trait empathy.

7. A main effect of the degree of in-group inclusion of the crier. An increase in in-group identification will result in an increase in support intentions. However, we still expect tears to increase support intentions towards outgroups, albeit to a smaller degree than support intentions towards in-groups.

All data, materials, and documents that we are allowed to share, are publicly available on our project page (<https://osf.io/fj9bd/>).

## 5. Method

### 5.1. Participants

#### 5.1.1. Sample size determination

Based on a non-systematic literature review, we identified the *warmth* effect as the smallest main effect ( $d = 0.45$  [0.33, 0.58], see Supplementary Material, Fig. 1.2.2). Using the *simr* package (Green & MacLeod, 2016) in R (R Core Team, 2018) and the multilevel model obtained from our pilot study (Main Pilot 3), we performed a power simulation (alpha level at 0.05). The pilot study sample size, which included 71 participants (279 cases), had a post-hoc power of 1. We, therefore, decreased the sample size until we reached a stable simulated power of 0.95, which was reached with a total sample of  $N = 50$  (total number of cases 200 given four repetitions per participant). In order to account for possible exclusions and cross-cultural variability of the effect size, we aimed to include a minimum of 80 participants (320 cases) per sampling location.<sup>5</sup> Due to exclusions, we fell short on this benchmark for 15 samples. However, only one sample (CHN\_002) included less than 50 participants. Nonetheless, we still included all samples specified in Table 1 as our a-priori sample size calculations suggested a sufficient amount of power.<sup>6</sup>

#### 5.1.2. Recruitment<sup>7</sup>

We recruited participating labs through a number of channels, including personal contacts, StudySwap (<https://osf.io/9aj5g/>), and the Psychological Science Accelerator (PSA; Moshontz et al., 2018), actively recruiting samples not confined to European or North American contexts. We thus employed a convenience sample of countries around the world but did not sample systematically and representatively, something that limits the universality and generalizability of our findings, which will be considered in the General Discussion. An overview of all participating labs and recruitment details, such as the number of participants is provided in Table 1. Each lab targeted a final sample of at least 80 adults aged 18 or older using an online survey (Qualtrics, Provo, UT). Most labs employed convenience samples such as undergraduates, while other labs sampled broader populations using crowdsourcing services (Table 1).<sup>8</sup> In total, we recruited 7745 participants across 56 labs, 41 countries, and all populated continents.

#### 5.1.3. Exclusion criteria

Participants were excluded ( $n = 738$ ) if they completed less than 50% of the questionnaire and/or indicated that their age is younger than

<sup>5</sup> We aimed to achieve at least 95% power for the main effect of the social-support hypothesis in each separate sample. The moderation and mediation effects will possibly show a somewhat lower power in each individual sample but not across all labs combined. For example, the smallest mediation effect identified by our non-systematic overview for perceived warmth ( $\beta = 0.08$ , see Supplementary Material) achieved 95% power across 240 cases (Schoemann, Boulton, & Short, 2017), which we clearly oversample.

<sup>6</sup> We were forced to drop some samples that included far less participants than  $n = 50$  or did not recruit participants at all. Information on those samples is provided in the Supplementary Material 4.2.

<sup>7</sup> We recruited most of our samples during the COVID-19 pandemic. In order to check whether this circumstance influenced our main results, we repeated our main analysis comparing samples recruited before country specific lockdown and during/after. We did not find any indication of a moderation by time of recruitment (Supplementary Material 4.7).

<sup>8</sup> Although the sampling strategy has implications for the generalizability of our findings, as it is not directly representative of the world's population, it is still more varied than most psychological studies (e.g., Rad et al., 2018). We addressed the issue of our convenience sampling directly, by comparing (psychology) undergraduates with non-student populations in order to assess whether a background in psychology might bias results. Controlling for this aspect in previous studies does not seem to support the idea that psychology undergraduates respond differently (see Supplementary Material 1.4).

**Table 1**  
Overview of sampling locations, sample characteristics, and language.

Region <sup>1</sup>	Subregion <sup>1</sup>	Country	Lab ID	Sample	Location	Incentives	Language	n				Age				
									Female	Male	Other	Min	Max	M	SD	
Africa	Western Africa	Nigeria	NGA_001	G	Social Media	–	English	70	23	47		18	53	34.3	8.04	
	Southern Africa	South Africa	ZAF_001	U	University of South Africa	–	English	170	110	58	2	19	63	28.9	10.2	
Americas	North America	Canada	CAN_001	G	Prolific.co	£1.80	English	198	98	99	1	18	64	29.9	9.79	
		Mexico	MEX_001	G	Prolific.co	£1.80	Spanish	204	101	102	1	18	68	26.7	7.33	
		United States of America	USA_001	U	Ithaca University	CC	English	104	86	18		18	23	19.5	1.22	
		Argentina	ARG_001	G	Social Media/Mailing Lists	–	Spanish	107	86	21		19	68	35.6	12.57	
	South America	Brazil	BRA_001	G	Social Media	–	Portuguese	89	42	46	1	20	69	33.8	11.11	
		Chile	CHL_001	U	Universidad Viña del Mar	–	Spanish	61	46	15		19	42	24.5	4.49	
		Colombia	COL_001	U	Universidad de los Andes	CC	Spanish	81	40	41		18	41	22.3	5.09	
		Peru	PER_001	G/U	University of Lima/Social Media	–		110	74	35	1	18	79	31.8	13.46	
		Eastern Asia	China	CHN_001	G	Social Media	Money	Chinese	152	99	53		19	53	25.7	7.73
				CHN_002	U	Huazhong University of Science and Technology	CC	Chinese	49	19	28	2	18	44	19.6	4.01
Asia	Southeastern Asia	Japan	JPN_001	G	Lancers.jp	200 ¥	Japanese	167	58	107	2	20	73	41.3	9.62	
		South Korea	KOR_001	G	<a href="https://www.dataspring.com">Dataspring.com</a>	2.5000 ₩	Korean	141	67	73	1	21	65	40.6	11.47	
		Malaysia	MYS_001	G/U	Monash University Malaysia/Local Community Klang Valley	–	English	89	67	22		18	54	26.5	7.43	
		Philippines	PHL_001	U	De La Salle University	CC	English	97	48	48	1	18	44	20.9	3.84	
	Southern Asia	Singapore	SGP_001	U	Singapore Management University	CC	English	99	73	26		19	27	21.6	2.01	
			SGP_002	U	Nanyang Technological University	CC	English	151	100	51		19	29	21.9	1.83	
		Thailand	THA_001	U	Chulalongkorn University	CC	Thai	116	78	33	5	18	64	24.7	10.42	
		India	IND_001	G	Prolific.co	£1.80	Hindi	97	50	46	1	18	46	28.8	6.14	
		Pakistan	PAK_001	U	Social Media	–	English	143	104	39		18	28	19.6	1.66	
		Western Asia	Israel	ISR_001	G/U	Crowdsourcing Website	8.5 NIS	Hebrew	169	96	72	1	18	54	27.7	4.35
			ISR_002	U	Tel Aviv University	CC	Hebrew	136	73	63		18	34	22.8	2.29	
			ISR_003	U	University of Haifa and the Technion	CC	Hebrew	76	42	34		19	60	26.8	7.25	
	Turkey		TUR_001	U	Social Media	–	Turkish	73	31	41	1	18	59	29.1	8.92	
				TUR_002	G	Social Media	–	Turkish	76	59	17		18	67	39.5	14.24
			TUR_003	G/U	Üsküdar University/Social Media	CC	Turkish	187	170	17		18	45	24.2	4.61	
	TUR_005		U	University Mailing Lists	–	Turkish	153	100	53		19	37	22.6	2.89		
United Arab Emirates	ARE_001		U	United Arab Emirates University	CC	English	73	52	21		18	41	27	4.49		
Europe	Eastern Europe	Hungary	HUN_001	U	ELTE Eötvös Loránd University	CC	Hungarian	93	77	16		19	34	22.77	3.25	
		Poland	POL_001	G/U	Facebook, Mailing Lists	–	Polish	76	49	27		18	54	27.3	8.30	
		Slovakia	SVK_001	U	Pavol Josef Šafárik University in Košice	CC	Slovakian	98	87	11		18	34	21.9	2.77	
	Northern Europe	Norway	NOR_001	U	University of Oslo	CC	Norwegian	184	148	35	1	19	55	23.3	5.92	
		Finland	FIN_001	U	University of Jyväskylä	Lottery	Finnish	114	95	16	3	18	68	34.1	11.87	
			FIN_002	U	University of Turku	–	Finnish	131	118	11	2	18	72	36.6	13.62	
		Great Britain	GBR_001	U	University of Chester	CC	British	73	62	10	1	18	65	27.3	11.05	
	Southern Europe	Ireland	IRL_001	G	Prolific.co	£6.44/h	English	80	45	35		18	62	31.1	10.64	
		Bosnia and Herzegovina		BIH_001	U	University of Mostar	–	Croatian	52	47	4	1	18	47	22.2	4.38
			Croatia	HRV_001	G/U	University of Rijeka	CC	Croatian	129	65	63	1	19	70	24.6	7.80
		Greece	GRC_001	G	Social Media	–	Greek	60	44	16		18	55	26	9.30	
		Portugal	POR_001	G	Social Media (Facebook, Mailing lists)	–	Portuguese	148	94	54		18	70	37.84	1.32	
		Serbia	SER_001	G/U	University of Belgrade	–	Serbian	129	96	33		19	57	24.7	8.00	
		Spain	ESP_001	U	University of the Basque Country	–	Spanish	76	70	4	2	19	44	20.5	3.18	
ESP_002			G	Social Media	–	Spanish	92	76	16		18	70	45.7	12.59		
Western Europe	Austria	AUT_001	U	University of Graz/Social Media	–	German	153	124	23	6	18	76	26.9	10.41		

(continued on next page)

Table 1 (continued)

Region <sup>1</sup>	Subregion <sup>1</sup>	Country	Lab ID	Sample	Location	Incentives	Language	n	Female	Male	Other	Age	Min	Max	M	SD
France <sup>2</sup>			FRA_000	G	Facebook	Lottery	French	380	350	26	4	18	18	76	38.2	13.42
			FRA_001	U	Université Grenoble Alpes	CC	French	120	105	15		18	18	45	21.1	3.70
			FRA_002	G	Social Media	-	French	78	62	15	1	21	21	77	44.3	14.30
Germany			DEU_001	G	SurveyCircle	Donation	German	146	105	40	1	20	20	71	26.3	7.03
			DEU_002	U	University of Mannheim	CC	German	81	75	6		18	18	55	21.3	4.47
			DEU_003	U	Social Media	-	German	51	38	13		18	18	67	30.1	10.30
the Netherlands			NLD_001	G	Prolific.co	£1.53	Dutch	161	56	103	2	18	18	56	26.2	7.54
			NLD_002	U	University of Amsterdam	CC	Dutch	88	75	12	1	18	18	31	19.7	1.92
			NLD_003	U	University of Groningen	CC	Dutch	105	85	20		18	18	25	19.8	1.64
Oceania	Australia & New Zealand	Australia	AUS_001	U	University of Queensland	CC	English	75	60	15		18	18	51	21.3	5.97
		New Zealand	NZL_001	U	Victoria University of Wellington	CC	English	81	68	13		18	18	34	20.2	3.27

Note. <sup>1</sup>Regions and subregions are based on the UN M49 coding scheme. U = undergraduates, G = general population, CC = (partial) course credit. <sup>2</sup>FRA\_000 was already recruited before the Stage 1 report was accepted due to a communication error. We chose to include it nevertheless as it features the same design as all other studies.

