

# How does personalization in news stories influence intentions to help with drought? Assessing the influence of state empathy and its antecedents

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11 **Abstract**

12 Personalized stories are a powerful tool for communicating about science, particularly when a  
13 scientific topic is complex or unfamiliar. One example of such a topic is drought, something  
14 many regions of the world face regularly. Like other environmental challenges, drought recovery  
15 efforts benefit from a mobilized collective response through prosocial action, including  
16 volunteering and donations. The objective of this study was to examine how storytelling about  
17 drought influences emotional responses and empathic processes that in turn contribute to  
18 prosocial action. Using data collected from an online survey ( $N = 249$ ), the current study tests the  
19 hypothesis that, relative to non-personalized stories, personalized news stories about drought will  
20 increase audiences' cognitive and emotional responses, including perceived suffering, narrative  
21 engagement, and state empathy. In addition, this study examines how emotional responses to  
22 personalized news stories influence readers' intentions to donate to farmers suffering from  
23 drought. Results reveal that personalized news stories are more likely than non-personalized  
24 stories to increase readers' state empathy and perceptions of others' suffering. Perceived  
25 suffering was directly related to the affective and cognitive dimensions of state empathy.  
26 Narrative engagement (i.e., transportation) was also directly related to the affective and cognitive  
27 dimensions of state empathy and indirectly associated with intentions to donate to assist those  
28 suffering from drought. Affective state empathy was directly associated with donation intentions,  
29 suggesting that an emotional response to media portrayals of suffering may promote prosocial  
30 intentions. We discuss the potential implications for using personalized news stories about  
31 drought and other natural disasters to motivate prosocial action.

32 **1 Introduction**

33 News media are a key source of public information about natural hazards and natural disasters  
34 such as drought (Houston, Pfefferbaum, and Rosenholtz 2012; Wilson 2000). Droughts, defined

35 as prolonged periods with rainfall below normal recorded levels<sup>1</sup>, are associated with reduced  
36 water supply, poor water quality, diminished crop yields, elevated food and energy prices,  
37 wildfires, impaired riparian habitats, and deteriorated rangeland (Church et al. 2020; Mishra and  
38 Singh 2010). Droughts are ubiquitous, occurring in most countries and climatic zones (Wilhite,  
39 Sivakumar, and Pulwarty 2014). The cumulated cost of drought in the United States make it, in  
40 economic terms, the costliest recurring natural disaster (Cook et al. 2007). The negative social,  
41 environmental and economic effects of drought are “further aggravated by growing demand for  
42 water” and earth’s increasing mean surface temperature due to climate change (Mishra and Singh  
43 2010, p. 205). The public looks to news outlets for information about natural hazards, including  
44 what areas are affected, the consequences of the hazard, and community response efforts.

45  
46 Until recently, environmental news has generally adhered to the doctrine of ‘just-the-facts’  
47 reporting, often de-emphasizing the role of emotions. Yet a growing number of scholars have  
48 criticized this approach to reporting, suggesting that emotional storytelling is a critical tool to  
49 engage audiences and encourage public action around social and environmental crises (Beckett  
50 and Deuze 2016; Maier, Slovic, and Mayorga 2017; Papacharissi and de Fatima Oliveira 2012;  
51 Swim and Bloodhart 2015) and large-scale distant disasters (Solman and Henderson 2019).  
52 Often, reporting about natural disasters can feature people in crisis or emotional images of  
53 people suffering (Solman and Henderson 2019). Indeed, the emotional focus of news media’s  
54 coverage of disasters has been described as an important tool for arousing compassionate  
55 responses from readers, which in turn may mobilize public engagement, volunteering, and other  
56 forms of prosocial action (Joye 2015).

57  
58 Emotional storytelling is characterized by the frequent use of dramatic and personalized  
59 narratives (Wahl-Jorgensen 2013). As a form of strategic narrative, personalized narratives focus  
60 on individual experiences, rather than collective or group experiences (Zhou and Niederdeppe  
61 2017). Extensive scholarship in health communication, has documented the persuasive effect of  
62 personalized news stories and their potential limitations (Green 2006; Kim et al. 2012; Kreuter et  
63 al. 2007; Zhou and Niederdeppe 2017). While mass media coverage of science and biological  
64 topics regularly includes personalized stories (Dahlstrom 2014), little is currently known about  
65 the implications of including personalized storytelling in news coverage of natural hazards such  
66 as drought and water scarcity. The potential for more frequent and severe natural hazards  
67 associated with climate change highlights the importance of understanding how personalized  
68 stories engage readers and may contribute to public action during environmental crises.

69  
70 Wahl-Jorgensen (2013) suggests that personalized storytelling can trigger an emotional reaction  
71 in readers that is “an indispensable prerequisite of political action (Boltanski 1999)” (p. 132).  
72 Thus, when the goal of communication is to motivate action, personalized storytelling may be  
73 key (Maier, Slovic, and Mayorga 2017). Yet to date, the links between exposure to personalized  
74 news stories about natural hazards, the arousal of empathy, and action to support hazard recovery  
75 or mitigation efforts are far from clear. The present study explores audiences’ responses to both  
76 personalized and non-personalized news stories about drought conditions in the Western U.S.  
77 Using an online experiment (N = 249), this study tests the hypotheses that personalization will

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<sup>1</sup> Definitions of drought vary widely. An overview of the definitions is beyond the scope of this paper, but see Mishra & Singh 2010 for a detailed review.

78 increase audiences' perceptions of others' suffering, narrative engagement (i.e., transportation  
79 into the story), state empathy, and ultimately, intentions to donate money to those affected by  
80 drought. Additionally, this study seeks to identify the specific pathways contributing to the  
81 arousal of the cognitive, affective, and associative dimensions of empathy and intentions to  
82 support farmers affected by drought.

