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EMPIRICAL ARTICLE

Episodic Simulation of Helping Behavior in Younger and Older Adults During the COVID-19 Pandemic

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Imagining helping a person in need increases one's willingness to help beyond levels evoked by passively reading the same stories. We examined whether episodic simulation can increase younger and older adults' willingness to help in novel scenarios posed by the COVID-19 pandemic. Across three studies, we demonstrate that episodic simulation of helping behavior increases younger and older adults' willingness to help during both everyday and COVID-related scenarios. Moreover, we show that imagining helping increases emotional concern, scene imagery, and theory of mind, which in turn relate to increased willingness to help. Studies 2 and 3 also showed that people produce more internal, episodic-like details when imagining everyday compared to COVID-related scenarios, suggesting that people are less able to draw on prior experiences when simulating such novel events. These findings suggest that encouraging engagement with stories of people in need by imagining helping can increase willingness to help during the pandemic.

General Audience Summary

Since late 2019, news outlets and social media platforms have shown examples of people in need amidst the COVID-19 pandemic. Across a series of studies, we examine whether people are more willing to help others in need after imagining a scenario in which they help the other person, compared to when they passively read the same story. Specifically, we examined whether imagining helping scenarios increase younger and older adults' willingness to help in novel scenarios posed by the COVID-19 pandemic. Across three studies, we found that imagining helping others in need increases one's willingness to help during both everyday and COVID-related scenarios of people in need. Further, we show that imagining helping increases emotional concern, scene imagery (i.e., vividness of a scene), and theory of mind (i.e., perspective-taking), all of which are related to participants' willingness to help those in need. In Studies 2 and 3, we found that people produce richer, more event-related details when imagining everyday scenarios, but more basic, factual details for COVID-related scenarios. This suggests that people may use memories of similar past events to help imagine familiar scenarios and rely more on factual knowledge when imagining more novel or unfamiliar scenarios. These findings suggest that encouraging audiences to engage with stories of people in need by imagining helping can increase willingness to help during the pandemic.

Keywords: episodic simulation, COVID-19, helping behavior, aging, scene imagery

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Since late 2019, global newsfeeds have been filled with stories about people facing unprecedented hardships due to COVID-19. While exposure to these stories may engender empathy and encourage people to lend a hand, recent research has shown that imagining helping a person in need increases one's willingness to help more than passively reading the same stories (Gaesser et al., 2018, 2020; Gaesser & Schacter, 2014; see Bo O'Connor & Fowler, 2022, for review). This sort of imagination relies on the ability to "try out" different scenarios by creating mental simulations of events that could happen in the future (i.e., episodic future thinking; Schacter et al., 2008, 2015; Taylor & Schneider, 1989). According to the *constructive episodic simulation hypothesis*, individuals draw on episodic memory to create these hypothetical scenarios, flexibly recombining elements of past experiences to simulate new situations (Schacter & Addis, 2007, 2020). Since the global pandemic is an unfamiliar scenario for most people, it is unclear whether episodic simulation will increase willingness to help for COVID-related scenarios. We aimed to test this in the present study.

From Imagination to Implementation

Episodic simulations, wherein one "tries out" potential future events, have been linked to emotion regulation and the creation and implementation of plans (Jing et al., 2016, 2017; Taylor et al., 1998; Taylor & Schneider, 1989). In addition to mentally working-through hypothetical events, research suggests that these mental simulations can increase the likelihood that a simulated behavior will take place (Taylor et al., 1998). For instance, imagining specific future behaviors (like voting) influences participants' subjective likelihood of the event taking place and predicts whether participants subsequently engage in the imagined behavior (Gregory et al., 1982; Libby et al., 2007). Similarly, when imagining helping others, research has found a link between episodic simulation and the amount people donate (Gaesser et al., 2018, 2020). Importantly, high-quality, easily imagined events are thought to be more believable future events, and subsequently, participants are more likely to complete the imagined event (Baumeister et al., 2011; D'Argembeau & Garcia Jimenez, 2020).

In terms of willingness to help, a series of studies by Gaesser and Schacter (2014) demonstrated that participants were more willing to help others in need after simulating helping scenarios compared to several control conditions. Notably, participants were more willing to help someone after simulating helping compared to (a) simply being exposed to the plight of the other person, (b) considering the journalistic style of the story, and (c) merely generating ways in which the person could be helped (but not imagining being actively involved). As such, the act of simulation and the subjective experience of the prelived scenario appear to play a large role in increasing willingness to help. They also found that *remembering* a time when you helped someone in a similar situation was effective at increasing willingness to help (Gaesser & Schacter, 2014). Notably, if a situation of need was completely novel and participants were unable to recall a related helping event, then willingness to help remained at baseline (Gaesser & Schacter, 2014). Thus, it is possible that while episodic simulation allows people to overcome the narrowness of their past experience, there may be limitations when dealing with a situation as unprecedented as COVID-19.

Episodic Simulation in Aging

Research indicates that episodic memory declines with age, and similar deficits have also been observed for episodic simulation (Addis et al., 2008). Indeed, older adults have been shown to produce more semantic (i.e., general facts) and fewer episodic (i.e., event-related) details than younger adults when asked to remember past or imagine future events (Addis et al., 2008, 2010; Cole et al., 2013).

To date, few studies have examined age differences in the effect of episodic simulation on willingness to help, and those that have suggest that the underlying mechanisms may differ with age. For instance, Gaesser et al. (2017) demonstrated that episodic simulation can increase older adults' willingness to help relative to a baseline condition. Importantly, subjective scene imagery similarly predicted willingness to help in both older and young adults, while a trend was found for theory of mind to be more strongly related to willingness to help in younger adults (Gaesser et al., 2017). Similar findings from Sawczak et al. (2019) also suggest that episodic simulation of helping can increase willingness to help across the life span, but episodic simulation increased younger adults' empathic concern more than it did older adults (Sawczak et al., 2019; see also Vollberg et al., 2021). Thus, while episodic simulation can increase willingness to help in older adults, it may do so via different mechanisms than in younger adults.

The Role of Familiarity in Episodic Simulation

As discussed, scene context appears to be particularly important for successful simulation of future events. Events imagined in familiar contexts are rated as being clearer than those set in unfamiliar contexts (Arnold et al., 2011). In a study examining younger adults, Gaesser et al. (2018) demonstrated that familiar spatial contexts facilitated a *greater* willingness to help than unfamiliar contexts when imagining helping. Moreover, scene familiarity influenced subjective vividness of the scene and increased perspective-taking of the person in need, which in turn influenced participants' willingness to help (Gaesser et al., 2018, 2020; see Gaesser, 2020 for review). What remains unclear is whether episodic simulation will increase willingness to help when the entire scenario is novel, such as those posed by the pandemic.

Imagining highly unfamiliar scenarios has been shown to increase task demands by requiring individuals to access disparate, unrelated sources of information (Robin & Moscovitch, 2014; Weiler et al., 2010). Given that cognitive control is known to decline with age (e.g., Amer et al., 2016), the increased combinatorial demands of imagining unfamiliar, COVID-related helping scenarios may prove challenging for older adults. Thus, we might expect an age-related decline in the ability to simulate helping in novel, COVID-related scenarios. Given the current global situation, and the time it may take for society to recover from the pandemic, understanding the potential cognitive mechanisms underlying age differences in willingness to help has important implications for society.

The Present Studies

We aimed to test whether episodic simulation of helping scenarios can be used to increase younger and older adults' willingness to help in novel, pandemic-related scenarios. Across three online experiments, participants read a series of problem scenarios

(half related to COVID-19 and half everyday problems), and for each one, they either imagined helping the person in need or completed a control condition (in which they judged the story source). Additionally, in Studies 2 and 3, participants also typed open-ended descriptions of their source judgments and imagined scenarios. Participants then rated their willingness to help the person in need and their phenomenological experience of the scenario.

Study 1

In addition to replicating previous findings in everyday scenarios, we hypothesized that episodic simulation would increase willingness to help in COVID-related scenarios but maybe to a lesser degree in older than younger adults. We also expected that phenomenological experiences (i.e., scene imagery, emotional concern, and subjective theory of mind) would strongly relate to willingness to help in both story contexts.