18 years. Participants were also excluded on a casewise basis if they failed the attention check. The attention check was failed if participants selected another situation than that described for the actual target (see Supplementary Material 2.1–2.2 for an overview of situations). Finally, participants were excluded if their nationality differed from the location of the lab AND if they also indicated that the country of the lab location had not influenced them most culturally.<sup>9</sup>

The final sample included 7007 participants (4474 females, 1975 males, 45 other) ranging from 18 to 79 years of age ( $M = 28.08$ ,  $SD = 10.89$ ). A detailed overview of each country and lab is provided in Table 1.

## 6. Ethics

Each lab received ethical approval from the local Institutional Review Board (IRB) or ethics committee or explicitly indicated that the respective institution does not require approval for this kind of study prior to conducting the study. Participants always provided informed consent prior to the study. Consent forms differed minimally across labs due to regional differences in requirements. All data were stored on a local server at the University of Oslo and are publicly available at the project page (<https://osf.io/fj9bd/>).

## 7. Pilot studies

We performed several pilot studies in order to examine the effectiveness of the design and the stimuli. First, we tested and confirmed whether the vignettes accompanying our tearful and non-tearful stimuli were perceived as positive, negative, or neutral (Supplementary Material 2.1 & 2.2 - Situation Ratings). Afterward, we tested a mixed design but found that our main manipulation did not work as intended (because the tears were not visible enough; Supplementary Material 2.4 - Main Pilot 1). We updated the materials (Supplementary Material 2.5) and tested the revised stimulus set in a within-subjects design. After revising our main design, we performed three additional pilot studies in order to get a further basis for a power analysis for our main study (Supplementary Material 2.6–2.8). All information is provided in the Supplementary Material.

## 8. Procedure

We employed a 2 (occurrence of tears: tears vs. no tears) x 3 (situational valence: positive vs. negative vs. neutral) x 2 (target gender: male vs. female) x 2 (social context: public vs. private) x 5 (group membership: Black vs. Asian vs. Latinx vs. Middle East vs. White) within-subject design.<sup>10,11</sup>

<sup>9</sup> Additionally, we performed our main analyses including those participants indicating that the country of the lab location has not influenced them the most culturally in an exploratory fashion. Results are found in the Supplementary Material 4.5.

<sup>10</sup> Importantly, this full-factorial design signifies that neutral situations can be presented with a crying target, whereas positive/negative situations are sometimes shown using a neutral target. These combinations have decreased ecological validity than the remaining combinations as it for example would be unlikely for someone to cry when drinking a glass of water (one of the neutral situations). However, by using a wide combination of situations and tearful targets we increased the overall ecological validity of the design, as we isolated the tear-effect from situational effects.

<sup>11</sup> The full within design might bias responding as being presented with both crying and non-crying targets could induce demand characteristics – participants might have guessed the hypothesis and acted accordingly. Therefore, we also report our main analyses using only the first target (see Supplementary Material 4.5). Comparing between- with within-designs in previous studies does not support evidence for demand effects in our design (see Supplementary Material 1.4).



Following informed consent, participants were exposed to four targets. Every participant was randomly presented with two tearful and two non-tearful targets (occurrence of tears). In addition, all possible combinations of the valence of the situation, the gender of the target, the group membership of the target, and the social context (whether the situation occurs in a public or private place) were randomly presented. Thus, while participants always saw two tearful and two non-tearful targets whether the described situation was positive, neutral, or negative, whether the background occurred in public or privately, whether the target was male or female, and the target's group membership were determined fully at random. For each target, participants completed the same measures.

## 9. Materials

### 9.1. Main stimuli

We employed a total of 100 different stimuli that represent five different 'ethnic' groups (as characterized by the respective databases): White, Asian, Black, Latinx, and Turkish. We randomly chose 20 stimuli from each group representing ten females and ten males. All individuals showed a neutral expression,<sup>12</sup> as we were specifically interested in the effect of tears and wanted to control for any facial expressions associated with emotional crying. Stimuli including individuals of European, Asian, African American, and Hispanic descent, were taken from the Chicago Face Database (Ma, Correll, & Wittenbrink, 2015). Pictures of Turkish individuals from a Mediterranean, Middle Eastern, or Balkan background were taken from the Bogazici database (Saribay et al., 2018). For each picture, tears were digitally added using a procedure developed by Küster (2018a); see Fig. 1 for an example.

This technique has been successfully employed in previous studies (e.g., Balsters et al., 2013; Küster, 2018a, 2018b) and has several advantages. First, in contrast to describing crying individuals in a vignette, presenting pictorial stimuli mimics real-world perception of emotional tears more validly. Second, while the removal of tears from pictorial stimuli has been proven to be a valuable technique, crying faces possibly transmit more information than only visible tears, such as specific muscle contractions and overall facial expression. Starting with neutral facial expressions allowed us to systematically control for these aspects. Development of tearful stimuli was performed in several rounds, and all the pictures were pilot tested in a reaction time study to determine whether the study participants perceived visible tears (see Supplementary Materials 2.5 - Stimulus Rating). Thus, our final stimulus pool contained 200 pictures: 100 tearful and 100 non-tearful, balanced across 50 different males and females from five different backgrounds.

### 9.2. Situations

Situations were randomly selected from a pool of six pre-tested situations for each category (positive, neutral, negative) based on topics identified by Vingerhoets (2013) and Zickfeld et al. (2020; see Supplementary Materials 2.1-2.2). Each situation existed in a *public* version, in which the depicted individual expressed the (non-)tearful reaction with strangers present, and also in a *private* version, which described the protagonist being alone or accompanied only by significant others. The broad range of situations helped prevent our effects from being too situationally specific. Example situations included: "[...] had a green salad for lunch at a restaurant." (neutral, public), "[...] just accepted the proposal by his romantic partner after eating dinner together at home." (positive, private), or "[...] said her last words at the grave of her mother

<sup>12</sup> In both picture databases, models were instructed to pose a *neutral* facial expression (Ma et al., 2015; Saribay et al., 2018). For the Chicago Face Database, photographs were selected based on how "apparently neutral the face seemed" (Ma et al., 2015, p. 1125).

during the funeral service." (negative, public).

## 10. Measures

First, participants were provided with a description of the background situation at the top of the page and a picture of the target. Targets were presented with an onscreen size of 15.87 × 15.87 cm (600 × 600 px) and repeated five times across the whole page, with the situations always added below the picture. As the studies were mainly conducted online, viewing distances and visual angles varied across participants and device types.

### 10.1. Support intentions

Participants were first asked about their intentions to support the target with three items adapted from previous research on social support (Hendriks, Croon, & Vingerhoets, 2008a; Schwarzer & Schulz, 2003; Van de Ven et al., 2017; Vingerhoets et al., 2016). We included items that were applicable across the broad range of presented situations. The final items included "I would be there if this person needed me," "I would express how much I accept this person," and "I would offer support to this person." The three items were averaged into one intention-to-support score.

### 10.2. Perceived appropriateness

Then, participants were asked to report how appropriate the expression of the depicted person is in order to assess the perceived appropriateness of the reaction.

### 10.3. Perceived warmth

Next, we assessed perceptions of *warmth*. We applied the items "warm" and "friendly," which were the two strongest items from the four items used to assess warmth in previous studies (Van de Ven et al., 2017; Zickfeld & Schubert, 2018; Zickfeld et al., 2018; see Supplementary Material 2.3 for selection procedure).

### 10.4. Perceived competence, honesty, dominance, & attractiveness

In addition, though not focal to the present project, we measured perceived *competence*, *honesty*, *dominance*, and *attractiveness* of the target. For *competence*, we included the items "competence" and "capable," identified through the same procedure as the warmth items. To assess *honesty*, we used two items from previous studies (Picó et al., 2020): "honest" and "reliable." Finally, we included an item targeting perceived *dominance* using "dominant" and *attractiveness* using "attractive" (Oosterhof & Todorov, 2008).

### 10.5. Perceived helplessness

Subsequently, participants were prompted with three items assessing *perceived helplessness* based on Vingerhoets et al. (2016). Items assessed how "helpless," "overwhelmed," and "sad" the targets were perceived to be.

### 10.6. Perceived connectedness

Afterward, participants completed the Inclusion of Others in the Self (IOS) scale to assess their perceived *connection* with the target (Aron, Aron, & Smollan, 1992). The IOS scale consists of seven Venn-like diagrams that show two circles increasing in overlap, with the left circle of each pair referring to the respondent and the right one to the depicted target.



Fig. 1. Sample images from the Chicago Face Database (Ma et al., 2015). Original images are presented on the left-hand side. Modified images with digital tears added are shown on the right-hand side. Note that the male stimulus is not used in the present project due to our randomization technique, which did not select this image from the total pool. Permission from Ma, Correll, & Wittenbrink (2015). The Chicago Face Database: A Free Stimulus Set of Faces and Norming Data. *Behavior Research Methods*, 47, 1122-1135.

### 10.7. Perceived feeling touched/other emotions

In addition, not focal to the main hypotheses, we employed an item as used by Zickfeld et al. (2018) targeting how “touched and moved” the targets were perceived to be. We also added an option for participants to indicate whether they perceive the target to be feeling additional emotions, including *anger*, *joy*, *pride*, *disgust*, *fear*, *surprise*, *no emotion/neutral*, and *other*, which allowed participants to write their own answer.

### 10.8. State empathic concern/personal distress

To assess participants’ reactions towards the target, we also measured *state empathic concern* and *personal distress*. We retained two items per construct, each based on the highest component loadings as reported in Batson, Fultz, and Schoenrade (1987). *Empathic concern* was measured with “compassionate” and “softhearted”; for *personal distress*, we used the items “upset” and “disturbed.”

### 10.9. Perceived valence

We assessed how *positive* and *negative* the participants perceive the targets felt (“How positive/negative do you think this person feels?”).

### 10.10. Group identification<sup>13</sup>

Finally, we also assessed to what degree participants include the target in one of their social groups. Participants were asked to what degree they think the presented target is part of one of their own social groups.

All items were completed on a 7-point scale ranging from *not at all* (0) to *very much so* (6), except for the *other* emotion rating that used a dichotomous format and the IOS scale that displayed circles (but also ranged from 0 to 6). Finally, to probe for attention, participants were asked to select the situation the depicted target was experiencing, which was presented as one among a number of different situations randomly selected from the total pool.

### 10.11. Trait empathic concern

After having completed these measures for all four targets, participants completed the *empathic concern* dimension of the Interpersonal Reactivity Index (IRI; Davis, 1980), assessing trait (affective) empathy (see Supplementary Material 4.3.1 for specific translation of the IRI scale). The empathic concern subscale consists of 7 items (e.g., “I often have tender, concerned feelings for people less fortunate than me”) and

<sup>13</sup> Note that this variable focused on the target’s *ethnicity* in the pilot studies. As this operationalization can be problematic because ethnicities are not restricted to certain countries or cultures, we decided to assess the general degree of subjective in-group inclusion of the target.

was completed on a 5-point scale with anchors at *Does not describe me well* to *Describes me very well*.

### 10.12. Demographics

Finally, participants provided demographic information, including gender, age, nationality, and the number of children they have. If participants indicated a different nationality than the location of the lab, they were presented with a dichotomous item probing whether the country of the lab location has influenced them most culturally. Participants also completed a measure assessing their employment status, including six answer alternatives: “student,” “employed,” “self-employed,” “unemployed,” “retired,” and “other.” In the end, participants were debriefed.

## 11. Translation

Translations were performed using a five-step back-translation method modeled on the PSA guidelines (Moshontz et al., 2018). First, a bilingual person translated the material from American English to the target language. Then, another bilingual person translated the resulting material independently back to English. Subsequently, translators discussed similarities and differences in the two versions with a third bilingual individual. The resulting preliminary version was given to two non-academics fluent in the target language that reported perception and possible misunderstandings. After making cultural adjustments, the final version of the translation was produced. Note that some language versions were used for several countries (e.g., Latin America).