## 83 **2 Theoretical Background**

### 84 **2.1 Narratives and personalization**

85 Narratives are generally defined as a story about an event or a chain of events that occur over  
86 some time period to an individual or group of characters (Dahlstrom 2014). Narratives can  
87 entertain or be strategically employed to promote social or individual action (Zhou and  
88 Niederdeppe 2017). Broadly, compared to informational formats, narratives evoke a greater  
89 emotional response, including empathic concern, (Shen, Ahern, and Baker 2014) and help  
90 audiences identify with specific characters or contexts (Dahlstrom 2014; Murphy et al. 2013).

91  
92 Situated within the domain of strategic narratives, personalized stories are characterized by a  
93 focus on individual experiences, feelings, and perspectives (Zhou and Niederdeppe 2017).  
94 Personalization has received a great deal of attention in the field of communication, particularly  
95 in the context of persuasive health communication. Prior work in this area has suggested that  
96 personalized news focused on characters' perspectives and feelings can promote behavior  
97 change. For example, stories focused on individuals' experiences produced significantly greater  
98 positive emotions, empathic attitudes, intentions, and behaviors toward stigmatized groups than  
99 non-narrative formats (Oliver et al. 2012). Messages targeting respondents' identities were more  
100 effective than information-based messages about organ donation, contributing to greater donor  
101 registration rates (Dillow and Weber 2016). Though scholarship on personalized news about  
102 natural disasters is more limited, Maier et al. (2017) found that the use of personalized stories  
103 about large-scale distant suffering due to mass violence in Africa was more effective than  
104 straight news. Personalization was also more effective than including photographs, mobilizing  
105 information, or statistical information in generating emotional responses similar to empathy (e.g.,  
106 sympathy, sadness, anger, compassion) and, indirectly, charitable giving (Maier, Slovic, and  
107 Mayorga 2017).

108  
109 Understanding how to mobilize coordinated community response efforts is crucial considering  
110 the role that the public can play in hazard response, recovery efforts, and political action to  
111 encourage policies that mitigate the negative socioeconomic impacts of drought and water  
112 scarcity. The objective of this study is to examine the effects of personalized and non-  
113 personalized stories about drought to improve our understanding of how and when  
114 personalization can motivate emotional responses and prosocial action to support individuals  
115 suffering from drought. To do so, we apply Zhou and Nierdeppe's (2017) conceptualization of  
116 personalized narratives as stories that include (1) identifiable individuals, (2) individual  
117 experiences (i.e., rather than collective or shared experiences), and (3) an expression of the  
118 character's perspectives and emotions. Below we describe three theoretical constructs often  
119 described as critical antecedents of narrative persuasion – empathy, perceived suffering, and  
120 transportation. We then review theories and previous research examining the association between  
121 empathy and prosocial action. Finally, we describe the results of an online survey assessing

122 the effect of personalization on readers' cognitive and emotional responses, narrative  
123 engagement, and intentions to donate to farmers suffering from drought.

124

## 125 **2.2 Empathy**

126 There is growing attention in journalism and communication studies to the use of emotive  
127 storytelling in arousing sympathy (Maier, Slovic, and Mayorga 2017) and empathy (Shen,  
128 Ahern, and Baker 2014). Empathy is a multi-item construct, that some argue differs substantially  
129 from emotions such as sympathy and pity (Gerdes, Segal, and Lietz 2010). Definitions of  
130 empathy vary widely across disciplines. Communication researchers describe empathy as being  
131 either trait-based (e.g., an enduring characteristic of an individual) or state-based (e.g., a reaction  
132 to empathy-arousing messages; (see Shen 2010a). State-based empathy (or state empathy) is a  
133 construct that describes "actual automatic and somatic responses" (Preston and de Waal 2002, p.  
134 4) that are activated after exposure to specific media stimuli (Shen 2010a).

135

136 State empathy is a process that includes physiological and intellectual dimensions, though  
137 scholars disagree about what to call these dimensions (Shen 2010a). Using Shen's previous  
138 framework, we define state empathy as a multi-item construct composed of a physiological  
139 dimension (labeled as "affective"), intellectual dimension (labeled as "cognitive"), and  
140 associative dimension (called "associative"). The affective dimension of state empathy includes  
141 the observer's ability to physically mirror the experiences or feelings of others (Iacoboni 2008).  
142 Cognitive state empathy is generally defined and measured as perspective taking, or the act of  
143 picturing oneself in another's shoes. The associative dimension is a measure of character  
144 identification, often as a result of perceived similarities between the audience and the message  
145 subject. The role of associative state empathy has received less attention than the other  
146 dimensions, contributing to questions about whether identification, due to perceived similarities  
147 between the audience and the message subject, can reliably generate an empathic response. Thus,  
148 we add to the existing body of literature by simultaneously evaluating the effect of personalized  
149 news stories on the cognitive, affective, and associative dimensions of state empathy.

150

151 Contemporary scholarship has developed interventions focused on both the affective (Decety and  
152 Jackson 2006) and cognitive dimensions of state empathy, including efforts to induce perspective  
153 taking for people with AIDS, minority groups, and the homeless (Batson et al. 1997; Stephan and  
154 Finlay 1999; Finlay and Stephan 2000). State empathy has been measured after exposing  
155 participants to media stimuli, such as pictures, videos, or audio recordings of harmful acts toward  
156 people or animals (Schultz 2000; Shelton and Rogers 1981; Berenguer 2007; Daniel Batson et al.  
157 1997; Daniel Batson, Early, and Salvarani 1997; Daniel Batson et al. 2002; Swim and Bloodhart  
158 2015), or after exposure to public service announcements (PSAs) (Bagozzi and Moore 1994;  
159 Campbell and Babrow 2004; Finlay and Stephan 2000; Shen 2010b; Shen, Ahern, and Baker  
160 2014; Shen 2010a; 2011; Stiff et al. 1988). Exposure to personalized narratives, including a  
161 newspaper account of someone else's emotional or physical experience, has also been used to  
162 arouse empathic responses (Shen, Ahern, and Baker 2014; Stiff et al. 1988), though this format  
163 has received less attention than PSAs. Drawing on this work we posit that:

164

165 **H1:** Personalized news stories (vs. non-personalized news stories) will be positively associated  
166 with readers' state empathy.