Method

Participants

This study was preregistered on AsPredicted (https://aspredicted.org/blind.php?x=bd4z8w). Based on previous research using this paradigm online (Gaesser et al., 2018), we aimed to test 100 young adults (18–35 years) and 100 older adults (60–80 years). Participants were recruited through a Qualtrics research panel and testing took place between April and June 2020. All participants were Canadian residents who were fluent in English with no history of stroke, neurological conditions (e.g., epilepsy), cognitive impairment (e.g., dementia, Alzheimer's), or psychiatric issues (e.g., schizophrenia or bipolar disorder). All participants were compensated for their time. In total, 219 participants completed the study, and 10 study responses were removed due to having duplicate IP addresses. A further nine participants were removed due to taking >2.5 *SD* longer than their age cohort to complete the study. Data collection continued until 100 younger ($M = 28.05$, $SD = 5.48$, 59% women, 2% other) and 100 older adults ($M = 67.00$, $SD = 4.52$, 51% women) with usable data completed the study. Among younger adults, 52% self-identified as White, Caucasian, or European; 20% as Asian; 10% as Black or African; 5% as Canadian; 4% as mixed ethnicity; 4% as unknown or refused to answer; 3% as Middle Eastern; and 2% as Hispanic or Latin American. Among older adults, 74% self-identified as White, Caucasian, or European; 19% as Canadian or American; 3% as Asian; 1% as Black or African; 1% as mixed ethnicity; 1% as Jewish; and 1% as unknown or refused to answer.

Procedure

The paradigm used in this study was adapted from previous research on episodic simulation of helping behavior (Gaesser et al., 2018; Gaesser & Schacter, 2014). In a within-subjects design, participants were presented with one-line stories depicting examples people in need of help. Half of the stories described everyday examples of people in need (e.g., "This person is locked out of their house"), while the other half described scenarios that are specific to the COVID-19 pandemic (e.g., "This person is out of essentials due to panic buying"; see Supplemental Material, for a list of the scenarios). Stories were pseudorandomized into one of two conditions wherein participants were asked to either (a) focus on the story by considering its journalistic style and online media source (no-helping condition) or (b) imagine a vivid scenario of helping the person in need (imagine helping condition). These conditions are similar to those used in previous work (Gaesser et al., 2018; Gaesser & Schacter, 2014).

Participants were presented with the instructions for the task and completed two practice trials (one for each condition) to become familiar with the task. Participants were asked whether they understood the instructions, and further instructions/examples were given to those who did not understand the instructions, while those who reported understanding the task were immediately forwarded to the trials. Given the online nature of data collection, anyone still not understanding the instructions after two checks was excluded from the study; although this exclusion criterion was not included in our preregistration, it was used to ensure that participants understood the instructions.

For each trial, participants were presented with the story for 10 s, followed by a 60 s condition prompt (during which time, they were supposed to either imagine helping the person or consider the journalistic style of the story). Immediately after the prompt, participants were asked how willing they would be to help the person in need (1 = *not at all* to 7 = *very willing*). Participants also rated the stories in terms of scene coherence (1 = *vague* to 7 = *coherent and clear*), scene detail (1 = *simple* to 7 = *detailed*), whether the story made the participants feel troubled, distressed, sympathetic, compassionate, worried, and moved (1 = *not at all* to 7 = *extremely*), and as a measure of perspective-taking/subjective theory of mind, participants were asked to rate how much they considered the thoughts and feelings of the person in need (1 = *not at all* to 7 = *a great deal*). Participants also rated each scenario on how similar it was to situations they have previously experienced (1 = *not at all* to 7 = *very similar*). These ratings remained on the screen until participants responded to all of them (i.e., self-paced). Participants completed 12 trials with six stories in each condition (3 COVID-related, 3 depicting everyday scenarios). Participants then completed a demographic questionnaire.

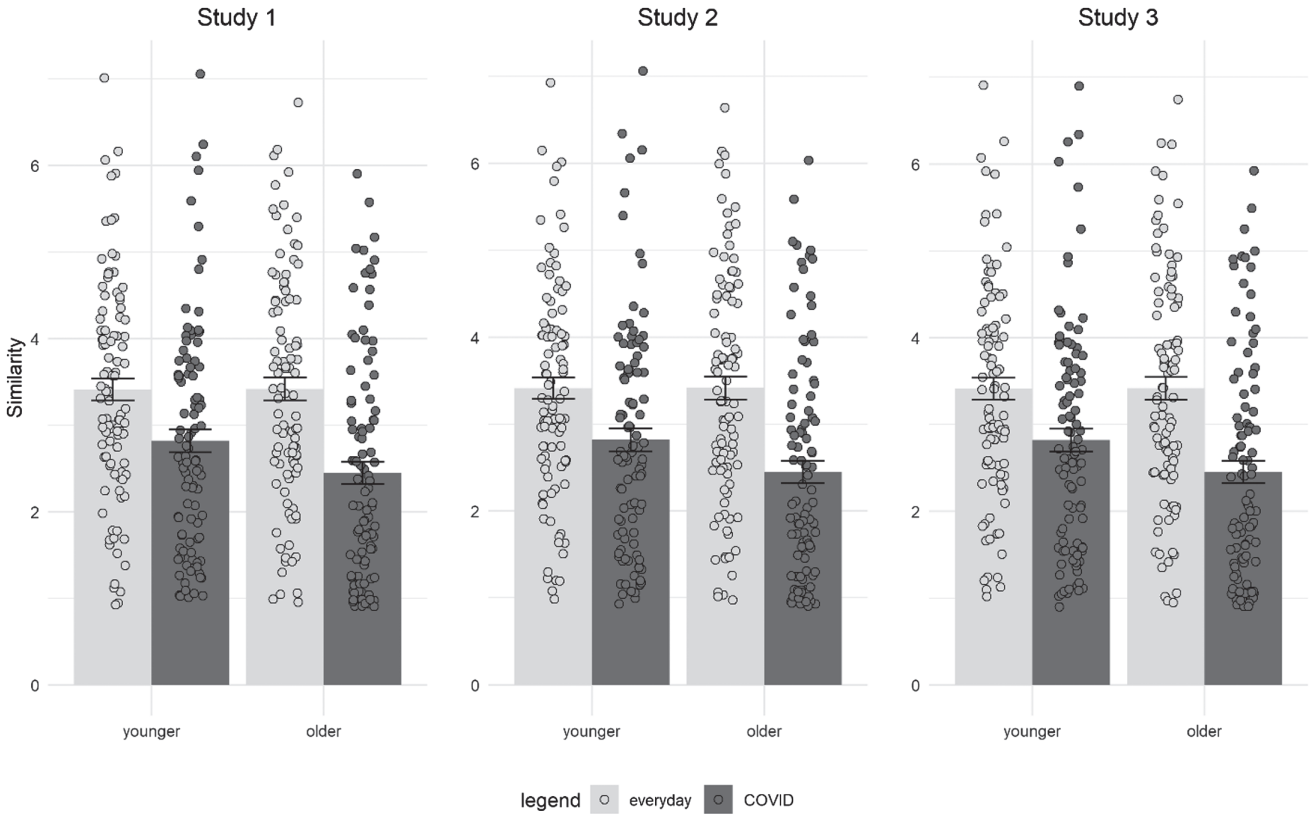
Results

Similarity of Everyday Versus COVID-Related Scenarios

As a manipulation check, we conducted a 2 (story type: everyday vs. COVID-19) × 2 (age: younger vs. older adults) analysis of variance (ANOVA) on participants' ratings of situation similarity (nota bene: this analysis was not part of the preregistration). As expected, we found a main effect of story, $F(1, 198) = 121.65$, $p < .001$, $\eta_p^2 = 0.381$, reflecting everyday scenarios ($M = 3.42$, $SE = .09$) being rated as more similar to situations participants had previously experienced compared to COVID-related scenarios ($M = 2.64$, $SE = .09$). There was also a story by age interaction, $F(1, 198) = 6.98$, $p = .009$, $\eta_p^2 = 0.034$. Follow-up analyses revealed that this was due to a larger effect of story in older adults (everyday: $M = 3.42$, $SE = .13$; COVID: $M = 2.45$, $SE = .13$), $t(99) = 9.00$, $p < .001$; however, the effect was still significant in younger adults (everyday: $M = 3.41$, $SE = .12$; COVID: $M = 2.82$, $SE = .13$), $t(99) = 6.45$, $p < .001$ (see Figure 1). The main effect of age was not significant, $p = .279$. Thus, participants thought that COVID-related scenarios were less similar to previous experiences than everyday scenarios, and this effect was more pronounced in the older group.