## 12. Results

For all analyses, we set the alpha level at 0.05.<sup>14</sup> We analyzed the data employing multilevel models and the *lme4* package (Bates, Mächler, Bolker, & Walker, 2015) in R (R Core Team, 2018).<sup>15</sup> We report unstandardized effect sizes *B* and their 95% confidence intervals, standardized effect sizes *d*, and overall effect sizes *R*<sup>2</sup> (Page-Gould, 2016) based on the *sjPlot* package (Lüdtke, 2018).<sup>16</sup> For the main models, we

<sup>14</sup> We realized later that we did not register to correct our alpha given the amount of hypotheses tested. In general, even when setting the alpha at 0.001, interpretation of our findings would have remained the same. For the main confirmatory analyses, we present adjusted *p*-values using the Holm correction.

<sup>15</sup> In case models did not converge, we employed the Nealder Mead optimization. Note that this decision was not registered.

<sup>16</sup> Note that we originally registered to calculate effect sizes “based on transformations by Bowman (2012) and Lakens (2013).” We now employ the *sjplot* package for simplicity. Results of these calculations differed to a non-substantial degree. Note that effect sizes obtained by the *sjplot* package differed slightly from the meta-analysis approach, as the latter did not take participant random effects into account.

**Table 2**

Overview of mean scores and standard deviations for each main measure across the neutral, positive, and negative situation per occurrence of tears.

	Occurrence of Tears	Overall	Negative	Neutral	Positive
Intention to Support	No Tears	3.17 (1.50)	3.58 (1.49)	2.91 (1.47)	3.05 (1.46)
	Tears	3.88 (1.41)	4.22 (1.35)	3.72 (1.42)	3.66 (1.38)
Perceived Warmth	No Tears	2.70 (1.41)	2.71 (1.41)	2.86 (1.36)	2.51 (1.43)
	Tears	3.39 (1.38)	3.54 (1.36)	3.10 (1.36)	3.52 (1.36)
Closeness (IOS)	No Tears	2.32 (1.45)	2.44 (1.50)	2.30 (1.43)	2.23 (1.41)
	Tears	2.86 (1.62)	3.16 (1.70)	2.60 (1.52)	2.78 (1.57)
Perceived Helplessness	No Tears	1.89 (1.43)	2.36 (1.45)	1.51 (1.35)	1.81 (1.38)
	Tears	3.51 (1.46)	3.76 (1.29)	3.76 (1.44)	2.83 (1.38)
Perceived Positivity	No Tears	2.39 (1.44)	1.83 (1.33)	2.69 (1.30)	2.65 (1.51)
	Tears	2.05 (1.70)	1.29 (1.32)	1.52 (1.28)	3.28 (1.68)
Perceived Negativity	No Tears	2.69 (1.60)	3.35 (1.57)	2.38 (1.47)	2.36 (1.56)
	Tears	3.52 (1.73)	4.30 (1.42)	3.98 (1.40)	2.32 (1.65)
Perceived Appropriateness	No Tears	3.18 (1.77)	3.12 (1.63)	4.01 (1.56)	2.36 (1.72)
	Tears	3.46 (1.89)	4.54 (1.45)	2.15 (1.71)	3.55 (1.70)
State Empathic Concern	No Tears	2.08 (1.63)	2.58 (1.68)	1.76 (1.52)	1.93 (1.58)
	Tears	3.49 (1.64)	3.88 (1.54)	3.27 (1.65)	3.29 (1.65)
State Personal Distress	No Tears	1.27 (1.42)	1.66 (1.52)	0.89 (1.25)	1.26 (1.39)
	Tears	1.81 (1.58)	2.12 (1.65)	1.92 (1.56)	1.40 (1.43)
Trait Empathic Concern		3.84 (0.68)			

Note. No Tears  $n = 11949$ – $12435$ , Tears  $n = 11924$ – $12451$ . All scales were completed on a 7-point scale with possible responses ranging from 0 to 6.

always added participants nested in countries, targets nested in ethnicities as random effects, and allowed their intercepts to vary randomly (Judd, Westfall, & Kenny, 2012). An overview of all registered models is presented in the Supplementary Material 4.1. To examine effects across countries, we employed random-effects meta-analyses using the *metafor* package (Viechtbauer, 2010). In general, we performed equivalence testing to determine whether effects are smaller than an effect size we a priori consider to be interesting (Lakens, 2017). We set the *smallest effect size of least interest* (SESOL) to  $d = +/- 0.20$  and used the *TOSTER* package (Lakens, 2017) to test for equivalence.<sup>17</sup> Given our final sample size, even very small effects were likely to attain statistical significance. With the equivalence test, we evaluated if the minimal effects are very small (statistically significantly smaller than  $d = |0.20|$ ), and if they were, we did not interpret them. When running exploratory tests after testing our main hypotheses, we employed Bonferroni corrections for multiple comparisons.

### 13. Transformations

The three items on support intentions were averaged into one intention-to-support score. The two items on warmth, state empathic concern, state personal distress, as well as the three items on perceived helplessness, were averaged into perceived warmth, felt empathic concern, personal distress, and perceived helplessness scores, respectively. In addition, the seven items of the trait empathic concern subscale were averaged into a trait empathic concern score (three of these items are reversed scored and were transformed before averaging). We calculated internal reliabilities using Pearson's correlation coefficient for perceived warmth ( $r = 0.75$ ), felt empathic concern ( $r = 0.82$ ), and felt personal distress ( $r = 0.59$ ), and using Cronbach's alpha for intention-to-support ( $\alpha = 0.87$ ), perceived helplessness ( $\alpha = 0.86$ ), and trait empathic concern ( $\alpha = 0.74$ ). Results for each lab can be found in the Supplementary Material 4.3.2.<sup>18</sup> As internal reliability was inadequate for the personal distress score ( $r < 0.65$ ), we also computed the specific model for the two items separately and compared results but did not observe any substantial differences (see Supplementary Material 4.4.1). For our main models, factors were coded using effects coding,

<sup>17</sup> In the main manuscript we only report cases in which the effect size was statistically equivalent to zero. Additional information on equivalence tests can be found in the Supplementary Material 4.4.11.

<sup>18</sup> In addition, reliabilities using Spearman-Brown and McDonald's Omega are presented in the Supplementary Material 4.3.2.1.

and continuous variables (perceived appropriateness, group identification, and trait empathic concern) were grand mean-centered.

### 14. Measurement equivalence

The topic of measurement equivalence is of high importance in cross-cultural research (Van de Vijver & Tanzer, 2004). It tries to address the question of whether measures are completed similarly across different languages and cultures and is an important prerequisite for comparing effect sizes or mean ratings. However, adequate model fit for *strict* or *scalar* equivalence, referring to equal intercepts, thereby allowing the comparison of mean scores, has low practical applicability especially given a high number of countries as in the present project (Byrne, Shavelson, & Muthén, 1989). Therefore, we tested for partial measurement equivalence for the main outcome measure (intention to support) across countries using the *semTools* package (Jorgensen et al., 2018). We observed an adequate model fit for the metric solution (CFI = 0.993, RMSEA = 0.077; detailed results can be obtained in the Supplementary Material 4.4.2), thereby indicating partial equivalence (He & van de Vijver, 2012). Therefore, we included all countries and samples in our final analyses.

An overview of the mean ratings and the respective standard deviations for each variable across the situations (neutral, negative tears, and positive tears) across all samples is provided in Table 2. In addition, correlations among all main variables separately for the occurrence of tears and the three types of situations are provided in Supplementary Table 4.4.3. Information for individual labs can be found in the Supplementary Material 4.4.4.

### 15. Confirmatory analyses

#### 15.1. H1/H1b. Tearful targets induce support intentions

In our main model (H1), we added the intention-to-support score as the dependent variable and the occurrence of tears as the independent variable (contrast coded:  $-0.5 = \text{no tears}$ ,  $0.5 = \text{tears}$ ). We added participants nested in country, as well as targets nested in ethnicity, as random effects, and allowed their intercepts to vary randomly. We observed a significant main effect of occurrence of tears (Table 3); pictures including tearful individuals received higher support intention ratings ( $M = 3.93$ ,  $SE = 0.06$ ) than individuals showing no tears ( $M = 3.22$ ,  $SE = 0.06$ ). Running a random-effects meta-analysis, we observed an overall effect size of  $d = 0.49$  [0.43, 0.55] (Fig. 2). Our findings thereby provide support for H1, that participants report more

**Table 3**  
Overview of different H1 models.

Predictors		B [95% CI]	$\beta$ [95% CI]	$p_{adj}$
Model H1 (Intercept)		3.57 [3.45, 3.70]	0.03 [-0.05, 0.11]	<0.001
Occurrence of Tears (OT)		0.71 [0.68, 0.73]	0.47 [0.45, 0.49]	<0.001
Model H1b (Intercept)		3.57 [3.45, 3.69]	0.03 [-0.05, 0.11]	<0.001
Occurrence of Tears (OT)		0.70 [0.67, 0.72]	0.47 [0.45, 0.48]	<0.001
Situational Valence (SV)	Contrast A	0.35 [0.32, 0.38]	0.24 [0.22, 0.26]	<0.001
	Contrast B	0.59 [0.55, 0.62]	0.39 [0.37, 0.42]	<0.001
OT x SV	Contrast A	-0.21 [-0.27, -0.15]	-0.14 [-0.18, -0.10]	<0.001
	Contrast B	0.01 [-0.06, 0.08]	0.01 [-0.04, 0.05]	>0.999
Random Effects	H1	H1b		
$\sigma^2$	1.16	1.07		
$\tau_{00}$ ID:Country	0.84	0.86		
$\tau_{00}$ Stimulus:Ethnicity	0.02	0.02		
$\tau_{00}$ Country	0.09	0.09		
$\tau_{00}$ Ethnicity	0.01	0.01		
ICC	0.45	0.48		
$N_{ID}$	7004	7004		
$N_{Country}$	41	41		
$N_{Stimulus}$	100	100		
$N_{Ethnicity}$	5	5		
Observations	24,867	24,867		
R2 (marg./cond.)	0.056/ 0.481	0.095/0.527		

Note. Occurrence of tears (-0.5: no tears, 0.5: tears); Situational Valence (contrast A: 0.33: negative, -0.66: neutral, 0.33: positive; contrast B: -0.50: negative, 0: neutral, 0.50: positive).

willingness to support tearful individuals than individuals not showing tears. Although we consistently found the effect in all samples, we observed a high level of heterogeneity,  $Q(40) = 159.92, p < .001, I = 80.45 [72.48, 90.17]$ . This suggests that there are differences between cultures and/or samples.

In a different model (H1b) using the same random effects, we added situational valence (coded by two orthogonal contrasts: contrast A: -0.66 = neutral, 0.33 = negative, 0.33 = positive; contrast B: 0 = neutral, 0.5 = negative, -0.5 = positive) in addition to the occurrence of tears and their interaction. In H1b, we predicted tears to increase social support in all situations. We observed significant main effects for both occurrence of tears and situational valence (Table 3). Negative situations received the strongest support intention ratings ( $M = 3.98, SE = 0.06$ ), followed by positive ( $M = 3.39, SE = 0.06$ ) and neutral situations ( $M = 3.34, SE = 0.06$ ). In addition, we observed a significant interaction effect between the occurrence of tears and contrast A. The effect of tears on social support intentions was stronger for neutral than for negative and positive situations (see Fig. 3, panel A). There was no significant interaction effect between the occurrence of tears and the situational valence contrast B. Therefore, these findings partly support H1b, as we did not expect significant interaction effects between the occurrence of tears and situational valence. Nevertheless, the key part of H1b was confirmed in that we found a social support effect in each of the situations with different valence. The interaction we found suggests that few people offer social support to someone in a neutral situation unless they display a tear (while they might already offer help to those in a negative situation, even if they do not cry).