## 167 **2.3 Media Coverage and Perceived Suffering**

168 Most people experience natural disasters through media coverage (Maier et al. 2017). Therefore,  
169 how the story is framed and the frequency of the media coverage can influence public  
170 perceptions of natural hazards. Indeed, frequent local-level newspaper coverage of drought  
171 conditions in California was significantly associated with greater public concerns about drought  
172 (Duffy 2016).

173  
174 To date, there is limited scholarship exploring media coverage of slow-onset hazards. However,  
175 a recent review of news coverage about the California drought found that news stories focused  
176 on slow-onset hazards [such as drought] are generally confined to episodic frames and focused  
177 on socio-economic impacts (Duffy 2016). Episodic frames about hazards generally focus on  
178 individual suffering and impacts. Media representations of hazards that focus on suffering have  
179 the potential to arouse intense emotional responses (Aarøe 2011). The emotional emphasis of  
180 media coverage of slow-onset hazards has been criticized for exaggerating risk and  
181 sensationalizing serious concerns, which can create problems for recovery efforts. Despite  
182 concerns about the use of dramatic narrative stories to boost readership, Solman & Henderson  
183 (2019) suggest that disaster reporting “is one of the few legitimate places for emotional  
184 expression in news journalism” (p. 1642).

185  
186 Scholars who have examined the use of emotive storytelling in disaster reporting have suggested  
187 that news focused on others’ suffering may carry more weight than reports focused on property  
188 damage or the severity of the disaster, and are more effective at capturing media attention and  
189 mobilizing public action (Solman and Henderson 2019; Joye 2015). Indeed, personalized stories  
190 about large-scale distant suffering heightened readers’ emotional distress more than stories  
191 focused on statistical information or stories including photographs of victims (Maier, Slovic, and  
192 Mayorga 2017). Yet previous work in this area has primarily focused on readers’ emotional  
193 distress, not readers’ perceptions of others’ suffering. According to Decety & Lamm (2006), a  
194 prerequisite for communication and empathy arousal is the preservation of individuality. While  
195 making a link between the self and other through perspective taking is a critically important  
196 component of empathy, separating our own feelings from others’ feelings and thoughts, or self-  
197 other awareness, is also essential to preventing egocentric responses to others’ feelings and  
198 thoughts (Segal et al. 2017). Therefore, this study will also examine how personalized news  
199 stories impact readers’ perceptions of others’ suffering and whether these perceptions are  
200 associated with state empathy.

201  
202 **H2:** Personalized news stories (vs. non-personalized news stories) will be positively associated  
203 with readers’ perceived suffering.

204 **H3:** Perceived suffering will be positively associated with readers’ state empathy.

## 205 **2.4 Narrative Engagement**

206 Narrative engagement, also called absorption, is a popular umbrella concept used to describe a  
207 readers’ immersion into the story world (Appel et al. 2015; Oliver et al. 2012). Transportation is  
208 a subtype of narrative engagement described as a psychological state that simultaneously  
209 involves attention, imagery, and emotions (Appel et al. 2015). Transportation relates to the  
210 experience of engaging with, or being transported into a narrative world (Green, Brock, and  
211 Kaufman 2004). Previous work has reported mixed results regarding the relationship between  
212 transportation and empathy. Oliver et al. (2012) found that story involvement, a subtheme in

213 Green & Brock’s (2000) narrative transportation scale, influenced emotional reactions to a  
214 narrative news story and intentions to help stigmatized groups (prisoners and elderly persons).  
215 Transportation was a significant predictor of empathy arousal in response to a narrative but not a  
216 significant mediator of narrative impact on empathy and cognitive responses (Shen et al. 2014).  
217 Drawing on this work, we propose the following hypotheses:  
218

219 **H4:** Personalized news stories (vs. non-personalized news stories) will be positively associated  
220 with readers’ transportation into the story.

221 **H5:** Transportation will be positively associated with perceived suffering and state empathy.

## 222 **2.5 The Empathy-Altruism Hypothesis**

223 Much of the scholarship on empathy is grounded in the empathy-altruism hypothesis (Batson  
224 1991). Batson and colleagues (see Batson et al. 1989, for a review) tested this hypothesis through  
225 a series of experiments exploring the relationship between empathic feelings (e.g. sympathy,  
226 compassion, warmth, tenderness, etc.), positive attitudes towards others (Batson et al. 1997;  
227 Finlay and Stephan 2000), and behavioral intentions (Batson et al. 2002). Results indicate that  
228 participants prompted to imagine the subject’s feelings (compared to those prompted to  
229 concentrate on being objective) were significantly more likely to express intentions to donate  
230 funds to support an addiction and counseling service (Batson et al. 2002).  
231