Figure 1

Participants' Ratings of Situation Similarity Across Everyday and COVID-Related Stories in Studies 1–3



Note. Individual data points are jittered for ease of visualization, error bars represent standard error of the mean.

Willingness to Help by Condition and Story Manipulation

We used hierarchical mixed-effects modeling[1] (e.g., Sommet & Morselli, 2017) to explore the effect of condition (no-helping vs. imagine helping), story type (everyday vs. COVID-19), and age (younger vs. older adults) on willingness to help while accounting for random effects of individual stories (i.e., story number) and participants. We constructed multiple models in a hierarchical fashion, adding predictors to the model one at a time. We then compared the models to assess whether each variable added to the overall predictability of willingness to help. To avoid overparameterization, the most parsimonious model was then constructed by retaining only the variables that significantly added to the model. The initial base model indicated a small correlation (intraclass correlation coefficient [ICC] = 0.29) between willingness to help ratings from individual participants. Story number was added to the model as a random effect and was found to significantly predict willingness to help, $\chi^2(1) = 377.12$, $p < .001$; ICC = 0.42. Thus, both random effects were retained for the analysis. Fixed factors were added to the model in the following order: condition, story type, Condition × Story Type, age, Condition × Age, Story × Age, Age × Condition × Story. Finally, the most parsimonious model was constructed by including only predictors that improved model fit.

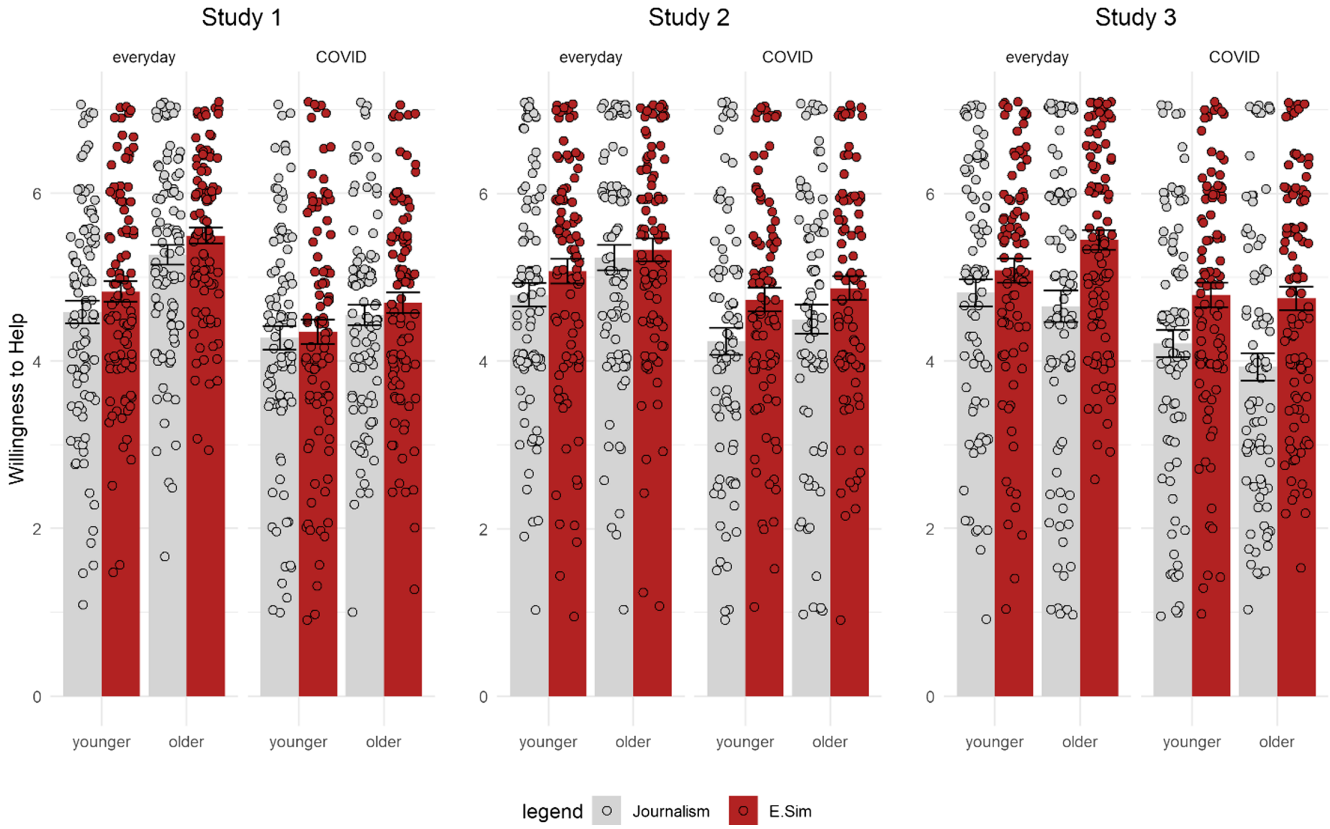
Condition was found to improve model fit, $\chi^2(1) = 9.00$, $p = .003$, as did age, $\chi^2(1) = 8.29$, $p = .004$, and the interaction between age and story type, $\chi^2(1) = 7.30$, $p = .007$; these factors were entered into the best-fit model. All other predictors did not improve model fit: story type, $\chi^2(1) = 3.43$, $p = .063$; Condition × Story Type, $\chi^2(1) = 0.88$, $p = .346$; Condition × Age, $\chi^2(1) = 0.20$, $p = .652$; Condition × Story Type × Age, $\chi^2(1) = 0.18$, $p = .669$.

The best-fit model revealed that there was an effect of condition, $B = 0.17$, $SE = 0.06$, $t(2185.74) = 3.02$, 95% CI [0.06, 0.28], such that willingness to help was higher following episodic simulation of helping ($M = 4.82$, $SE = .18$) relative to judging journalistic style ($M = 4.65$, $SD = 18$; see Figure 2, for observed means). There was also an effect of age, $B = 0.42$, $SE = 0.14$, $t(198) = 2.90$, 95% CI [0.14, 0.70], due to older adults' ($M = 4.94$, $SE = .19$) overall higher willingness to help than younger adults ($M = 4.52$, $SE = .19$). The interaction between age and story type, $B = -0.76$, $SE = 0.34$, $t(10.56) = 2.25$, 95% CI [−1.42, −0.10], is due to older adults' reporting higher willingness to help in everyday ($M = 5.32$, $SE = .26$) compared to COVID-related scenarios ($M = 4.56$, $SE = .26$). While the direction of the effect was the same in younger adults (everyday: $M = 4.75$, $SE = .26$; COVID: $M = 4.29$, $SE = .26$), the difference failed to reach significance, $B = -0.46$, $SE = 0.34$, $t(10.56) = 1.37$, 95% CI [−1.12, 0.20]. Random effects for the best-fit model were

[1] Note that this differs from the preregistration, in which we proposed an ANOVA approach. However, mixed-effects modeling was rightly suggested by a reviewer, as it can account for stimulus effects (particularly important in this case, as we are using a novel set of stimuli generated for this study).

Figure 2

Average Willingness to Help in Younger and Older Adults Across All Conditions in Studies 1–3



Note. Individual data points are jittered for ease of visualization, error bars represent standard error of the mean. In Study 2, neither the main effect of age nor the interactions with age were significant, but means are plotted separately by age group for the sake of comparison with Studies 1 and 3. See the online article for the color version of this figure.

$\sigma^2 = 1.85$, ICC = 0.40, $\tau_{00\ id} = 0.89$, $\tau_{00\ StoryNumber} = 0.32$. Marginal and conditional R^2 for the model were 0.046 and 0.425, respectively.