### 15.1.1. Robustness checks of main result

We ran two (pre-registered) robustness checks of our main results in H1, by including a key sample characteristic (whether the sample used students or non-students as respondents), and whether results are robust if we compared the response to the first picture presentation to the ones that were presented later (2nd, 3d, or 4th). Details on these analyses are presented in the Supplementary Material 4.4.5. Rerunning the random-effects meta-analysis of the main model, comparing student and non-student participants, we found slightly stronger effects for students ( $d = 0.50 [0.44, 0.56]$ ) in contrast to non-students ( $d = 0.47 [0.40, 0.54]$ ). Similarly, we observed a smaller effect size when focusing on the first targets only ( $d = 0.30 [0.24, 0.34]$ ) in contrast to targets appearing second, third or fourth ( $d = 0.56 [0.49, 0.62]$ ). When exploring the interaction of order with the occurrence of tears, we observed that ratings for tearful individuals were similar, while ratings of intention to support towards non-tearful individuals decreased for targets appearing second and later. The key findings are that the results are robust for these factors.

### 15.2. H2. Parallel mediation by perceived warmth, helplessness, and connectedness

First, using the same model as in H1, we tested whether tearful individuals were perceived as warmer and more helpless and whether participants felt more connected to them. For all measures, we observed significant main effects for the occurrence of tears (see Supplementary Material 4.4.6). Employing a random-effects meta-analysis, we found that tearful individuals were perceived as warmer ( $d = 0.51 [0.46, 0.56]$ ), more helpless ( $d = 1.18 [1.06, 1.31]$ ), and participants felt more strongly connected to them ( $d = 0.36 [0.31, 0.41]$ ).<sup>19</sup> For the mediation model, we constructed three different multilevel models: *path a*, *paths b & c'*, and *path c* (see Fig. 4). For *path a*, we employed the occurrence of tears as the independent variable and perceived warmth, perceived helplessness, and the IOS score as the dependent predictors using three separate models.<sup>20</sup> For *paths b* and *c'*, we regressed intention to support on perceived warmth, perceived helplessness, IOS, and occurrence of tears. Finally, *path c* was estimated by the model fitted in H1. To construct a 95% confidence interval around the indirect effect (*path a* \* *path b*), we employed a Monte Carlo simulation (Falk & Biesanz, 2016).<sup>21</sup>

In H2, we predicted that perceived warmth, helplessness, and connectedness would show a positive indirect effect on the relationship between the occurrence of tears and support intentions. We observed a parallel mediation of the effect of tears on support intentions by perceived warmth, helplessness, and connectedness (Fig. 4), and each indirect effect was positive and statistically significant. We thus confirm the predicted mediation that tears increase perceived warmth, helplessness, and connectedness of the target, all of which in turn increase the intention to provide social support.

H2 thus received support: the tearfulness of individuals resulted in higher perceived warmth, helplessness, and connectedness, which, in its turn, was associated with higher support intention ratings. Effects were strongest by perceived helplessness and smaller by perceived warmth and connectedness.

<sup>19</sup> Additionally, we repeated the moderation model used for H4-7 that we present next with each of the three mediating variables as the dependent variable separately in an exploratory fashion. Results can be found in the Supplementary Material 4.4.8.

<sup>20</sup> We originally registered to employ a *g*lmer binomial model by including occurrence of tears as the dependent and all mediators as the predictors in one model. However, we later realized that this model was incorrect.

<sup>21</sup> The program can be obtained from: <http://www.psych.mcgill.ca/perpg/fac/falk/mediation.html#CIcalculator>

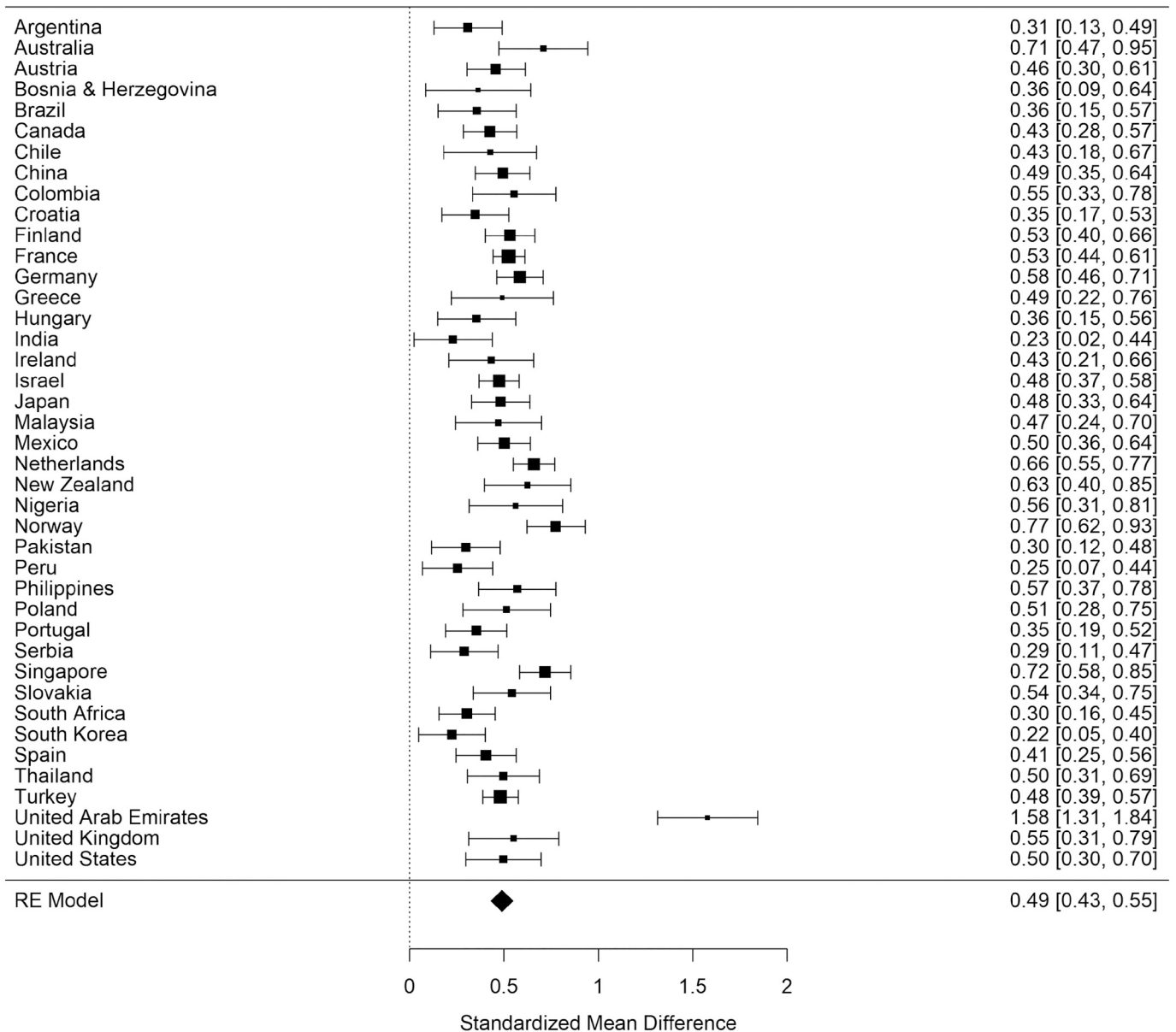


Fig. 2. Forest plot presenting random-effects meta-analysis of social support intentions for the occurrence of tears on a country level. Intervals present 95% CIs.

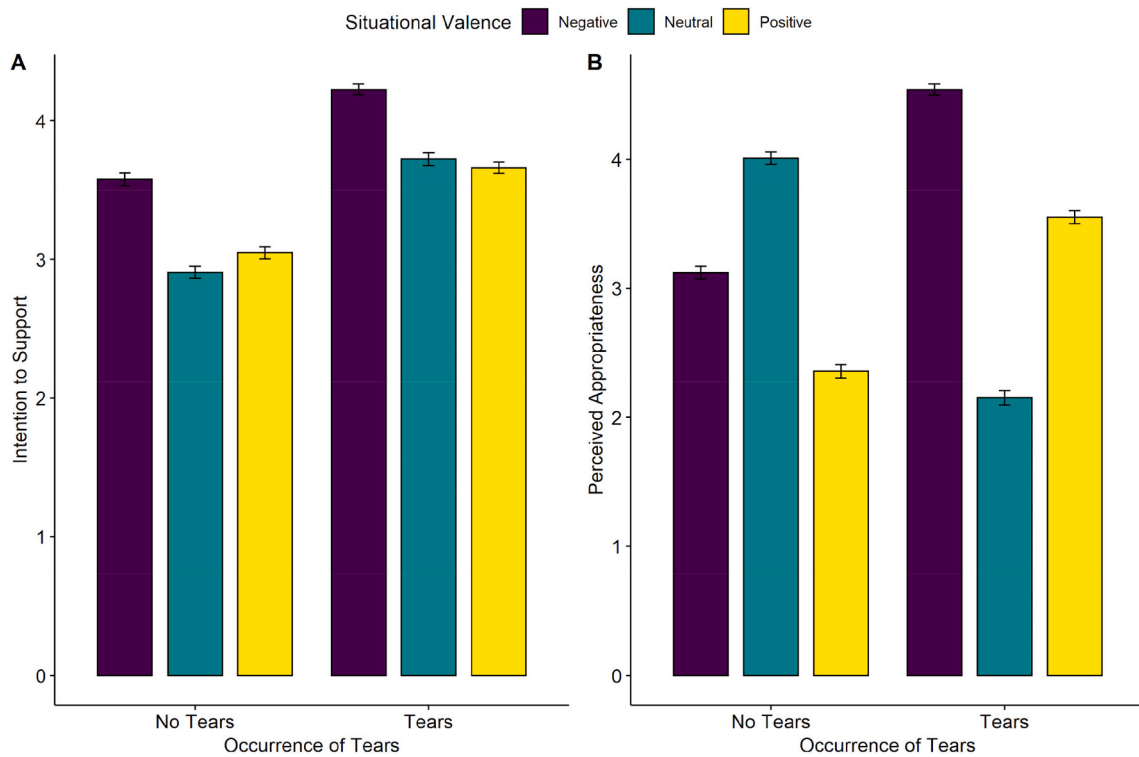
15.3. H2b. Parallel mediation by state empathic concern and personal distress

To test state empathic concern and personal distress as mediating variables, we employed the same procedure as outlined in H2 (see Fig. 5). The occurrence of tears was used as the independent variable, state empathic concern and personal distress as the mediators, and intention to support as the dependent variable. In H2b, we predicted that the relationship between the occurrence of tears and support intentions would be mediated by state empathic concern, but not by state personal distress. We observed a parallel mediation by states of empathic concern and a very small one for personal distress (Fig. 5). Using equivalence testing, we observed that the state personal distress indirect effect was significantly smaller than our SESOI (Supplementary Material 4.4.9). Following our a priori criteria, we thus interpret the effect via personal distress as a null-effect. The reason why personal distress did not mediate the effect of the manipulation of tears on support intentions was that personal distress only had a small effect on support intentions when controlling for empathic concern. So although participants felt some personal distress when they saw others cry, this

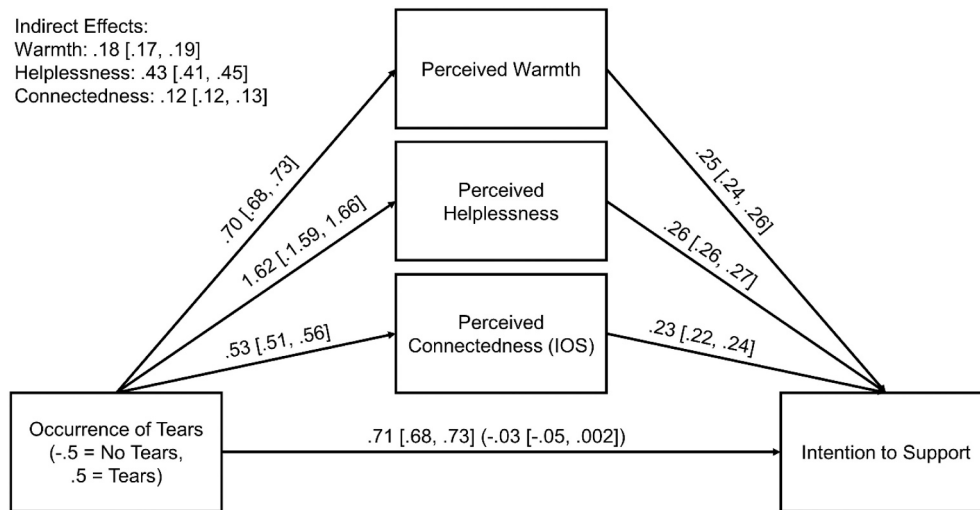
was not the reason why they reported intentions to help them. Rather, it was the empathic concern participants felt for the crier that was associated with the support intentions, thereby supporting H2b.