232 Following Batson’s work, empathy is regularly described as a key factor in social interaction  
233 (Gerdes and Segal 2009), civic engagement (Miaskiewicz and Monarchi 2008) and social  
234 tolerance (Segal, Wagaman, and Gerdes 2012). Indeed, researchers in the fields of psychology,  
235 social work and business have identified empathy as a critical source of prosocial behavior  
236 (Batson 2018; Grant and Berry 2011; Segal et al. 2017), often defined as voluntary actions  
237 benefiting others or society (Eisenberg and Miller 1987). Bagozzi and Moore (1994) exposed  
238 respondents to a “rational” appeal condition and an emotional appeal (called the high-empathy  
239 condition) and found that respondents in the latter group expressed greater intentions to help  
240 victims of child abuse. Participants reported greater distress and willingness to contribute to an  
241 organization that helps children with cancer when they were exposed to a stimulus with an  
242 identified victim rather than a non-identified victim (Kogut and Ritov 2005). Guided by research  
243 in the tradition of the theory of reasoned action (Ajzen 1991; Kim and Hunter 1993), Oliver et al.  
244 (2012) found that empathic attitudes were associated with stronger intentions to help stigmatized  
245 groups dealing with health-related challenges.  
246

247 As the examples above illustrate, most of the previous work considering the role of empathy-  
248 arousing messages in communication has focused on the health domain (e.g., Shen 2011; 2010a;  
249 2010b; Stiff et al. 1988). There is also a substantial body of work in environmental contexts  
250 focused on arousing empathy for animals (Berenguer 2007; 2010; Schultz 2000; Shelton and  
251 Rogers 1981) and assessing the relationships between empathy, pro-environmental attitudes and  
252 pro-environmental behavior. For example, Swim and Bloodhart (2015) exposed participants to  
253 messages focused on climate change-related threats to polar bears, and found that participants  
254 prompted to take the perspective of the animals were more likely (than those prompted to remain  
255 objective) to donate to environmental advocacy organizations. Here, we expand this work by  
256 focusing on the impacts of drought – though this context has implications for climate change  
257 communication and messages about other natural hazards and disasters. Drawing on the

258 empathy-altruism hypothesis and previous work in health and environmental contexts, we posit  
259 the following:

260  
261 **H6.** State empathy will be positively associated with intentions to donate to farmers suffering  
262 from drought.

## 263 **2.6 Assessing the Cognitive, Affective and Associative Dimensions of Empathy as a** 264 **Source of Prosocial Behavior**

265 Early scholars debated whether empathy-driven prosocial action occurred due in response to  
266 others' affective cues – as Hoffman (1981) posited – or as a result of a cognitive process driven  
267 by individuals' perspective taking abilities (Decety and Jackson 2006). Proponents of the  
268 'affective assumption' have suggested that narratives persuade by creating an emotional  
269 involvement with characters (Busselle and Bilandzic 2009; Green, Brock, and Kaufman 2004;  
270 Slater and Rouner 2002) and that it is the emotional response to others' needs that produces the  
271 "other-oriented desire" to reduce perceived distress or suffering in others (Davis 1994, p. 134).  
272 Indeed, experimental research across a variety of contexts has found a strong association  
273 between readers' emotional responses (i.e., distress) and willingness to help victims in need  
274 (Kogut and Ritov 2005; Maier, Slovic, and Mayorga 2017).

275  
276 There is also evidence to support the association between the cognitive dimensions of empathy,  
277 including perspective taking, and prosocial behavior – or the 'cognitive hypothesis'. Perspective  
278 taking has been associated with increased psychological closeness between individuals, helping  
279 behavior (Cialdini et al. 1997), and mimicking behavior (van Baaren et al. 2009; Müller et al.  
280 2012).

281  
282 Still, other scholars have suggested that the cognitive and affective dimensions are "sequentially  
283 and causally connected" (Stiff et al. 1988, p. 200) such that cognition enables people to take the  
284 perspectives of others, but it is affective empathy that generates the motivation to act. Keen  
285 (2010) has suggested that the affective, cognitive, and associative dimensions are  
286 complementary, especially in response to reading, because "When texts invite readers to feel,  
287 they also stimulate readers' thinking" (p. 69).

288  
289 Others have suggested that identification, a key component of the associative dimension of state  
290 empathy, is critical for communication and behavior because: "you persuade a man [sic] only  
291 insofar as you can talk his language by speech, gesture, tonality, order, image, attitude, idea,  
292 *identifying* your ways with his" (Burke 1969, p. 55). Thus, a character's identity, gender, socio-  
293 demographic characteristics, along with their expressed values may generate associative state  
294 empathy when they align with readers' values and identity. Identification is the process through  
295 which relationships develop and social bonding occurs (Shen 2010a; 2010b) and is necessary for  
296 message relevance (Campbell and Babrow 2004) and reduced reactance, which can lead to the  
297 rejection of persuasive messages (Shen 2010a). Shen (2010a) has suggested that identification is  
298 associated with Kelman's theory of attitude change and may therefore be, "more predictive of  
299 behavior" than the other dimensions of state empathy.

300  
301 To date, scholarship on empathy in communication regularly treats the multi-item construct of  
302 state empathy as a single outcome variable, limiting current understanding of the underlying

303 mechanisms associated with empathy arousal and helping behavior in response to narrative news  
304 stories. Indeed, we are not familiar with any study to date that has tested a tripartite model of  
305 state empathy, as proposed here. To address this gap, we use a structural equation model to  
306 simultaneously test the effect of the cognitive, affective and associative dimensions of state  
307 empathy on prosocial behavior, asking the following research question:  
308

309 **RQ1:** To what extent do the cognitive, affective and associative dimensions of state empathy  
310 influence intentions to donate to others?