Willingness to Help Correlations With Phenomenological Experiences

Previous research has suggested that phenomenological experiences (such as emotional concern, scene imagery, and subjective theory of mind) may be potential mechanisms through which episodic simulation increases willingness to help (Gaesser et al., 2018; Gaesser & Schacter, 2014; Sawczak et al., 2019). Indeed, scene imagery and subjective theory of mind were found to be higher following episodic simulation relative to the journalistic style condition (see Supplemental Material; this exploratory analysis was not preregistered). As in previous work, scales measuring emotions experienced in response to the scenarios were averaged to form an emotional concern index per condition, as were ratings of scene coherence and detail to form a scene imagery index reflecting the overall vividness of the scene produced by participants (Batson, 2011; Gaesser et al., 2017). To explore whether these phenomenological experiences contribute to participants' increased willingness to help following episodic simulation in the everyday and COVID-related scenarios, we examined the repeated-measures correlations (Bakdash & Marusich, 2017) between these measures and willingness to help using the "rmcorr" package in R. Because there was an interaction between story type and age on willingness to help, correlational analyses were conducted within each story type for younger and older adults separately. We then used Fisher's z transformations to compare the relationship between phenomenological experiences and willingness to help between age groups (Meng et al., 1992; see Table 1, for r_{rm} coefficients and Fisher's z transformations). A Bonferroni-adjusted α level ($p < .004$) was used to correct for the 12 tests performed.

Individuals within both age groups reliably exhibited a significant positive relationship between willingness to help and emotional concern for both the everyday and COVID-related scenarios, suggesting that as emotional concern increases, so does one's willingness to help the person in need. A comparison of these correlations revealed that the relationship between willingness to help and emotional concern was stronger in older, compared to younger adults in the COVID-related scenarios, suggesting that as emotional concern increases, so does one's willingness to help and that the strength of this relationship may differ by story context and age (see Table 1, for Fisher's z values comparing correlation coefficients between age groups; and Supplemental Material, for scatterplots).

Table 1
Within-Subject Correlations Between Phenomenological Experience and Willingness to Help Across Studies 1–3

Phenomenological experience	Emotional concern		Young versus old	Scene imagery		Young versus old	Theory of mind		Young versus old
Scenarios	Younger	Older	(Fisher's z)	Younger	Older	(Fisher's z)	Younger	Older	(Fisher's z)
Study 1									
Everyday	.575**	.499**	0.75 (.22)	.515**	.262	2.10 (.02)	.709**	.656**	0.69 (.24)
COVID	.425**	.599**	−1.66 (.05)	.158	.293*	−0.99 (.16)	.567**	.725**	−1.92 (.03)
Study 2									
Everyday	.472**	.503**	−0.27 (.39)	.429**	.298	1.01 (.16)	.742**	.769**	−0.42 (.34)
COVID	.345**	.527**	−1.51 (.07)	.495**	.445**	0.43 (.33)	.626**	.698**	−0.86 (.20)
Study 3									
Everyday	.682**	.562**	1.33 (.09)	.331*	.111	1.57 (.06)	.733**	.724**	0.13 (.45)
COVID	.529**	.544**	−0.14 (.56)	.441**	.384**	0.46 (.32)	.715**	.770**	−0.83 (.20)

Note. Correlation values reflect the within-subject correlation (r_{rm}) between phenomenological experience and willingness to help. Fisher's z p values are presented in parentheses.
Correlation p values are noted as * $p < .004$. ** $p < .001$.

For scene imagery, younger adults exhibited a significant positive relationship between willingness to help and scene imagery for the everyday scenarios, while older adults did not. Moreover, a comparison of these correlations using Fisher's r to z transformation revealed that the relationship between willingness to help and scene imagery was stronger in younger, compared to older adults in the everyday helping scenarios, suggesting that scene imagery may be a stronger predictor of willingness to help in younger adults in typical scenarios. However, in terms of COVID-related scenarios, only older adults exhibited a relationship between scene imagery and willingness to help; nevertheless, the Fisher's transformation determined that there was no age-related difference in the relationship between scene imagery and willingness to help in COVID-related scenarios.

For subjective theory of mind, individuals in both age groups exhibited a relationship between willingness to help and subjective theory of mind for the everyday and COVID-related scenarios. Fisher's z transformation revealed that the relationship between willingness to help and subjective theory of mind was stronger in older, compared to younger adults in the COVID-related scenarios, suggesting that as subjective theory of mind increases, so does one's willingness to help and that the strength of this relationship may differ by story context and age.

Discussion

In Study 1, we found that episodic simulation of helping increased willingness to help in both older and younger adults in both the COVID-related and everyday scenarios. However, the relationship between willingness to help and participants' emotional concern, scene imagery, and subjective theory of mind varied with age and story type. In Study 2, we aimed to replicate these effects and gain further insight into participants' imagined events.

Study 2

Study 2 used the same procedure as Study 1, except participants typed a description of how they imagined helping the person in need or where they thought the story was from. This prompt encouraged participants to engage with the task and allowed us to determine whether participants were performing the task correctly. We also scored participants' descriptions of their imagined events in terms of internal (episodic-like) and external (semantic information, commentary, repetitions) details, using the autobiographical interview protocol (Levine et al., 2002), to determine whether the type of details produced differed with age and story type. We expected participants to produce more internal details when imagining everyday scenarios due to having memories for similar events. Conversely, we expected more external details to be produced when imagining the more unfamiliar COVID-related scenarios due to a lack of personal experiences on which to draw.

Method

Participants

We aimed for the same sample size as Study 1, and the same recruitment and inclusion criteria were used. Additionally, IP addresses that completed Study 1 were excluded from participating. A total of 224 people completed Study 2 between June and July 2020. Similar exclusion criteria were used when cleaning the data, such that seven participants were removed for taking >2.5 *SD* longer than their age cohort to complete the study, two younger adults were removed for typing gibberish in the open-ended response boxes, and 22 participants were removed for completing the wrong task on more than 50% of all trials (i.e., more than 6 trials, see Data Screening section for details). Additionally, four older adults were removed for scoring below 11 on the adapted version of the Mini-Mental State Examination (MMSE; see Procedure section for details). The final sample ($N = 189$) consisted of 96 younger adults ($M = 28.17$, $SD = 5.20$, between the ages of 18 and 36, 64.6% women) and 93 older adults ($M = 66.62$, $SD = 4.75$, between the ages of 60 and 79, 53.8% women). Among younger adults, 43.75% self-identified as White, Caucasian, or European; 31.25% as Asian; 7.29% as Canadian; 5.21% as Black or African; 3.13% as Hispanic, Latin, or South American; 2.08% as mixed ethnicity; 2.08% as Middle Eastern; 2.08% as Indian; 1.04% as Native American; and 2.08% as unknown or refused to answer. Among older adults, 67.03% self-identified as White, Caucasian, or European; 15.38% as Canadian (including French Canadian); 4.39% as Asian; 3.29%

as Jewish; 2.19% as Indian and Sri Lankan; 1.09% as Middle Eastern; 1.09% as Jamaican; 1.09% as Egyptian; 1.09% as Aboriginal; 1.09% as mixed ethnicity; and 2.19% as unknown or refused to answer.

Procedure

The procedure was the same as Study 1 with the addition of open-ended responses collected during the condition prompts. Specifically, participants were given 60 s to type a description of their imagined scenario and/or thoughts while judging the journalistic style of the story (see Supplemental Material, for transcript examples). Immediately after each condition prompt, participants performed the same ratings as in Study 1 (i.e., willingness to help, scene coherence, etc.). After completing all trials, participants rated each story on how safe it was to help the person in need (1 = *not at all* to 7 = *very safe*). They were then forwarded to an online version of the MMSE (Folstein et al., 1975), a tool used in aging research to screen for cognitive deficits. Since the study was conducted online, portions of the MMSE that require in-person responses (i.e., drawing) were removed from the test. Similar modifications have been used in the past to administer the MMSE remotely, with high internal consistency and correlations to the original MMSE found (see Kennedy et al., 2014, for more information). These modifications resulted in a maximum score of 14; therefore, we selected scores <11 as a cutoff for potential Mild Cognitive Impairment to keep scores proportionate to those used for remote administration of the MMSE (Kennedy et al., 2014). Participants then completed a demographics questionnaire.

Data Screening. Using participants' open-ended descriptions, each trial was scored as being completed correctly or incorrectly. Incorrect trials were defined as explicit mention of performing the opposite task (e.g., judging the journalistic style of a story on imagining helping trials); incorrect trials were excluded from the analyses.