15.4. H3. Mediation by perceived appropriateness

Using the same procedures as outlined in H2, we tested whether perceived appropriateness mediated the effect of the occurrence of tears with the situational valence interaction on perceived warmth, helplessness, and connectedness (see Fig. 6). We performed three separate models with perceived warmth, helplessness, and connectedness as the dependent variables, the interaction between the occurrence of tears and situational valence as the independent variable, and perceived appropriateness as the mediator. For these models, we also included the main effects of the occurrence of tears and situational valence. For path a, we employed the occurrence of tears x situational valence interaction as the independent variable and perceived appropriateness as the dependent variable. For path b and c', we regressed perceived warmth (or in the other models perceived helplessness or connectedness) on perceived appropriateness and the interaction between the occurrence



**Fig. 3.** Representations of (A) the interaction between the occurrence of tears and situational valence on intentions to support, (B) the interaction between the occurrence of tears and situational valence on perceived appropriateness. Error bars represent 95% confidence intervals.



**Fig. 4.** Overview of parallel mediation of the relationship between the occurrence of tears and support intentions. Coefficients represent unstandardized estimates. Estimate in parentheses represents the direct effect when controlling for the mediators. 95% confidence intervals are presented.

of tears and situational valence. For path c, we used the model described in H1b with perceived warmth, helplessness, or connectedness as the dependent variable. This model basically represents a conditional process analysis with path a being moderated. An overview of all models is provided in Fig. 6.

In H3, we predicted that appropriateness would be higher in matching situations (displaying tears in negative and positive situations, not showing tears in the neutral situation) and that appropriateness would, in turn, affect warmth, helplessness, and connectedness. Figure 6 confirms the matching effect on appropriateness, and displays the results of the indirect effect of the interaction between the occurrence of tears and situational valence via perceived appropriateness on perceived warmth, helplessness, and connectedness. Mediations were confirmed in all cases;

perceptions of appropriateness affected the outcome variables. However, the direct effect between the occurrence of tears x situational valence interaction and the three outcome variables remained statistically significant in all three models. Therefore, our findings partly support H3.

**15.5. H4–7. Moderating effects on support intentions**

In addition, we tested the influence of several variables on the effect tears have on support intentions. Again, we used the intention-to-support score as the dependent variable. As a factor, we added the occurrence of tears. We also added social context (H4; -0.5 = public, 0.5 = private), target gender (H5; 0.5 = female, -0.5 = male), and the

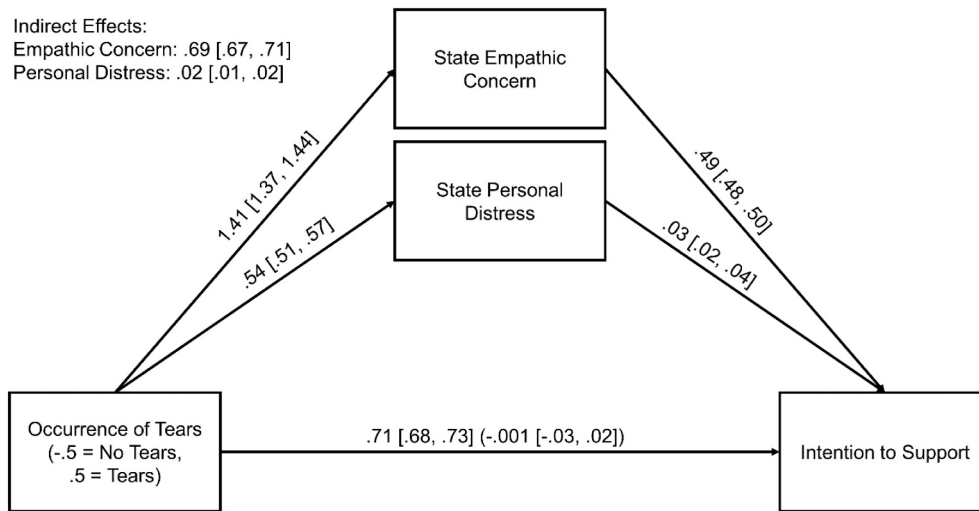


Fig. 5. Overview of parallel mediation of the relationship between occurrence of tears and support intentions. Coefficients represent unstandardized estimates. Estimate in parentheses represents direct effect when controlling for the mediators. 95% confidence intervals are presented.

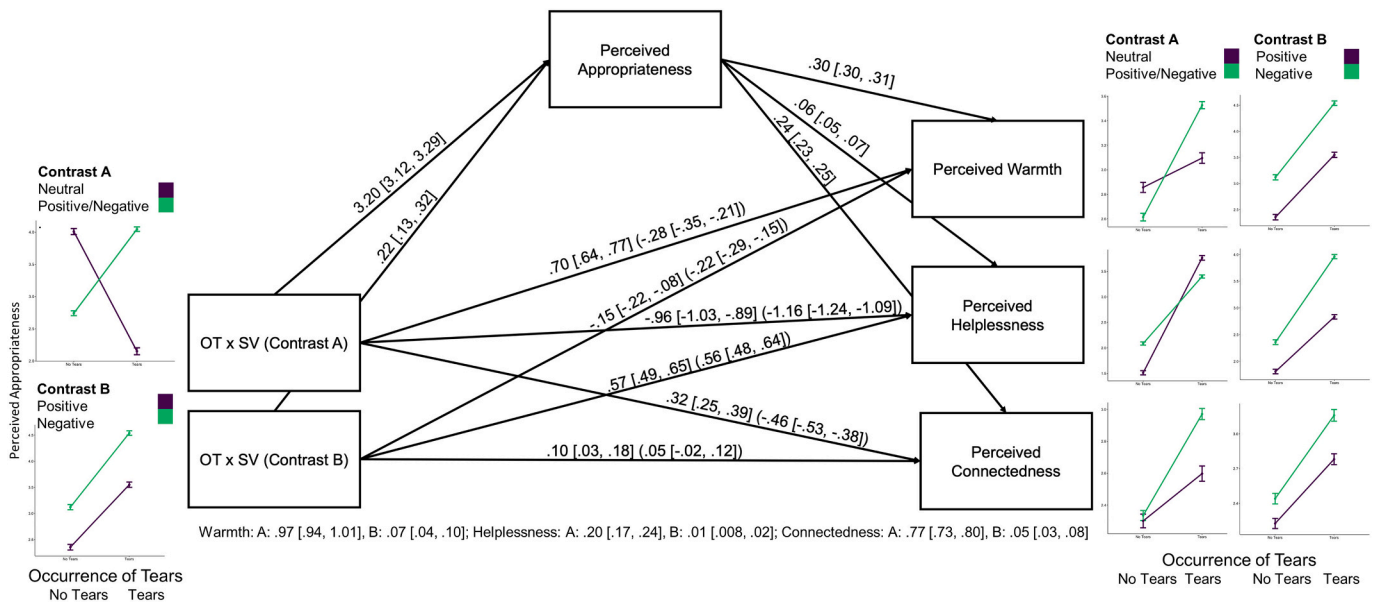


Fig. 6. Overview of mediation model. Coefficients represent unstandardized estimates. Estimate in parentheses represents direct effect when controlling for the mediators. 95% confidence intervals are presented. Indirect effects are printed below the model. OT = Occurrence of Tears (−0.5 = no tears, 0.5 = tears), SV = Situational Valence (contrast A: 0.33 = negative, −0.66 = neutral, 0.33 = positive; contrast B: 0.5 = negative, 0 = neutral, −0.5 = positive).

gender of the participant (0.5 = female, −0.5 = male).<sup>22</sup> As covariates, we added the trait empathic concern score (H6) and group identification as measured by the degree of subjective inclusion of the pictured target in the participant’s in-group (H7). As two-way interactions, we included all interactions with the occurrence of tears and the interaction between target gender and gender of the participant (H5b). An overview of the model can be found in Table 4.<sup>23</sup>

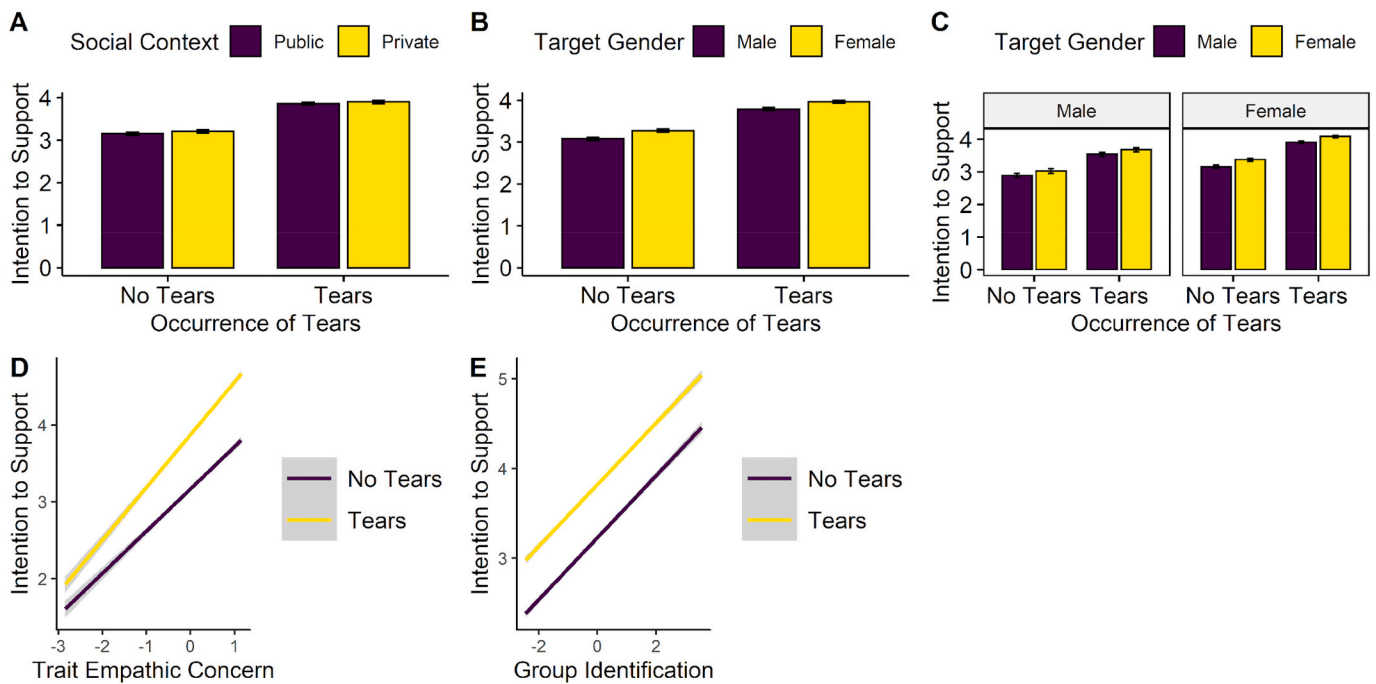
<sup>22</sup> As registered, we excluded *other* as a category in targeting the gender of the participants, as less than 5% of the total sample indicated this option.