### 311 **3 Method**

#### 312 **3.1 Stimuli**

313 Data were collected using online surveys through the Qualtrics platform. The survey took  
314 15 minutes to complete. Participants were assigned randomly to one condition (personalized or  
315 non-personalized). Both conditions included a simulated news story about drought conditions in  
316 the Southwestern U.S. in 2015 (Personalized = 392 words; Non-personalized = 387 words). Both  
317 stories were titled, “Arizona farmers burdened by the Megadrought” and formatted to resemble  
318 an AP-style article. We included a single image of drought conditions across the state of  
319 California from 2011 to 2015. The image came from the U.S. Drought Monitor and did not vary  
320 across conditions. We kept the introductory paragraph and the structure of the article the same  
321 across both stories to prevent the introduction of confounding cues. The articles were based on  
322 reports by the Associated Press and designed to avoid specific partisan cues. Both news stories  
323 are available in the Supplementary Material.  
324

325 The focus of the articles in the two conditions differed. The personalized story included three  
326 components of personalized narratives: (1) an identifiable farmer, (2) direct quotes about the  
327 farmer’s experience with drought, and (3) direct quotes about the farmer’s economic and  
328 personal suffering due to drought conditions. The non-personalized story focused primarily on  
329 expert concern about the 2015 drought. It broadly addressed the social and economic impacts of  
330 drought conditions for farmers in the Southwest, though it did not include any direct quotes from  
331 individual farmers or descriptions of the character’s emotional state or experiences.  
332

333 The survey for this study began with an assessment of participants’ trait empathy. Trait empathy  
334 refers an individual’s unique ability to respond to another person’s distress while state empathy  
335 is situation based. Following previous scholarship, we include trait empathy as a control variable  
336 likely associated with state responses to a stimuli (Bagozzi and Moore 1994; Campbell and  
337 Babrow 2004; Finlay and Stephan 2000; Shen 2010a, 2010b; Shen 2011; Shen et al. 2014. After  
338 completing the trait measures, participants read one of the two randomly assigned stories, rated  
339 their perceptions of the story, completed the perceived suffering, state empathy, and  
340 transportation measures, and intentions to donate to farmers affected by drought in the  
341 Southwest. Finally, participants completed demographic questions.

#### 342 **3.2 Participants**

343 Eleven participants dropped out of the study before they could complete the survey and were  
344 removed from the data, resulting in a sample size of  $N = 249$ . Participants included

345 undergraduate students enrolled in an introductory course on mass communication at a public  
346 university in the midwestern United States ( $M$  age = 20 years,  $SD$  = 1.4 years). We distributed  
347 surveys in a classroom setting and provided participants extra credit for participation. Most  
348 respondents were women (67%) who had completed some college ( $M$  = 2.73 and  $SD$  = .68) and  
349 self-reported as moderately wealthy growing up (1=poor to 5=wealthy;  $M$  = 3.2,  $SD$  = .90), with  
350 income in the range of \$50,000 to \$99,000 (1=less than \$10,000 to 9=over \$150,000;  $M$  = 6.35,  
351  $SD$  = 2.13). While we didn't ask for information about race, the student population at this  
352 University is 70% white (Data USA, n.d.).

353  
354 In our sample, 62 participants had a single missing value, resulting in a small portion (0.44%) of  
355 the total number of missing values over the total number of responses across all participants.  
356 Preliminary tests were conducted in SPSS 26 (IBM). For all analysis  $p < .05$  was considered  
357 significant. Scale reliability was measured using Cronbach's  $\alpha > .65$  was considered acceptable  
358 (Nunnally, 1978).

### 359 3.3 Measurements

360 *State empathy* was measured using a previously validated scale (Shen, 2011). The scale included  
361 12 items representing the affective, cognitive and associative dimensions of state empathy and  
362 ranged from 1=*not at all* to 5=*completely*. Principal-axis factoring with varimax rotation  
363 identified a three-factor solution explaining 64% of the variance in state empathy (Factor scores  
364 and items listed in Table 3). The first factor labeled "cognitive" was associated with five  
365 statements pertaining to the reader's understanding of others' point of view and recognition of  
366 the situation detailed in the articles. ( $M$  = 3.61,  $SD$  = .70, Cronbach's  $\alpha$  = .84). The second  
367 factor, which we labeled "affective" was associated with four statements related to readers'  
368 emotional reactions to the story ( $M$  = 3.07,  $SD$  = .94, Cronbach's  $\alpha$  = .89). The final factor  
369 we labeled "associative," and it was comprised of three statements about identifying with the  
370 topic and individual experiences detailed in the stories ( $M$  = 2.97,  $SD$  = 1.02, Cronbach's  $\alpha$  =  
371 .88). In the following sections, we refer to these as cognitive SE, affective SE, and associative  
372 SE.

373  
374 *Perceived suffering* was measured using three items asking participants to indicate whether the  
375 story portrayed the pain, suffering and distress associated with drought in the Southwest (from  
376 1=*strongly disagree* to 5=*strongly agree*). The three items created a reliable scale and were  
377 collapsed ( $M$  = 3.51,  $SD$  = .87, Cronbach's  $\alpha$  = .89).

378  
379 *Transportation* into the story was assessed using Appel et al's (2015) Transportation Scale –  
380 Short Form. The five-item items had seven-point response scales from 1 (*not at all*) to 7 (*very*  
381 *much*) and were reliable ( $M$  = 4.07,  $SD$  = 1.32, Cronbach's  $\alpha$  = .90).

382  
383 *Intentions to donate* were measured after reading the newspaper articles. Participants read the  
384 following statement: "Lots of things come up that keep people from donating to social  
385 organizations even if they want to." Respondents then answered the question: "Would you be  
386 willing to donate money to help farmers in the Southwest affected by the drought?" by selecting  
387 one of two possible options: 0=no, 1=yes.

388

389 *Trait empathy* was measured using the affective and cognitive dimensions of the Social Empathy  
390 Index (SEI) (Gerdes et al. 2011; Segal et al. 2012). The full SEI includes 22 items measuring five  
391 dimensions of empathy and responses range from 1 = *never* to 6 = *always*. The scale included 9  
392 items measuring the affective dimensions of trait empathy (M = 4.53, SD = .67, alpha = .83).  
393 Example questions included: “When I see someone receive a gift that makes them happy, I feel  
394 happy myself,” “I am good at understanding other people’s emotions.” And “When I see  
395 someone being publicly embarrassed, I cringe a little.” One item was removed to improve scale  
396 reliability (“When I see someone accidentally hit his or her thumb with a hammer, I feel a flash  
397 of pain myself”).