Additionally, open-ended responses were scored for the type of details produced based on the coding scheme outlined in the Autobiographical Interview scoring manual (Levine et al., 2002). The criteria define internal details as those that are directly related to the event, while external details consist of extraneous and semantic information unrelated to the event (including commentary and references to other episodes; Levine et al., 2002). While this scoring method is typically used to code larger narratives in which participants describe their imagined events over the course of several minutes, it is important to note that the present study limits participants' responses to 60 s. Scoring was conducted independently by two trained scorers. Similar to previous research (Levine et al., 2002; Wang et al., 2016), interrater reliability was assessed by comparing 25% of the open-ended responses in terms of the number of internal and external details scored. ICCs for the number of internal and external details produced were .827 and .919, respectively.

Results

Similarity of Everyday Versus COVID-Related Scenarios

In keeping with Study 1, we performed a 2 (story type: everyday vs. COVID-19) × 2 (age: younger vs. older adults) ANOVA on participants' ratings of situation similarity as a manipulation check. Replicating Study 1, we found a main effect of story, $F(1, 185) = 115.57$, $p < .001$, $\eta_p^2 = 0.385$, reflecting everyday scenarios ($M = 3.46$, $SE = .11$) being rated as more similar to situations participants had previously experienced compared to COVID-related scenarios ($M = 2.58$, $SE = .10$). Once again, we found a story by age interaction, $F(1, 185) = 7.89$, $p = .005$, $\eta_p^2 = 0.041$. Follow-up analyses revealed that there was a larger effect of story in older adults, $t(90) = 8.79$, $p < .001$, such that everyday ($M = 3.64$, $SE = .16$) scenarios were seen as more similar to previous experiences than COVID-related scenarios ($M = 2.52$, $SE = .12$). Importantly, younger adults also rated everyday scenarios ($M = 3.27$, $SE = .15$) higher in similarity to previous experiences compared to COVID-related scenarios ($M = 2.63$, $SE = .15$), $t(95) = 6.18$, $p < .001$. The main effect of age was not significant, $p = .682$.

Willingness to Help by Condition and Story Manipulation

As with Study 1, we built mixed-effects models hierarchically to explore the effect of condition (no-helping vs. imagine helping), story type (everyday vs. COVID-19), and age (younger vs. older adults) on willingness to help while accounting for random effects present in individual stories (i.e., story number) and participants. As with Study 1, the initial intercept model indicated a correlation (ICC = 0.32) between willingness to help ratings within individual participants. Story number was added to the model as a random effect and found to significantly predict willingness to help, $\chi^2(1) = 298.31$, $p < .001$; ICC = .45. Thus, both random effects were retained for the analysis. Fixed factors (see Study 1 section for list) were added to the model, and the most parsimonious model was constructed by including only predictors that improved model fit.

Condition was found to improve model fit, $\chi^2(1) = 21.50$, $p < .001$, as did the age by condition interaction, $\chi^2(1) = 3.91$, $p = .047$. All other predictors did not improve model fit: story type, $\chi^2(1) = 2.69$, $p = .101$; Condition × Story Type, $\chi^2(1) = 1.68$, $p = .195$; age, $\chi^2(1) = 1.84$, $p = .174$; Age × Story Type, $\chi^2(1) = 1.37$, $p = .242$; Condition × Story Type × Age, $\chi^2(1) = 0.14$, $p = .707$. Thus, the most parsimonious model included condition and the condition by age interaction.

As with Study 1, best-fit model estimates indicate that there was an effect of condition, $B = 0.41$, $SE = 0.09$, $t(1735) = 4.73$, 95% CI [0.24, 0.59], such that willingness to help was higher following episodic simulation ($M = 5.03$, $SE = .20$) of helping relative to judging journalistic style ($M = 4.75$, $SE = .20$; see Figure 2). In this case, we found an interaction between condition and age which was explained by older adults' ($M = 4.93$, $SE = .22$) higher willingness to help than younger adults ($M = 4.56$, $SE = .22$) in the journalism condition, $B = 0.37$, $SE = 0.18$, $t(263.6) = 2.04$, 95% CI [0.01, 0.72], but not in the episodic simulation condition (older: $M = 5.09$, $SE = .22$; younger: $M = 4.98$, $SE = .22$), $B = 0.11$, $SE = 0.17$, $t(230) = 0.66$, 95% CI [−0.22, 0.45]. Moreover, the effect of condition was found to be significant in younger adults, $t(1735) = 4.73$, $p < .001$, and trending in older adults, $t(1746) = 1.76$, $p = .08$. Random effects for the best-fit model were $\sigma^2 = 1.81$, ICC = 0.45, $\tau_{00\ id} = 1.09$, $\tau_{00\ StoryNumber} = 0.40$. Marginal and conditional R^2 for the model were 0.012 and 0.459, respectively. Thus, older adults' higher willingness to help in the journalism condition may have reduced our ability to find a significant effect of episodic simulation in that group (i.e., older adults' willingness to help may have already been at or close to ceiling in the baseline journalism condition in this study). Notably, because pandemic-related scenarios may include safety

concerns (i.e., whether it is safe to help the person in need), best-fit models were also generated with participants' safety ratings as a random factor; however, this did not change the results (see Supplemental Material).

Willingness to Help Correlations With Phenomenological Experiences

We again observed that episodic simulation increased emotional concern, scene imagery, and subjective theory of mind relative to the journalistic style condition (see Supplemental Material). We performed repeated-measures correlational analyses between these phenomenological experiences and willingness to help separately for younger and older adults in both everyday and COVID-related scenarios (refer to Table 1, for correlation coefficients and Fisher's z comparisons). A Bonferroni-adjusted α level ($p < .004$) was used to correct for multiple comparisons.

Breaking these correlations down by story type, individuals in both age groups exhibited a significant positive relationship between willingness to help and emotional concern for both the everyday and COVID-related scenarios.

For scene imagery, younger adults exhibited a significant positive relationship between willingness to help and scene imagery for the everyday scenarios; however, replicating Study 1, the relationship was not significant for older adults when correcting for multiple comparisons. However, the Fisher's transformation determined that there was no age-related difference in the relationship between scene imagery and willingness to help. Further, in COVID-related scenarios, both younger and older adults exhibited a significant relationship between scene imagery and willingness to help.

For subjective theory of mind, individuals in both age groups exhibited a relationship between willingness to help and subjective theory of mind for both the everyday and COVID-related scenarios.

Exploratory Analysis of Internal and External Details

Study 2 included participants' written descriptions of the scenes they imagined. Previous research suggests that the type of details produced may differ when imagining familiar versus unfamiliar events (de Vito et al., 2012), with familiar scenarios giving rise to more episodic details and unfamiliar scenarios relying more on semantic details (Wang et al., 2016). Given the unfamiliar contexts involved with the COVID-19 pandemic, an exploratory analysis was conducted to assess the type of details produced when participants imagined helping a person in need.

We used hierarchical mixed-effects modeling to explore the effect of story type (everyday vs. COVID-19), age (younger vs. older adults), and story similarity ratings on internal and external details produced on imagining helping trials. As with the main analysis, both participant and story number were added to the model as random effects. Fixed factors of story type, age, and similarity ratings were then added to model individually, and the most parsimonious model was constructed to include only predictors that improved model fit.

For internal details, there was a strong correlation between the number of details produced within each participant (ICC = 0.79). Story number was also found to significantly predict the number of internal details produced, $\chi^2(1) = 118.19$, $p < .001$; ICC = 0.38. Thus, both random effects were retained for the analysis. Age, $\chi^2(1) = 5.01$, $p = .02$, and story type, $\chi^2(1) = 5.20$, $p = .02$, were significant predictors of the number of internal details produced and retained to construct the best-fit model. There was also a trend for the Story Type × Similarity interaction, $\chi^2(1) = 3.72$, $p = .05$; however, all other factors did not significantly predict the number of internal details produced: Story Type × Age, $\chi^2(1) = 0.00$, $p = .97$; similarity, $\chi^2(1) = 3.21$, $p = .07$; Similarity × Age, $\chi^2(1) = 0.00$, $p = .97$; Similarity × Story Type × Age, $\chi^2(1) = 0.31$, $p = .57$.