<sup>23</sup> We later realized that our hypotheses did not explicitly state that they would control for the other variables. Therefore, our registered model did not fit our hypotheses perfectly. We decided to rerun all hypotheses in five separate models, which can be found in the Supplementary Material 4.4.12. In general, we observed no differences from the joint model. The main difference was that the group identification x occurrence of tears interaction was not statistically significant anymore, though the effect was in the same direction.

We again observed the robust significant main effect of occurrence of tears – tearful individuals received stronger support intentions ( $M = 3.85, SE = 0.06$ ) than non-tearful photographs ( $M = 3.24, SE = 0.06$ ). We did not find support for H4; there was no significant main effect of social context (whether people were presented in a private or public setting), nor was there an interaction of this social context with the manipulation of whether a tear was present or not (Fig. 7A).

We found a significant effect of target gender, in that intentions to support female targets were slightly higher ( $M = 3.61, SE = 0.06$ ) than for male targets ( $M = 3.48, SE = 0.06$ ), but this effect was rather small ( $d = 0.09 [0.06, 0.11]$ ). This effect was significantly smaller than the SESOI, so it should be interpreted as the absence of an effect. Target gender also did not interact with the occurrence of tears, so the support intentions evoked by tears are of the same magnitude for female and male targets (Fig. 7B). Hypothesis 5 is thus not confirmed.

Similarly, on average female participants indicated higher intentions to support ( $M = 3.60, SE = 0.06$ ) in contrast to male participants ( $M =$



**Fig. 7.** Representations of (A) moderation of H1 (tear → social support intentions) effect by social context, (B) moderation of H1 effect by target gender, (C) three-way interaction between the occurrence of tears, target gender, and the gender of the participant on the intention to support, (D) interaction between the occurrence of tears and trait empathic concern on the intention to support, and (E) interaction between the occurrence of tears and group identification on the intention to support. Interactions in D and E were statistically significant. Error bars represent 95% confidence intervals.

3.49, *SE* = 0.06). Again, this effect was rather small (*d* = 0.07 [0.04, 0.11]) and statistically smaller than the SESOI. It also did not interact with the occurrence of tears, so it is not the case that females or males responded differently to seeing others cry. Finally, there was no interaction of target gender with respondent gender, rejecting Hypothesis 5b (Fig. 7C).

Both trait empathic concern (*r* = 0.23 [0.21, 0.24]) and group identification (*r* = 0.32 [0.29, 0.32]) showed positive associations with support intentions. We also observed statistically significant interaction effects for the occurrence of tears with trait empathic concern, as the social support effect due to tears was stronger for individuals scoring high on trait empathic concern but still present for those who score low on this trait (Fig. 7D, Supplementary Material 4.4.9), confirming Hypothesis 6. We also found a small but significant interaction of the occurrence of tears with group identification on support intentions: the social support effect due to tears was smaller for individuals indicating high group identification (Fig. 7E). Hypothesis 7 predicted that tears would still evoke help in people that identify with the target less (albeit it to a lesser degree than for in-group members), but we see that tears lead to a slightly stronger social support effect with perceived out-group members (Supplementary Material 4.4.9).

Note that we did not test all possible interactions that combine these possible moderators. The main reason is that there were a large number of interactions for which we did not have specific hypotheses. We fully realize that possible other interactions exist and that those could be of interest to other researchers. As the data are publicly available, other researchers can explore additional hypotheses of interest.

### 16. Exploratory analyses

To explore the potential impact of culture on the social-support effect (the increase in social support when a tear is displayed when it is not), we re-ran our main model (H1), accounting for several country-level indices that have been related to emotional expressiveness or responsiveness, social support, or other important aspects (Supplementary

Material 3.1). As we only had specific hypotheses for some of them, we treated this from an exploratory angle. In total, we focused on 21 different country-level variables that are presented in their entirety in the Supplementary Material 3.<sup>24</sup> To reduce overfitting, we used a split-half cross-validation technique by randomly dividing the full dataset into two halves (IJerman et al., 2018).

Before running the algorithm, we checked for extreme effect sizes using the robust median absolute deviation (Leys, Ley, Klein, Bernard, & Licata, 2013) and identified the effect from the United Arab Emirates as an extreme point, which in turn was removed for these analyses. On the first half of the data, we employed a random forest algorithm for meta-analyses using the *MetaForest* package (Van Lissa, 2020). Random forest represents a supervised machine learning approach that has several strengths compared to classical regression analyses as it is naïve to the direction of effects, can include higher-order interactions, is non-parametric, and can overcome problems with multicollinearity (see IJerman et al., 2018). It then explores and identifies moderators according to their importance (i.e., the amount of heterogeneity they explain). Following Van Lissa (2020), we first checked for model convergence and identified that our model converged at around 5000 number of trees and then selected variables for which the 50% percentile interval of the variable importance statistic does not include zero, which resulted in excluding *Openness*. Based on a 10-fold clustered cross-validation, we selected the optimal tuning parameters for the model, which resulted in a fixed-effects model with six variables considered at

<sup>24</sup> Originally, we planned to include 32 different country-level variables, but 11 variables could not be included due to missing data for some countries. The original variables can be found in the Supplementary Material 3.1. In addition, we originally planned to identify important variables in a first step by including all moderators in a meta-regression model. We changed this approach due to two reasons. First, it was not possible to fit the proposed model as it included more parameters than observations. Second, the random forest approach represents a superior way of exploratorily selecting moderator variables by reducing overfitting (Van Lissa, 2020).



**Table 4**  
Overview of the moderation model for H4–7.

Predictors	B [95% CI]	$\beta$ [95% CI]	$P_{adj}$
(Intercept)	3.54 [3.43, 3.65]	0.02 [−0.06, 0.09]	<0.001
Occurrence of Tears (OT)	0.61 [0.58, 0.64]	0.41 [0.39, 0.43]	<0.001
Target Gender (TG)	0.13 [0.08, 0.17]	0.09 [0.06, 0.11]	<0.001
Social Context (SC)	0.00 [−0.03, 0.03]	0.00 [−0.02, 0.02]	>0.999
Respondent Gender (RG)	0.11 [0.05, 0.16]	0.07 [0.04, 0.11]	0.001
Group Identification (GI)	0.30 [0.29, 0.32]	0.32 [0.31, 0.33]	<0.001
Trait Empathic Concern (tEC)	0.50 [0.46, 0.53]	0.23 [0.21, 0.24]	<0.001
OT x TG	0.01 [−0.05, 0.06]	0.00 [−0.04, 0.04]	>0.999
OT x SC	0.01 [−0.04, 0.07]	0.01 [−0.03, 0.05]	>0.999
OT x RG	0.02 [−0.03, 0.08]	0.02 [−0.02, 0.06]	>0.999
OT x GI	−0.03 [−0.05, −0.01]	−0.03 [−0.05, −0.02]	0.001
OT x tEC	0.08 [0.04, 0.12]	0.04 [0.02, 0.06]	0.005
TG x RG	−0.04 [−0.10, 0.03]	−0.02 [−0.07, 0.02]	>0.999
<b>Random Effects</b>			
$\sigma^2$	1.06		
$\tau_{00}$ ID:Country	0.55		
$\tau_{00}$ Stimulus:Ethnicity	0.01		
$\tau_{00}$ Country	0.05		
$\tau_{00}$ Ethnicity	0.01		
ICC	0.37		
$N_{ID}$	6369		
$N_{Country}$	41		
$N_{Stimulus}$	100		
$N_{Ethnicity}$	5		
Observations	23,656		
R2 (marg./cond.)	0.240/ 0.521		

Note. Occurrence of tears (−0.5: no tears, 0.5: tears); Target Gender (−0.5: male; 0.5: female); Social Context (−0.5: public, 0.5: private); Respondent Gender (−0.5: male, 0.5: female).

the split of each tree and a minimum of three variables that needed to remain in a tree group after being split. We observed that our final model converged and could explain  $R^2_{oob} = 13.6\%$  of the variance in new data. Variable importance and partial dependencies of moderator variables can be found in the Supplementary Material 4.4.10. We found that variables including the human development index, social support, a country’s GDP, extraversion, and subjective well-being showed the highest variable importance, while moderators such as historical heterogeneity of migration, the amount of urban population, life expectancy, or climate demandingness showed a negative importance.

For the second half, we ran several meta-regressions using only the predictors indicating a higher variable importance than zero from the first half dataset one-by-one. We inspected the amount of heterogeneity explained by the combined and individual moderators. We set our alpha level at 0.005. An overview of moderators and their contribution by decreasing order of variable importance is provided in Table 5. We observed that higher GDP per capita increased the effect of tears on social support intentions, as did higher subjective well-being. In addition, there was suggestive support that a high HDI increased social support intention scores, higher education, and reduced religiosity explained some heterogeneity, although these were not statistically significant at the 0.005 level.

Notably, there are many additional cross-country variables that

might be considered as potential moderators for the main effects. We encourage researchers to explore such associations as the data is publicly available.

## 17. Discussion

The current project represents the most comprehensive test of the hypothesis that tears evoke social support intentions. Across 7007 participants, 24,886 ratings, and 41 countries from all populated continents, we observed consistent evidence that being exposed to tearful faces evokes the intention to support the crier (compared to seeing the same face without tears). While we found specific mediators and moderators of this effect, the effect was never lower than the SESOI we had a priori set ( $d = 0.20$ ). An overview of specific hypotheses and their findings is provided in Table 6.

## 18. Tears evoke the intention to support

We observed a robust effect size of  $d = 0.49$  [0.43, 0.55] that seeing someone shed tears evoked more intentions to provide social support than when someone did not display tears. When we include our sample to existing studies in a meta-analysis, the effect is similar,  $d = 0.56$  [0.47, 0.65] (see Supplementary Fig. 4.6.1). The magnitude of that effect reflects mean effect sizes typically observed across social psychology (Richard, Bond, & Stokes-Zoota, 2003; Schäfer & Schwarz, 2019) and can, therefore, be regarded as substantial. Our findings support the idea that tears act as a social glue and their likely importance for attachment and bonding (e.g., Bowlby, 1982; Nelson, 2005; Radcliffe-Brown, 1922; Zeifman, 2012).

Although effect sizes differed across countries, as discussed in more detail below, the intention to support effect of tears manifested itself in all samples. Therefore, it is possible to assume a common basis associated with responses when observing other people crying. This could be based on evolutionary aspects, as discussed by Walter (2006), or simply refer to social scripts that are embedded in all of the tested countries. It is intriguing that humans probably are the only species that produce tears when crying (Vingerhoets, 2013). The universality of this effect of tears in observers is consistent with theories by Hasson (2009) and Walter (2006), who argued that, through natural selection, the secretion of visible tears was favored as it signals the need for help, thereby instigating bonding and interpersonal connections. Hasson and Walter argue that it may be that tears are one factor contributing to the development of humans as an ultrasocial species. The present data cannot prove such

**Table 5**

Overview of the different predictors trying to explain the heterogeneity in effect sizes.