### 398 **3.4 Analysis**

399 The theoretical model was tested in *Mplus 8* using structural equation modeling (SEM) in  
400 (Muthén and Muthén 1998-2017). We used the WLSMV estimator, recommended for models  
401 with categorical outcome variables. The chi-square value reported below is calculated using the  
402 DIFFTEST function in *Mplus*. Trait empathy was placed in the model as a control on state  
403 empathy. Story personalization (0 = non-personalized; 1 = personalized) was an exogenous  
404 variable that influenced all of the other post-test variables in the model: perceived suffering, state  
405 empathy and prosocial intentions.

406  
407 Model fit was evaluated using the comparative fit index (CFI), standardized root-mean-square  
408 residual (SRMR), and root-mean-square error of approximation (RMSEA) criteria identified by  
409 Hu and Bentler (1999): CFI > .90 and RMSEA < .05. We adopted a 95% confidence model in  
410 the bootstrapping procedure. All exogenous variables were correlated.

## 411 **4 Results**

412 Because this research concerned both the impact of story type on behavioral intentions and the  
413 mediating role of state empathy, perceived suffering and transportation, we followed O’Keefe’s  
414 (2003) suggestion and did not conduct a message manipulation check as the messages differed  
415 on objective, modifiable features. We used a structural equation model to evaluate the direct and  
416 indirect effects of personification on state empathy, perceived suffering, transportation, and  
417 intentions to donate.

418  
419 *Preliminary Analysis.* Correlations between key variables are presented in Table 1. To address  
420 H1, H2, and H4, we conducted ANOVA tests to evaluate the main effects of personalization on  
421 state empathy (SE), perceived suffering, and transportation. Descriptive results are reported in  
422 Table 2. There were significant treatment group effects on cognitive SE  $F(1, 246) = 11.73, p <$   
423  $.001$  and affective SE  $F(1, 246) = 8.54, p < .01$ . Respondents’ scores on perceived suffering also  
424 varied significantly between the personalized and non-personalized story versions  $F(1, 247) =$   
425  $6.72, p < .01$ . These findings provide support for H1 (i.e., personalization is associated with state  
426 empathy) and H2 (i.e., personalization is associated with perceived suffering). There were no  
427 significant differences in transportation between the personalized and non-personalized news  
428 stories  $F(1, 246) = 1.59, p = .21$ . Thus, H4 was not supported.

429  
430 *Model Results* Based on the aforementioned results, the hypothesized model was reduced to  
431 Figure 1 without associative SE and no direct association between story format and

432 transportation. The final model fit the data well:  $\chi^2(4) = 29.0, p < .000$ , RMSEA (Root Mean  
433 Square Error of Approximation) = 0.035, CFI (Comparative Fit Index) = 0.93, and explained  
434 87% of the variance in intention to donate (see Figure 2).

435  
436 Story personalization was significantly associated with cognitive SE ( $\beta = .17, SE = 0.06, p < .01$ )  
437 and affective SE ( $\beta = .15, SE = 0.07, p < .05$ ) (H1). Story personalization was also significantly  
438 associated with perceived suffering ( $\beta = .17, SE = 0.06, p < .01$ ) (H2). The intensity of perceived  
439 suffering was positively associated with both the cognitive ( $\beta = .37, SE = 0.09, p < .001$ ) and  
440 affective dimensions of state empathy ( $\beta = .24, SE = 0.08, p < .01$ ), providing support for H3.  
441 Transportation was positively and significantly associated with perceived suffering ( $\beta = .56, SE$   
442  $= 0.06, p < .000$ ), cognitive SE ( $\beta = .35, SE = 0.08, p < .000$ ), and affective SE ( $\beta = .61, SE =$   
443  $0.06, p < .000$ ), providing support for H5.

444  
445 H6 was supported. There was a significant association between affective SE and intentions to  
446 donate ( $\beta = .39, SE = 0.16, p < .05$ ). Cognitive SE, perceived suffering, and transportation were  
447 not directly associated with intentions to donate. This finding highlights the potential importance  
448 of affective responses to narrative stories as a critical pathway to promote prosocial intentions  
449 and provides limited support for the ‘cognitive hypothesis’.

450  
451 We used 1000 bootstrap samples and bias-corrected confidence intervals to explore the specific  
452 indirect effects of transportation and perceived suffering on behavioral intentions. The specific  
453 indirect effects of transportation on donations, through affective SE, are significant ( $\beta = .222, SE$   
454  $= 0.10, p = .025$ ) 95% CI [.075, .375].

## 455 **5 Discussion**

456 News coverage about climate change, and the natural hazards associated with it, represent an  
457 opportunity that challenges journalists’ role as “critics of (nation) state power,” tests journalism’s  
458 “default position[s],” and demands “new ways of communicating” (Kunelius 2019). This  
459 research sheds light on proposed patterns of causality between empathy-arousing messages and  
460 prosocial intentions and advances the use of empathy-arousing messages and emotional  
461 storytelling in the context of drought and natural hazards. This study’s findings also illustrate the  
462 nuanced effects of state empathy on behavioral intentions and the importance of affective  
463 responses to narratives portraying human suffering. Overall, the expected relationships were  
464 observed in most cases, and the final model accounted for a large amount of the variance in  
465 respondents’ intentions to donate to farmers suffering from drought.