The best-fit model revealed that the effect of age, $B = -0.33$, $SE = 0.15$, $t(182.30) = 2.26$, 95% CI [−0.62, −0.04], was due to older adults producing fewer internal details overall ($M = 1.46$, $SE = .19$) compared to younger adults ($M = 1.80$, $SE = .18$; see Figure 3). The effect of story, $B = -0.74$, $SE = 0.32$, $t(8.73) = 2.32$, 95% CI [−1.36, −0.11], was due to participants producing fewer internal details in COVID-related scenarios ($M = 1.26$, $SE = .23$) compared to everyday scenarios ($M = 2.00$, $SE = .23$). This pattern is in line with previous research showing that the type of details produced differs when imagining familiar versus unfamiliar events (de Vito et al., 2012), with familiar scenarios giving rise to more episodic details compared to unfamiliar scenarios (Wang et al., 2016). Random effects for the best-fit model were $\sigma^2 = 1.27$, ICC = 0.46, $\tau_{00\ id} = 0.77$, $\tau_{00\ StoryNumber} = 0.28$. Marginal and conditional R^2 for the model were 0.046 and 0.492, respectively.

For external details, there was a correlation between the number of details produced within each participant (ICC = 0.31). Once again, story number was found to significantly predict the number of external details produced, $\chi^2(1) = 23.45$, $p < .001$; ICC = 0.34. Thus, both random effects were retained for the analysis. Only the Story Type × Age interaction, $\chi^2(1) = 3.85$, $p = .05$, was found to be a significant predictor of the number of external details produced. All other factors were excluded from the best-fit model: age, $\chi^2(1) = 0.06$, $p = .80$; story type, $\chi^2(1) = 1.24$, $p = .27$; similarity, $\chi^2(1) = 0.03$, $p = .87$; Similarity × Story Type, $\chi^2(1) = 0.02$, $p = .88$; Similarity × Age, $\chi^2(1) = 0.17$, $p = .68$; Similarity × Story Type × Age, $\chi^2(1) = 0.28$, $p = .60$.

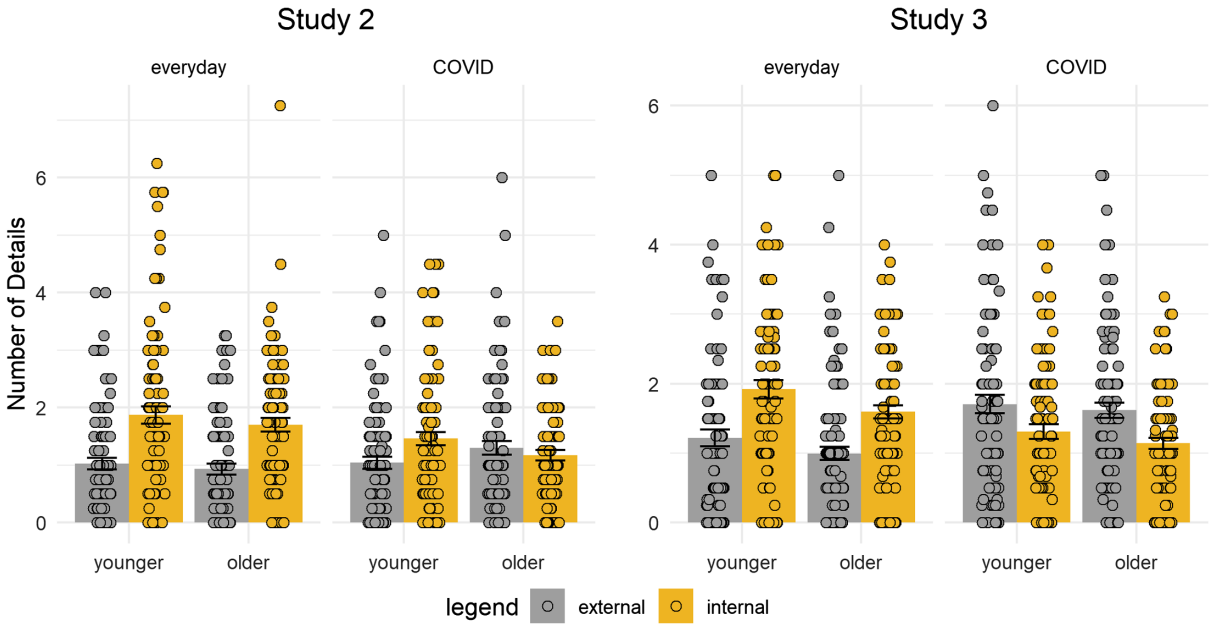
Contrasts for the best-fit model suggest that there was no effect of age on the number of external details produced in COVID-related, $B = 0.19$, $SE = 0.19$, $t(27.50) = 1.01$, 95% CI [−0.18, 0.56], or everyday scenarios, $B = -0.09$, $SE = 0.13$, $t(288.77) = 0.67$, 95% CI [−0.36, 0.18], nor was there an effect of story within younger adults (the reference population), $B = 0.03$, $SE = 0.15$, $t(13.21) = 0.17$, 95% CI [−0.28, 0.33]. Thus, while participants produced numerically more external details in COVID-related (older: $M = 1.15$, $SE = .13$; younger: $M = 0.99$, $SE = .13$) compared to everyday scenarios (older: $M = 0.87$, $SE = .13$; younger: $M = 0.96$, $SE = .13$), however, this difference was not significant, older: $t(15.1) = 1.81$, $p = .09$; younger: $t(14.5) = 0.17$, $p = .87$. Random effects for the best-fit model were $\sigma^2 = 1.03$, ICC = 0.34, $\tau_{00\ id} = 0.49$, $\tau_{00\ StoryNumber} = 0.04$. Marginal and conditional R^2 for the model were 0.006 and 0.347, respectively.

Modeling the Effect of Condition on Willingness to Help Through Internal Details

To further assess the influence of internal details on the relationship between the story type and willingness to help, we conducted an exploratory within-subject mediation analysis on imagining helping trials using the "MLMED" macro (Hayes & Rockwood, 2017). Willingness to help was entered as the dependent variable, story type (everyday vs. COVID-related) as the independent variable, and internal details produced as a potential mediator (see Figure 4,

Figure 3

Average External and Internal Details Produced by Younger and Older Adults on Episodic Simulation Trials With Respect to Story Type



Note. Individual data points are jittered for ease of visualization, error bars represent standard error of the mean. See the online article for the color version of this figure.

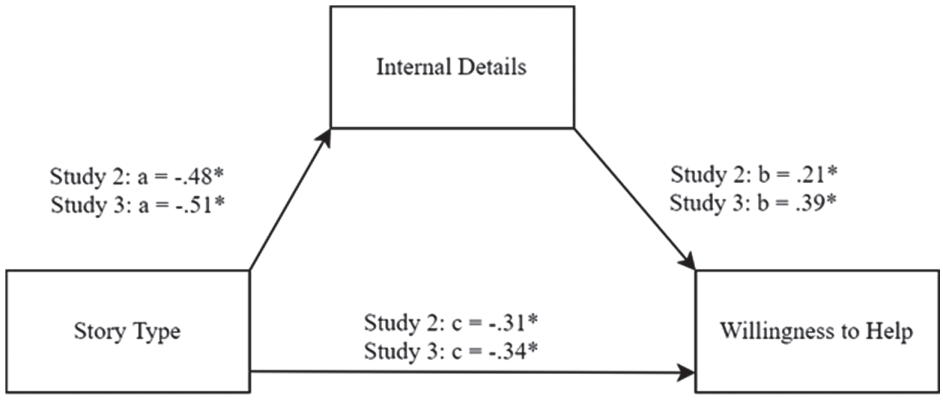
for the effects of each path). We found a significant indirect effect of story type on willingness to help via internal details, effect = −.10, *SE* = .03, 95% CI [−.15, −.05], suggesting that COVID-19-related stories lower participants' willingness to help (relative to the everyday baseline) by lowering the number of internal details used to construct their imagined scenes.

Discussion

In Study 2, we replicated our main finding of increased willingness to help following episodic simulation for age groups regardless of story type. Interestingly, our exploratory analyses revealed a dissociation between COVID and everyday scenarios and situation

Figure 4

Mediation Models for Studies 2 and 3: The Effect of Story Type on Willingness to Help Through Internal Details



Note. *SE* = standard error; CI = confidence interval.
* $p < .05$.

similarity ratings. Further, we demonstrated that the effect of story on willingness to help was mediated by the number of internal details produced. In Study 3, we aimed to replicate this effect, along with the other findings from Studies 1 and 2.

Study 3

Study 3 was a direct replication of Study 2; thus, all methods and analyses were the same.