Predictor	Estimate	[95% CI]	$p$	$R^2$
Human Development Index (HDI)	0.06	[0.01, 0.10]	0.009	0.41
Social support	0.06	[0.01, 0.10]	0.008	0.44
GDP	0.07	[0.03, 0.11]	<0.001	0.72
Extraversion	0.02	[−0.03, 0.06]	0.483	0
Subjective Well-Being (SWB)	0.06	[0.02, 0.10]	0.002	0.54
Uncertainty avoidance	−0.03	[−0.08, 0.01]	0.114	0.08
Masculinity	0.00	[−0.04, 0.04]	0.998	0
Neuroticism	−0.02	[−0.07, 0.02]	0.291	0
Religiosity	−0.05	[−0.09, −0.00]	0.035	0.28
Education	0.04	[0.00, 0.09]	0.046	0.19
Individualism	0.04	[−0.01, 0.08]	0.101	0.08
Conscientiousness	0.01	[−0.04, 0.05]	0.813	0
Population density	0.04	[−0.01, 0.08]	0.086	0.15
Agreeableness	0.02	[−0.03, 0.06]	0.436	0
Employment in agriculture	−0.04	[−0.08, 0.01]	0.108	0.10

Note. Predictors are presented in decreasing order of variable importance as observed in the first half. All predictors were standardized.  $R^2$  represents the amount of explained heterogeneity.

**Table 6**  
Overview of hypotheses and the specific finding.

Hyp.	Prediction	Type	Finding	Decision	See
H1	Higher intention to support (SUP) for display of tears vs. not (TEAR)	Confirmatory	Tearful targets evoked higher support intentions	Confirmed	T3
	Robustness test of H1 for occupation	Auxiliary	Slightly stronger effects for students	–	SM4.4.5
	Robustness test of H1 for presentation order	Auxiliary	Smaller effect for first targets than later targets	–	SM4.4.5
H1b	SUP highest for negative situations > positive > neutral	Confirmatory	Negative situations received the strongest support intention ratings, followed by positive and neutral situations	Confirmed	T3, F3
	TEAR increases SUP in all valence situations (SV)	Confirmatory	We found the H1 effect for each valence	Confirmed	F3
	We expect no interaction between TEAR and SV	Confirmatory	Significant negative interaction between tears and comparing neutral against positive/negative situations	Rejected	T3, F3
H2	Effect of TEAR on SUP mediated by perceived warmth, helplessness, and connectedness	Confirmatory	Positive significant indirect effect found by warmth, helplessness, and connectedness	Confirmed	F4
H2b	Effect of TEAR on SUP mediated by state empathic concern, but not personal distress	Confirmatory	Positive significant indirect effect by state empathic concern, small effect by personal distress, though equivalent to zero	Confirmed	F5
H3	Interaction effect of TEAR and SV on perceived warmth, helplessness, and connectedness mediated by perceived appropriateness	Confirmatory	Positive indirect effects for both interactions (comparing neutral vs. positive/negative and positive vs. negative), though the direct effect remained significant	Confirmed	F6
H4	Interaction effect between Social Context (SC) and TEAR on SUP	Confirmatory	No significant interaction between context and tears	Rejected	T4, F4
H5	Main effect of target gender (TG) on SUP	Confirmatory	Significant main effect, but one smaller than our smallest effect of interest	Rejected	T4, F4
H5b	Interaction between TG and respondent gender (RG) on SUP	Confirmatory	No significant interaction between target and respondent gender	Rejected	T4, F4
H6	Positive main effect of trait empathic concern (tEC) on SUP	Confirmatory	Significant positive main effect of tEC on SUP	Confirmed	T4
	TEAR increase SUP for individuals low on tEC	Confirmatory	Significant interaction between TEAR and tEC, but tears evoked still stronger support for individuals low on tEC	Confirmed	T4, F4, SM4.4.9
H7	Positive main effect of group identification (GI) on SUP	Confirmatory	Positive significant main effect of GI on support	Confirmed	T4
	Interaction effect between GI and TEAR on SUP	Confirmatory	Significant interaction effect, though against prediction the effect of tears on support was stronger for targets with whom one identified less	Rejected	T4, F4, SM4.4.9
–	Country-level variables moderating effect in H1	Exploratory	Country-level GDP and subjective well-being moderated effects	–	T5

Note. SUP = intention to support, TEAR = occurrence of tears, SV = situational valence, SC = social context, TG = target gender, RG = respondent gender, tEC = trait empathic concern, GI = group identification. All confirmatory hypotheses were registered. Final column (labeled See) shows in which Table (T), Fig. (F), or Supplemental Material (SM) the results can be found.

a theory, but the universality of the tear effect is consistent with that idea. Similarly, providing social support to criers can help to regulate the crier's arousal and mood, restoring homeostasis by bonding (Bylsma et al., 2008). If humans have evolved the capacity to shed tears, they would have also needed to evolve the ability to recognize and evaluate tears in others. Such processes have likely developed in tandem, but it is possible that a reduced ability to shed tears is also associated with a lowered understanding of others' crying. For instance, as observed in the current project, and as discussed later, individuals characterized low on empathy show low intentions to engage in social support. It is therefore likely that not only individuals shedding tears are perceived as warmer, but also that they are more likely to adequately respond to this potent signal themselves. Thereby, the ability to recognize and respond to tears might have evolved as it also contributed to the ultrasocial nature of humans (Hasson, 2009; Walter, 2006).

Given the current findings and previous theoretical ideas, we propose that tears present a universal social signal to instigate and form attachment or bonds between individuals (see also Gračanin et al., 2018). This proposal is supported by the fact that tears are most frequent during helpless periods of human development (Rottenberg & Vingerhoets, 2012; Zeifman, 2012), further corroborating the idea that their main function is to recruit social support. How tears transmit such a social signal and on which individual, situational, and cultural variables it depends, will be discussed in the next sections.

### 18.1. Why do tears evoke the intention to support?

In the current project, we found that people perceive crying targets to be more helpless and warmer and feel more connected to them. This mediated the relationship between our main manipulation of the presence of a tear and the intention to support (which replicates previous theoretical and empirical findings, e.g., Provine et al., 2009; Vingerhoets

et al., 2016; Van de Ven et al., 2017, with a comprehensive sample from all over the world). Similar to Vingerhoets et al. (2016), we found that the indirect effect via perceived helplessness was strongest. Finally, we confirmed our prediction that empathic concern for the crier, but not experiencing distress oneself when seeing someone else cry, would evoke support intentions. Our findings suggest that, in the present paradigm, concern for the crier played a much stronger role in driving social support intentions than concern for regulating one's own feelings.

What do these findings imply for our understanding of why tears might lead to social support? First, tears evoked social support intentions as observers thought the person shedding a tear was seen as more helpless. Tears have been stereotypically linked to the emotion of *sadness* (e.g., Balsters et al., 2013; Cordaro et al., 2016), which is often theorized as a low agency emotion (Ellsworth & Smith, 1988). Furthermore, theories have argued that the main reason for crying represents a feeling of helplessness and being overwhelmed (Vingerhoets & Bylsma, 2016). Tears might be perceived as the ultimate response for someone to cope with high negative or positive arousal (Vingerhoets, 2013), and this overload can then be signaled by the secretion of tears (Murube et al., 1999). Importantly, our measure of perceived helplessness combined the items measuring helplessness, sadness, and feeling overwhelmed into one measure, which turned out to be a reliable construct. To us, this confirms that, what formerly might have been attributed to sadness, is actually part of this broader construct of helplessness. This is also the more parsimonious explanation, as it helps to explain why we see social support intention responses to tears also in positive situations, where sadness itself is less likely. Still, the effect of helplessness was smallest for positive situations and strongest for neutral ones – when the reason for the crying was not clear to the observer (see Supplementary Material 4.4.5). It seems plausible that individuals shedding tears of joy can be perceived as overwhelmed but less likely to be sad (Zickfeld et al., 2020). Another possible reason for

this is the role of appropriateness (see next section).

A second key finding is the role of perceived warmth: tearful individuals are perceived as warm, possibly because they are overwhelmed by their feelings and arousal and do not represent an imminent threat (Fiske, Cuddy, & Glick, 2007). Thereby, they present a possible target whom people can easily approach for bonding. As Fiske and colleagues (2007) argue, individuals high on warmth and low on competence will be met with pity. However, there is inconclusive evidence whether tearful individuals are perceived as low on competence, and this possibly differs across situational valence (Zickfeld et al., 2018).

We observed the smallest indirect effect for feeling connected to the crier as measured by the inclusion-of-the-other-in-the-self scale. Individuals might feel more connected to someone crying, as tears highlight a basic and possibly unique function that is shared among all humans. Indeed, sharing distress has been found to increase social support via increased connectedness (e.g., Vezzali, Drury, Versari, & Cadamuro, 2016). Importantly, the current paradigm focused on responses to strangers shedding tears. The effect of feeling connected might be more important when observing close others crying.

Finally, we observed that feelings of empathy in the observer fully mediated the link between tears and the intention to support. According to an influential theory, empathy-induced helping can be caused by either empathic concern or personal distress (Batson, Fultz, & Schoenrade, 1987). Both feelings are induced by perceiving another person in need, in our study operationalized as perceived helplessness, but while empathic concern represents a sympathetic and altruistic response towards the needy target, personal distress results in helping due to decreasing discomfort, thereby presenting an egoistic motivation to help. We observed a much stronger effect of empathic concern, while the effect of personal distress was negligible, suggesting that social support intentions evoked by emotional tears might represent a form of genuine altruism. Individuals might act because they want to alleviate the crier's distress, not their own (Batson, Fultz, & Schoenrade, 1987; Bobowik, Dorozuk, Slawuta, & Basabe, 2020). However, caution should be applied before generalizing these findings to other contexts and situations. It is possible that personal distress plays a more important function when observing tears shed by close others. In the present project we focused on reactions towards crying strangers that may entail fewer feelings of distress because they are perceived as less close and might induce less discomfort. Future studies should investigate whether empathic concern plays a more important role when manipulating the relationship with the crier.

### 18.2. The role of appropriateness of tears

We predicted that an important factor influencing whether tearful individuals are perceived as more helpless and as warmer and whether people feel more connected to them was the perceived appropriateness of the crying reaction. We confirmed that when crying was perceived as more appropriate to the situation (i.e., tears in positive and negative situations increased appropriateness, compared to tears in neutral situations), the increase in appropriateness was related to stronger helping intentions.

Importantly, appropriateness only had a small effect via perceived warmth, perceived helplessness, and felt connectedness, so there are other possible variables affecting this relationship between the situation and the responses to the crier. Appropriateness seems to depend particularly on the situational context (Warner & Shields, 2007). The present study showed that crying for extraordinary positive and negative reasons, such as winning an award or attending a funeral, was perceived as highly appropriate, while crying during more mundane situations, such as doing the laundry, was perceived as less appropriate. Notably, neutral crying situations still had a major effect on support intentions (in fact showing the strongest effect size). A likely reason for this is that support intentions were lowest in the neutral situations in which the target person did not shed a tear, and this low baseline drove a large part

of the tear's effect on support intentions in the neutral situations (Fig. 3). Another possible interpretation is that observing someone shedding tears in a seemingly neutral situation (such as doing the laundry) results in attributing or assuming that something distressing must have happened to that person. In fact, there is some evidence that tears signal high emotional intensity (Gračanin, Krahmer, Balsters, Küster, & Vingerhoets, 2021), and, in the current study, ratings of helplessness were similarly high for targets shedding tears in a neutral situation compared to targets crying for a negative reason. It seems that if the reason for crying is unknown, individuals typically assume a negative or distressing reason for the tears, which is supported by previous studies manipulating tears without presenting specific contextual cues (e.g., Bobowik et al., 2020; Van de Ven et al., 2017). All in all, we found that perceived appropriateness seems to influence the perception of crying targets as more helpless or warmer and feeling more connected to them, but not so much support intentions directly. Finally, the mediation effect by perceived appropriateness was smallest on perceiving the crier as helpless, which seems to strengthen the idea that signaling helplessness is one of the most potent mechanisms explaining the intention to support effect that can sometimes operate regardless of context (Gračanin et al., 2021).