466  
467 Relative to participants exposed to the non-personalized news story, participants exposed to the  
468 personalized news story reported higher levels of perceived suffering, cognitive SE, and affective  
469 SE, confirming and building on previous evidence that narrative news stories about  
470 environmental hazards can engender emotional responses from readers that may in turn  
471 encourage prosocial action. While previous research has suggested that identification  
472 (associative SE) is a key dimension of state empathy, we were not able to verify these findings  
473 because our stimuli did not generate a significant associative response. It is possible that this is  
474 due to the nature of the sample and a story focused on an adult farmer instead of a younger  
475 subject.

476  
477 Perceived suffering was directly associated with the affective and cognitive dimensions of state  
478 empathy. While previous work has used perceived suffering as a criterion for the selection of  
479 empathy-arousing messages (Shen 2011), this study empirically tested the role of perceived  
480 suffering in activating state empathy and prosocial intentions. Our findings highlight the  
481 importance of perceived suffering in state empathy arousal, but fail to provide evidence of  
482 significant effect of perceived suffering on prosocial behaviors. While Maier et al. (2017) found  
483 that news stories about large-scale distant suffering were more effective in generating emotional  
484 responses (e.g., sympathy, sadness, anger), and indirectly, charitable giving, we only found  
485 partial support for these associations in the context of drought. It is possible that perceived  
486 suffering is not as strongly associated with helping behavior as actual emotional distress or  
487 transportation. Indeed, the observed significant indirect effects from transportation to intentions  
488 through affective SE would appear to support this assertion. It is also possible that the use of  
489 younger participants, whose generally are less able to regulate emotions (Somerville, Jones, and  
490 Casey 2010), also contributed to these results. We discuss the limitations of using a student  
491 sample in detail below. These findings may also be due to the fact that this study emphasized the  
492 economic impacts of drought on farmers. Previous scholarship in agro-environmental contexts  
493 has found that economic messages have a more muted effect on public opinions than  
494 environmental messages (Peterson et al. 2019). Future work could explore alternative frames  
495 with varying degrees of emotional arousal.

496  
497 Oliver et al. (2012) found differences in one of the two transportation measures (differences in  
498 story involvement but no differences in story impact) between the narrative and non-narrative  
499 story formats. In this study, we found a strong association between narrative engagement and  
500 perceived suffering and narrative engagement and state empathy. These results appear to confirm  
501 Oliver et al.'s (2012) assertion that narrative engagement precedes compassionate and affective  
502 responses to narrative stories.

503  
504 Previous research has revealed inconsistent effects of story manipulation on transportation when  
505 readers were assigned specific reading goals (e.g., proofreading vs. regular reading) or when  
506 stories were labeled as fact or fiction (Gnambs et al. 2014). Shen et al. (2014) also reported  
507 mixed results with transportation: narrative stories with an environmental frame led to greater  
508 transportation, but stories with an economic frame revealed no increase in audience  
509 transportation. Our results indicating no direct effect between personalization and transportation  
510 align with these previous findings. Similarly, the personified story used in this study focused on  
511 farmers' economic losses. Given these results, it is possible that economic frames are less  
512 effective in generating transportation and future work should explore this option. While our  
513 study revealed no significant differences in transportation between a personalized and non-  
514 personalized story, personalization is only one form that strategic narratives can take (Zhou and  
515 Niederdeppe 2017). Future work could also explore how narrative dramatization,  
516 emotionalization and fictionalization might influence readers' emotional and prosocial responses  
517 to news coverage about natural hazards.

518  
519 In this study, only affective state empathy was directly associated with intentions to donate. This  
520 finding reinforces previous evidence suggesting that affective empathy is more proximal to  
521 action than the cognitive dimension (Singer and Lamm 2009). Moreover, these results suggest

522 that the connection between empathy and prosocial intentions may only occur with the arousal of  
523 the affective dimension of empathy, providing one potential explanation for the previously  
524 mixed results exploring the empathy-arousing ability of narratives (Keen 2007). These results  
525 suggest that the current empathy-altruism hypothesis could be modified to better account for  
526 differences in the effect of the cognitive, affective, and associative dimensions of state empathy  
527 on behavioral intentions.

528

### 529 *Limitations*

530 Participants were limited to students at a public university in the U.S. It is possible that  
531 participants with more direct experience with drought or farming would be more likely to  
532 identify with the individual profiled in the personalized news story. It is possible that lack of  
533 experience with drought contributed to the lack of an observed direct relationship between  
534 identification and prosocial behavior. In addition, students' limited ability to make a financial  
535 contribution might be another reason for the lack of direct effects of story type or perceived  
536 suffering on prosocial behavior. Finally, participants were recruited as part of a class on media  
537 and society. Thus, this population may be more sensitized to different modes of communication  
538 and thus less affected by the stimuli used in this study. We recommend that future research  
539 replicate this study with adults.

540

541 Additionally, our measure of readers' donations, which we used to test Hypothesis 6 and  
542 Research Question 1, assessed participants' general intention to donate money, rather than asking  
543 them to make an actual donation or to specify how much they would donate. Although research  
544 related to the Theory of Planned Behavior (Ajzen 1991) suggests that individuals' behavioral  
545 intentions are often highly correlated with their actual behavior, assessing actual donations  
546 would have been preferable. Additionally, the yes/no format of the donation intentions question  
547 may have obscured differences between participants in the degree to which they planned to  
548 donate, or made them more likely to select the "yes" option (given it did not have a monetary  
549 value attached to it). Future research that enables participants to make actual donations of  
550 differing amounts would be a valuable next step.

551

552 Finally, the approach used in this study tells only how respondents felt immediately after reading  
553 personalized and non-personalized articles about drought. This approach provides us with limited  
554 information about the potential cumulative effect of mass media disaster coverage or the long-  
555 term impacts of reading a personalized news story about large-scale distant disasters.