Method

Participants

We aimed for the same sample size, recruitment methods, and inclusion criteria as Studies 1 and 2. A total of 230 people completed Study 3 between October and November 2020. The same exclusion criteria from Study 2 were used to clean the data such that four participants were removed for being the wrong age, three older adults were removed for getting less than 11 on the adapted version of the MMSE, and 26 participants were removed for completing the wrong task on more than 50% of all trials. The final sample ($N = 197$) consisted of 95 younger adults ($M = 27.24$, $SD = 4.59$, between the ages of 18 and 36, 72.6% women, 1.1% other, 2.1% prefer not to say) and 102 older adults ($M = 66.51$, $SD = 4.68$, between the ages of 60 and 80, 59.8% women). Among younger adults 45.26% self-identified as White, Caucasian, or European; 17.89% as Asian; 9.47% as Canadian (including French Canadian); 7.36% as Black or African; 3.15% as Indigenous or Native American; 2.10% as mixed ethnicity; 2.10% Middle Eastern; 2.10% as Indian or East Indian; 2.10% as Jewish; 1.05% as Hispanic, Latin, or South American; and 7.36% as unknown, other, or refused to answer. Among older adults, 69.6% self-identified as White, Caucasian, or European; 16.66% as Canadian (including French Canadian); 5.88% as Asian; 1.96% as mixed ethnicity; 1% as Black or African; 1% as Indian; and 3.92% as unknown or refused to answer.

Procedure

The same procedure from Study 2 was used for Study 3.

Data Screening. The same data screening methods described in Study 2 were used for Study 3, such that incorrect trials were excluded from all analyses. Interrater reliabilities for the number of internal and external details produced were .816 and .892, respectively.

Results

Similarity of Everyday Versus COVID-Related Scenarios

As with Studies 1 and 2, we performed a 2 (story type: everyday vs. COVID-19) × 2 (age: younger vs. older adults) ANOVA on participants' ratings of situation similarity as a manipulation check. Replicating Studies 1 and 2, we found a main effect of story, $F(1, 195) = 77.70$, $p < .001$, $\eta_p^2 = 0.285$, reflecting everyday scenarios ($M = 3.35$, $SE = .10$) being rated as more similar to situations participants had previously experienced compared to COVID-related scenarios ($M = 2.60$, $SE = .09$). Once again, we also found a story by age interaction, $F(1, 195) = 7.04$, $p = .009$, $\eta_p^2 = 0.035$. Follow-up analysis revealed that there was a larger effect of story in older adults, $t(101) = 7.63$, $p < .001$; however, the effect was still significant in younger adults, $t(94) = 4.74$, $p < .001$. Further, in this case, older adults ($M = 2.35$, $SE = .13$) rated COVID-related scenarios as being less similar to situations they had previously experienced than younger adults ($M = 2.85$, $SE = .13$), $t(195) = 2.65$, $p = .009$. The main effect of age was not significant, $p = .900$. Taken together, these results suggest that COVID-related scenarios were considered less similar to previous experiences than everyday scenarios, particularly to older adults.

Willingness to Help by Condition and Story Manipulation

As with Studies 1 and 2, we used mixed-effects models hierarchically to explore the effect of condition (no-helping vs. imagine helping), story type (everyday vs. COVID-19), and age (younger vs. older adults) on willingness to help while accounting for random effects present in individual stories (i.e., story number) and participants. As with Studies 1 and 2, the initial intercept model indicated a correlation (ICC = 0.32) between willingness to help ratings within individual participants. Story number was added to the model as a random effect and found to significantly predict willingness to help, $\chi^2(1) = 307.25$, $p < .001$; ICC = .44. Thus, both random effects were retained for the analysis. Fixed factors (see Study 1 section for list) were added to the model, and the most parsimonious model was constructed by including only predictors that improved model fit.

Condition was found to improve model fit, $\chi^2(1) = 61.27$, $p < .001$, as did the age by condition interaction, $\chi^2(1) = 8.51$, $p = .004$. There was also a trend for the story by age interaction, $\chi^2(1) = 3.68$, $p = .055$. All other predictors did not improve model fit: story type, $\chi^2(1) = 3.13$, $p = .08$; Condition × Story Type, $\chi^2(1) = 3.32$, $p = .069$; age, $\chi^2(1) = 1.84$, $p = .174$; Condition × Story Type × Age, $\chi^2(1) = 2.93$, $p = .087$. Thus, the most parsimonious model included condition and the condition by age interaction.

As with Studies 1 and 2, best-fit model estimates indicate that there was an effect of condition, $B = 0.32$, $SE = 0.09$, $t(1749) = 3.47$, 95% CI [0.14, 0.51], such that willingness to help was higher following episodic simulation of helping ($M = 4.99$, $SE = .21$) relative to judging journalistic style ($M = 4.47$, $SE = .21$; see Figure 2). Replicating Study 2, we found an interaction between condition and age. In this case, the interaction was due to a trend for older adults ($M = 4.29$, $SE = .23$) to report lower willingness to help than younger adults ($M = 4.65$, $SE = .23$) in the journalism condition, $B = -0.36$, $SE = 0.18$, $t(269.7) = 1.93$, 95% CI [−0.72, 0.01], but for no effect of age in the episodic simulation condition (older: $M = 5.00$, $SE = .23$; younger: $M = 4.97$, $SE = .23$), $B = 0.03$, $SE = 0.18$, $t(233) = 0.16$, 95% CI [−0.32, 0.38]. Nevertheless, the effect of condition was significant in both groups, older: $t(1760) = 7.68$, $p < 001$; younger: $t(1750) = 3.47$, $p < .001$. Thus, while there was an overall effect of condition on willingness to help, there was a trend for older adults to report lower willingness to help in the journalism condition. Random effects for the best-fit model were $\sigma^2 = 1.95$, ICC = 0.45, $\tau_{00\ id} = 1.16$, $\tau_{00\ StoryNumber} = 0.43$. Marginal and conditional R^2 for the model were 0.022 and 0.462, respectively.

Willingness to Help Correlations With Phenomenological Experiences

Again, we found that episodic simulation increased emotional concern, scene imagery, and subjective theory of mind relative to the

journalistic style condition (see Supplemental Material). In line with Studies 1 and 2, we performed within-subjects correlations for each story type separately in younger and older adults and then compared the relationship between phenomenological experiences and willingness to help between age groups (refer to Table 1, for correlation coefficients and Fisher's z transformations). A Bonferroni-adjusted α level ($p < .004$) was used to correct for multiple comparisons.

Individuals in both age groups exhibited a significant positive relationship between willingness to help and emotional concern for both the everyday and COVID-related scenarios.

For scene imagery, younger adults exhibited a significant positive relationship between willingness to help and scene imagery for the everyday scenarios, while older adults did not. Fisher's z determined that there was a trend toward an age difference between these relationships. Nevertheless, there was a significant relationship between scene imagery and willingness to help in COVID-related scenarios for both younger and older adults.

For subjective theory of mind, individuals in both age groups exhibited a relationship between willingness to help and subjective theory of mind for both the everyday and COVID-related scenarios.

Internal and External Details

As with Study 2, we used hierarchical mixed-effects modeling to explore the effect of story type (everyday vs. COVID-19), age (younger vs. older adults), and story similarity ratings on internal and external details produced on imagining helping trials with participant and story number entered into the model as random effects. Once again, the most parsimonious model was constructed to include only predictors that improved model fit.

For internal details, there was a strong correlation between the number of details produced within each participant (ICC = 0.31). Replicating Study 2, story number was found to significantly predict the number of internal details produced, $\chi^2(1) = 131.22$, $p < .001$; ICC = 0.43. Thus, both random effects were retained for the analysis. There was a trend for age, $\chi^2(1) = 3.14$, $p = .074$; story type, $\chi^2(1) = 3.15$, $p = .076$, and the Story Type × Similarity Interaction, $\chi^2(1) = 2.91$, $p = .088$, to add to the model. The other factors did not predict internal details produced: Story Type × Age, $\chi^2(1) = 1.15$, $p = .28$; similarity, $\chi^2(1) = 0.55$, $p = .46$; Similarity × Age, $\chi^2(1) = 0.08$, $p = .78$; Similarity × Story Type × Age, $\chi^2(1) = 0.09$, $p = .77$.