Importantly, our mediation models do not provide evidence for the causal role of the mediators on the outcome of intention to support, as we did not directly manipulate any mediator variable (MacKinnon & Pirlott, 2015). In addition, it is possible that several of these mediators work in a causal chain. For instance, observing a tear could result in inferences of perceived helplessness, which have been found to evoke empathic concern in the observer (Batson, Fultz, & Schoenrade, 1987). Ultimately, feelings of empathic concern then translate into the intention to support the crying target. A similar process is plausible with perceived warmth. Future studies would need to manipulate these factors directly in order to establish the causal relationship among the mediators of the intention to support effect.

### 18.3. When do tears evoke the intention to support?

Although the support effect due to tears was robust, we observed moderations by individual, situational, and cultural factors. Focusing on individual aspects, low group identification with the target showed a small but significantly stronger effect of the tear manipulation than high group identification. Although this effect is small, it is surprising and relevant because this finding was contrary to our expectations: whereas we expected the tear effect to be strongest for in-group members, it was stronger for out-group members. This finding is consistent with recent work by Bobowik et al. (2020), who found that pictures of immigrants were rated as warmer, and people showed more intentions to approach them and were more willing to engage in donations when these images included visible tears. The impact of tears in intergroup perception and behavior has to date been largely ignored, and our findings might point to possible avenues for future research on prejudice and discrimination. Importantly, the observed moderation might be driven by the fact that social support intentions were rather high for in-group members. Although adding tears increased social support intentions for in-group members, the effect might have been attenuated as social support intentions for non-tearful in-group members were already on a high level.

Another predicted moderator to have an effect on the strength of the relationship between the display of tears and social support intentions was that it was predicted and found to be stronger for people with a high disposition to feel empathic concern for others in need. Importantly, and as we had predicted, we confirmed that although the effect was less strong for people low on trait empathic concern, the effect was still there and significant. These findings are plausible as feelings of empathic concern were also found to mediate the intention to support effect in the present study, and such feelings have been related to trait empathic concern (Davis, 1983; Zickfeld, Schubert, Seibt, & Fiske, 2017). Low dispositions of empathy have also been associated with an inability to

cry (Hesdorffer, Vingerhoets, & Trimble, 2018). Therefore, there seems to be a connection between low empathy and reduced intentions to support others who are crying and between low empathy and the ability to shed tears. Those individuals probably lack the capacity to understand and reflect on the feelings of the crier, and such responses have been assumed to be related to an avoidant attachment style (Denckla, Fiori, & Vingerhoets, 2014).

Contrary to our predictions, the intention to support effect was not moderated by the targets' gender, nor by a combination of the observers' and targets' gender as found in previous studies (Stadel et al., 2019). In general, intention to support ratings by female participants and for female targets were stronger, but these factors did not moderate the effect of visible tears. Our findings add to the contradicting literature on the importance of gender in the perception and judgment of tears. A possible explanation for these contradicting findings could be that gender differences are more pronounced in specific cultures as well as specific contexts, such as in a work situation (Fischer et al., 2013). Although we manipulated contextual valence in the current project and whether crying occurred in public or private settings, we did not zoom in on even more specific contexts.

Related to the previous point is that we did not find evidence that the type of context had an effect on the responses to tears. Intention to support effects were virtually the same whether targets cried in public or private settings. Importantly, we employed vignette descriptions in the current project in order to enhance comparability and the applicability of our design. The specific context might have a stronger impact in a real-world setting, something that we will discuss in more detail in the limitations section. We did observe a moderation by the situational valence of the crying reason. The intention to support effect due to tears was strongest for neutral situations, while it did not differ between positive or negative reasons. This finding is quite interesting as neutral tear situations were perceived as the least appropriate, but this might have been due to the low support intentions in the neutral (compared to negative) situations when no tear was present. While observers were provided with an explanation in the case of negative and positive situations, they could not really attribute the crying response to any explicit cause in the neutral context. Therefore, it is possible that the intention to support effect is even stronger if a possible crying reason is unknown. Indeed, the strongest effect on perceived helplessness was observed for neutral situations (Supplementary Material 4.4.5), suggesting a possible mechanism.

An important point to make related to the context effects we find (and do not find) is that the present study did not assess crying across all possible situations. There have been some studies showing that vocal emotional crying can have adverse effects such as physical abuse (e.g., Reijneveld, van der Wal, Brugman, Hira Sing, & Verloove-Vanhorick, 2004; Zoucha-Jensen & Coyne, 1993). However, there seems to be less evidence with regard to visual (i.e., tearful) emotional crying. In a recent study, participants rated criers lower on variables such as perceived warmth and connectedness if they perceived their crying as fake (Van Roeyen, Riem, Tonicic, & Vingerhoets, 2020). These findings on so-called *crocodile tears* point at the possibility that tears could have adverse effects on social support in certain contexts. Nevertheless, emotional tears have been regarded as inherently genuine and honest signals, which could evoke aversive outcomes if exploited. Future studies would need to test such circumstances under which visual crying would result in reduced support intentions.

Finally, we find a high level of heterogeneity across countries in our meta-analysis. Effect sizes differed between a strong effect in the United Arab Emirates and the smallest effect size in South Korea. The amount of heterogeneity was explained by different country-level variables, including GDP per capita (explaining more than 70% of variation) and subjective well-being. To a smaller extent, we also found a positive prediction by social support and the human development index. These findings point to the idea that the social signal value of tears is strongest in wealthy and highly developed countries. This idea converges with

findings showing that individuals in wealthier countries tend to report higher frequencies of crying due to freedom of expression (Van Hemert et al., 2011). Therefore, the intention to support effect of tears might be stronger among these countries as individuals are more often confronted with someone crying. Similarly, previous research has linked social support to subjective well-being (e.g., Aknin et al., 2013; Gebauer, Riketta, Broemer, & Maio, 2008). It is possible that individuals in countries high on subjective well-being have more resources and are, therefore, more eager to socially support. It is important to note that our project oversampled countries high on measures of GDP and HDI, so caution should be applied when interpreting these findings.

Notably, we observed one influential point with the United Arab Emirates' effect that differed quite a lot from the remaining effects. It is not entirely clear why that effect differed to such a high degree from the overall effect size. Looking at country-specific means, it seems that, for tearful targets, the mean was similar to the remaining countries, while the mean for non-tearful targets was substantially lower, which was responsible for the large effect. This could be due to actual cultural differences suggesting that tears are an especially potent signal in the United Arab Emirates, due to perceptions of the items, as they were presented in English, or the composition of the sample. However, we should note that comparing means across countries has been regarded as questionable, even if measurement invariance is observed (Peng, Nisbett, & Wong, 1997).

## 19. Limitations

Although our study represents the most comprehensive project on the social effects of emotional tears to date, there are several limitations related to our design, measurement, and sample.

First, the applied within-subjects design (in which each respondent rated four target persons) that exposed participants to tearful and non-tearful targets possibly inflated our effect size. When focusing on the first target only, the effect size was significantly reduced. Nevertheless, we mainly replicated all findings from our main analyses focusing on the first targets only, and the smaller main effect we found was of practical importance. Additionally, in a real-world context, individuals will rarely be confronted with criers in isolation but most often be able to compare their expressions to that of others. The employment of photographs as stimuli in the current project certainly contributed to the internal validity and applicability across many different contexts. However, photographs of criers undoubtedly have a lower ecological validity than video stimuli, in which different aspects unfold over time, or individuals showing tears in a real-world context. Unfortunately, employing such a design was not compatible with our intention to include as many labs as possible from all over the world. Focusing on more complex video stimuli or lab and field studies would have increased the obstacles and costs of participating in the current project (see Moshontz et al., 2018).

Second, as already discussed in the introduction, we focused on intentions or motivations to support hypothetical crying targets. A more applied test of the social support hypothesis would have employed measures of actual behavior. As explained in the introduction, an actual behavioral social support effect would be unlikely if we were not first able to observe an effect when focusing on behavioral intentions. For practical purposes, a behavioral measure would have made it difficult to collect data from so many labs across the world, which would have threatened our primary goal to test the universality of the tear effect. As the present study revealed that the effects of tears on behavioral intentions are robust across countries and samples, future attempts can now, with more confidence, investigate whether the intentional effect translates into an actual behavioral effect (and under what circumstances). Hereby, researchers could focus on countries showing the strongest and smallest effects in our project as a starting point when focusing on laboratory or field studies of actual behavior. Relatedly, our findings pertaining to the other variables are based on self-report as well. Given the nature of some items (i.e., social support, empathic

concern), social-desirability could have played an important role. Individuals could have indicated that they feel high empathic concern or want to support the depicted targets because it is desirable to do so according to their social norms. There is some indication that social desirability differs across countries (Johnson & van de Vijver, 2003), which might have influenced our effects. This aspect emphasizes even more that behavioral measures are needed to replicate the current findings.

Third, we specifically focused on the visual aspects of emotional crying – tears projected on neutral faces. In real-life settings, crying responses can include specific facial muscle contractions, vocal features, and other non-verbal aspects such as posture, head movements, or gaze allocation. This was done as tears have been argued to represent the main signaling function of crying in adults (Vingerhoets, 2013). It is such a strong signal that it can be perceived and evaluated when only attended for some milliseconds (Balsters et al., 2013). In addition, tears represent an exclusive aspect of crying, whereas other non-verbal features such as facial expressions or posture can occur for other expressions or emotional responses. Although previous effects of tears did not differ when real-life crying images were shown, or tears were digitally added (Supplementary Material 1.4), typical non-verbal features of crying might enhance the effect observed in the current study. It would be interesting to investigate whether visual tears drive the effect on support intentions (and possibly actual support) or if behavior such as increased corrugator supercilii activity, sobbing, or covering the face in shame would influence social support beyond emotional tears. Notably, some evidence exists that especially vocal features of crying can be detrimental in certain contexts (e.g., Reijneveld et al., 2004; Zoucha-Jensen & Coyne, 1993).

Fourth, although we included samples from all populated continents, our sample shows an overreliance on European countries and an underrepresentation of African countries. This represents a rather common bias in crowd-sourced projects (Moshontz et al., 2018). Additionally, social norms pertaining to the signal of tears might be hypercognized across sampled countries. This aspect complicates identifying emotional tears as a universal evolutionary signal or cultural learned response. Studies focusing on indigenous societies, as employed in related studies on emotional expression (e.g., Crivelli, Jarillo, Russell, & Fernández-Dols, 2016), represent one possibility to evaluate this question. Nevertheless, the present project can be regarded as more comprehensive in contrast to previous studies focusing on European or North American countries only.

## 20. Conclusion

Based on the present findings, we conclude that tears evoke intentions to support others socially, thereby possibly strengthening social bonds. Visual tears signal helplessness and warmth, and observers also feel more connected to criers, which drives social support intentions. The present findings suggest that reactions to tears might also represent acts of genuine altruism, as they are informed by the perceivers' feelings of empathic concern. The effect of tears on support intentions is enhanced for individuals high on dispositional empathy, out-groups, and in wealthy countries reporting high subjective well-being. Across our tests of moderation, we never found evidence that showing tears resulted in less social support intentions.

In the beginning, we posed the question of whether tears resemble the purportedly universal signal of yawning or the culturally specific expression of smiling. Based on the findings from the current project, we can conclude that crying might be more similar to a human universal (see Hasson, 2009; Provine et al., 2009). The basic tendency to comfort individuals showing tears was rather robust across 41 countries from all populated continents, suggesting that tears represent an important social glue binding society together.

## Open practices

All data, analysis syntaxes, materials (except for the main stimuli), and the Stage I submission can be accessed on the Open Science Framework: <https://osf.io/fj9bd/>.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jesp.2021.104137>.

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