556

557 In spite of these limitations, these findings suggest that personalized news stories about drought  
558 events are one potential pathway to encourage readers' emotional responses, including perceived  
559 suffering and state empathy. Our results also suggest that transportation into a story, perceived  
560 suffering and state empathy may interact in important ways to contribute to intentions to support  
561 individuals suffering during drought events. While intentions are important, social action around  
562 drought, water scarcity, and climate change will require significantly more direct action,  
563 including political lobbying, organizing, and public protests. While we found many important  
564 relationships between our primary measures, we found no direct relationship between  
565 personalization and behavioral intentions. Thus, additional work is needed to further explore the  
566 effect of emotional storytelling on the adoption of prosocial actions in response to drought and  
567 natural hazards.

568  
569 In addition, we add a note of caution about the use of personalized stories to motivate action.  
570 Prior evidence from a variety of studies in health communication suggests that personalized  
571 stories are effective in encouraging individual attitudes and behaviors. However, previous  
572 research has also highlighted the limitations of using personalized narratives to generate  
573 collective action or promote specific social policies. For example, compared to depersonalized  
574 formats, personalized narratives generated more counterarguments in response to claims that  
575 social factors drive obesity (Zhou and Niederdeppe 2017) and less support for school-based  
576 nutrition policies (Barry, Brescoll, and Gollust 2013). Moreover, given the potential for  
577 psychological reactance to messages about climate change (Dixon, Hmielowski, and Ma 2019;  
578 Ma, Dixon, and Hmielowski 2019), messages about drought must be carefully designed and  
579 tested to avoid responses that might undermine effective persuasion (Nabi, Gustafson, and  
580 Jensen 2018). Future scholarship should explore the potential for personalized narratives in  
581 environmental contexts to encourage both individual-level attitudes and behaviors as well as  
582 collective action and policy support.

583  
584 Given the potential for the frequency, duration, and severity of drought events to increase, there  
585 is a critical need for further study about the use of emotional storytelling for hazard coverage.  
586 Our work focused on personalized and non-personalized news stories about farmers, but future  
587 work could explore empathic and prosocial responses to stories about other groups (i.e., the  
588 elderly, immigrants). Previous research has suggested that reports about floods by Western-  
589 dominated global media are less likely to use personal stories about individual suffering when  
590 reporting about flooding in the developing world (Solman and Henderson 2019). Future work  
591 could explore if readers' empathic responses to stories about individual suffering vary by subject  
592 location, nationality, gender, and race.

593  
594 The extreme suffering produced by drought highlights the importance of understanding how to  
595 mobilize an effective collective response to slow-onset hazards such as drought and water  
596 scarcity. One potential tool for such mobilization is the media. Yet while 'just-the-facts'  
597 reporting about drought, environmental hazards, or climate change, may raise awareness about  
598 these environmental issues, emotive storytelling and personalized narratives appear to be a  
599 promising tool to generate readers' empathic responses and, indirectly, intentions to support  
600 individuals suffering due to drought. In addition, our findings suggest that personalized stories  
601 designed to produce prosocial intentions may be more effective when they generate a  
602 combination of transportation, perceived suffering and affective state empathy. In sum, these  
603 results point to ways that environmental writers and reporters can raise awareness and potentially  
604 mobilize social action around drought and water scarcity.

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- 847

848

849 **6.1 Tables**

850 Table 1. Correlations

	1. Cog. SE	2. Aff. SE	3. Assoc. SE	4. Per. Suffering	5. Transport	6. Int. to Donate
1. Cog. SE	1.00					
2. Aff. SE	.519**	1.00				
3. Assoc. SE	.496**	.751**	1.00			
4. Per. Suffering	.612**	.567**	.429**	1.00		
5. Transport	.579**	.721**	.601**	.567**	1.00	
6. Int. to Donate	.263**	.232**	.105	.207**	.170*	1.00

851  
852

\*p < .05. \*\*p < .01.

853 Table 2. Descriptive Statistics for Non-Personalized and Personalized Stories

	Story Format			
	Non-Personalized		Personalized	
	M	SD	M	SD
Cog. SE	3.46	0.70	3.75	0.67
Aff. SE	2.89	0.93	3.23	0.91
Assoc. SE	2.89	1.00	3.05	1.04
Per. Suffering	3.37	0.92	3.65	0.79
Transport	3.94	1.36	4.19	1.26
Int. to Donate	0.42	0.49	0.44	0.49

854

855

856 Table 3. Factor Solution for State Empathy

	Factor		
	Cognitive SE 1	Affective SE 2	Associative SE 3
I can understand the points of view expressed in the article	<b>.809</b>	.121	.084
I recognize the situation detailed in the article	<b>.781</b>	.045	.136
Reactions to the drought are understandable	<b>.642</b>	.133	.127
The emotions expressed in this story are genuine	<b>.576</b>	.316	.041
I can understand what farmers in the southwest are going through	<b>.589</b>	.286	.292
I experienced the same emotions as the farmer(s) when reading this story	.202	<b>.803</b>	.368
I was in a similar emotional state as the farmer(s) when reading the story	.148	<b>.776</b>	.421
I can feel the farmer's emotions	.310	<b>.704</b>	.258
When reading the message, I was fully absorbed	.230	<b>.510</b>	.410
I can identify with the farmers in the story	.210	.370	<b>.800</b>
I can identify with the situation described in the story	.145	.236	<b>.770</b>
I can relate to what farmers are going through in the story	.146	.449	<b>.688</b>

857

858

859 **6.2 Figure Legends**

860 Figure 1. Hypothesized model

861

862 Figure 2. Final path model

863 **7 Conflict of Interest**

864 *The authors declare that the research was conducted in the absence of any commercial or financial*  
865 *relationships that could be construed as a potential conflict of interest.*

866 **8 Author Contributions**

867 DW led the development of the research design, oversaw the analysis, research interpretation and  
868 writing. EJ and NW assisted with the development of the survey, data interpretation and writing. JH  
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