The data from Study 3 were submitted to the best-fit model from Study 2 for the purpose of comparison. Random effects for the best-fit model were $\sigma^2 = 1.06$, ICC = 0.42, $\tau_{00\ id} = 0.60$, $\tau_{00\ StoryNumber} = 0.16$. Marginal and conditional R^2 for the model were 0.030 and 0.436, respectively. Replicating the direction of the effects in Study 2, this model revealed that age had a negative influence on the number of internal details produced (older: $M = 1.33$, $SE = .15$; younger: $M = 1.57$, $SE = .15$), $B = -0.23$, $SE = 0.13$, $t(190.88) = 1.80$, 95% CI [−1.10, −0.06], as did story type (COVID: $M = 1.24$, $SE = .18$; everyday: $M = 1.66$, $SD = .18$), $B = -0.43$, $SE = 0.24$, $t(13.90) = 1.75$, 95% CI [−0.90, 0.05] (see Figure 3).

For external details, there was a correlation between the number of details produced within each participant (ICC = 0.34). Once again, story number was found to significantly predict the number of external details produced, $\chi^2(1) = 89.46$, $p < .001$; ICC = 0.43. Thus, both random effects were retained for the analysis. Only story type, $\chi^2(1) = 4.21$, $p = .04$, was a significant predictor of the number of external details produced and retained for the best-fit model. The other factors did not significantly predict the number of external details produced: age, $\chi^2(1) = 0.60$, $p = .44$; Story Type × Age, $\chi^2(1) = 2.40$, $p = .12$; similarity, $\chi^2(1) = 2.56$, $p = .11$; Story Type × Similarity, $\chi^2(1) = 1.13$, $p = .29$; Similarity × Age, $\chi^2(1) = 0.23$, $p = .63$; Similarity × Story Type × Age, $\chi^2(1) = 0.00$, $p = .94$.

The best-fit model revealed that the effect of story, $B = 0.45$, $SE = 0.21$, $t(9.32) = 2.13$, 95% CI [0.04, 0.87], was due to participants producing more external details in COVID-related ($M = 1.61$, $SE = .16$) than everyday scenarios ($M = 1.16$, $SE = .16$; see Figure 3). Random effects for the best-fit model were $\sigma^2 = 1.20$, ICC = 0.41, $\tau_{00\ id} = 0.73$, $\tau_{00\ StoryNumber} = 0.12$. Marginal and conditional R^2 for the model were 0.025 and 0.429, respectively.

Modeling the Effect of Condition on Willingness to Help Through Internal Details

In line with the findings of Study 2, we conducted a within-subjects mediation analysis to assess the role of internal details as a mediator between story type and willingness to help. Replicating the findings of Study 2, the indirect effect of story type on willingness to help via internal details produced was significant, effect = −.20, $SE = .04$, 95% CI [−.27, −.14], once again suggesting that COVID-related stories lower participants' willingness to help by lowering the number of internal details used to construct their imagined scenes.

Discussion

In Study 3, we again found that episodic simulation of helping increased willingness to help in both older and younger adults in both COVID-related and everyday scenarios. In this case, the relationship between willingness to help and participants' phenomenological experiences was largely similar between age groups. Finally, we replicated the finding that the effect of story on willingness to help is mediated by the number of internal details produced. Thus, COVID-related scenarios resulted in fewer episodic-like details which influenced participants' willingness to help.

General Discussion

The present study examined whether episodic simulation increases willingness to help in novel COVID-related situations and whether this is affected by age. Across three studies, we found that episodic simulation increased participants' willingness to help relative to a semantic control condition. This was true for both the everyday and COVID-related scenarios. Despite older adults exhibiting a higher baseline level of willingness to help in Study 2 and a lower baseline in Study 3, episodic simulation was found to increase willingness to help in both age groups. Across all three studies, episodic simulation increased scene coherence and theory of mind, and in Studies 2 and 3, the same was true for emotional concern (see Supplemental Material). In turn, these factors related to increased willingness to help, supporting previous work suggesting that these phenomenological experiences may be the mechanisms by which episodic simulation affects prosocial intentions (Gaesser et al., 2018; Sawczak et al., 2019). Studies 2 and 3 showed that people produce fewer internal details when imagining COVID-related scenarios, and Study 3 found that COVID-related scenarios resulted

in more external details produced. Taken together, these findings suggest that we may rely less on episodic information and more heavily on external details (including semantic knowledge) when simulating events are less similar to our previous experiences.

This is one of the first studies to explore episodic simulation of scenarios related to an ongoing global crisis (cf. Sinclair et al., 2021, and commentary by Bulley & Schacter, 2021). Previous work that has explored simulation of unfamiliar scenarios has typically used hypothetical, often highly unlikely events (e.g., climbing Mount Everest; Arnold et al., 2011; de Vito et al., 2012; Wang et al., 2016) or manipulated scene familiarity by asking participants to imagine scenarios in either familiar or unfamiliar settings (Gaesser et al., 2018). Critically, the work here demonstrates that episodic simulation can be used to increase willingness to help in unfamiliar, real-world scenarios posed by the pandemic. Further, the present findings suggest that the underlying mechanisms involved in episodic simulation share considerable overlap in both familiar and unfamiliar scenarios (Gaesser et al., 2020). Specifically, we found that emotional concern, scene imagery, and subjective theory of mind are strong predicters of willingness to help in both everyday and COVID-related scenarios.

Nevertheless, we observed some differences between simulation of everyday and COVID-related scenarios. Across all three studies, subjective scene imagery was rated higher for COVID-related, compared to everyday scenarios. Despite everyday situations being more like those previously experienced by participants, higher scene imagery for COVID-related scenarios may reflect extensive media coverage of COVID-19. Relatedly, Study 3 revealed that when describing imagined COVID-related scenarios, participants produced more external details, which include descriptions of tangential events, editorializing statements, and semantic, rather than episodic, details (Levine et al., 2002). While it should be noted that participants received less time to describe their simulated events than is typically given in the lab, they still produced enough details to differentiate between conditions.[2] These findings support previous research that suggests that imagining familiar scenarios gives rise to more internal, episodic-like details, while novel scenarios rely more heavily on external details (de Vito et al., 2012; Wang et al., 2016). People also seem to rely more on semantic knowledge when episodic events are unavailable or impoverished (Devitt et al., 2017). While unfamiliar scenarios are typically found to be less vivid than familiar scenarios (Arnold et al., 2011; Gaesser et al., 2018, 2020), the increased external details and higher scene imagery ratings found here suggest that one can successfully construct a vivid, realistic scene, despite having few similar experiences on which to draw.

We expected the increased demand of simulating unfamiliar, COVID-related scenarios to lead to age differences. Contrary to our hypothesis, both younger and older adults exhibited a similar increase in willingness to help following episodic simulation, regardless of story type. These findings are in line with previous work examining episodic simulation in everyday scenarios across the life span (Gaesser et al., 2017; Sawczak et al., 2019). Indeed, while previous research has established age-related declines in episodic memory and simulation abilities (Addis et al., 2008, 2010), empathy and prosociality are thought to increase later in life (Carstensen et al., 2006; Mayr & Freund, 2020), and these may help to compensate for age-related deficits in simulation.

Practical Applications

Simulation of potential future events makes them seem more plausible and increases the likelihood of actually engaging in the imagined behavior (D'Argembeau & Garcia Jimenez, 2020). Thus, we suggest that similar tactics be used to encourage the general public to help those in need. Such strategies may be especially useful during difficult times when baseline willingness to help appears low. For instance, reporting styles could be tailored to encourage episodic simulation, wherein news stories ask their audiences to picture themselves giving aid to those in need or complying with health regulations. Fundraising events may also benefit from asking donors to take a moment, before donating, to picture themselves helping the person in need.

Limitations and Future Directions

A number of limitations should be discussed. First, the present studies did not include a debriefing questionnaire to assess potential demand characteristics. As such, it is possible that participants' willingness to help ratings and phenomenological experiences were influenced by their knowledge of experimenter expectations. However, because measures that were less obvious to participants (i.e., the production of internal and external details) were also influenced by the study manipulation, it seems unlikely that demand characteristics explain the entire effect in this case. Second, since the pandemic is a rapidly changing situation, it is difficult to control for fluctuations in case numbers and media exposure. To assess whether the evolving situation influenced our findings, we submitted the data from Studies 2 and 3 to a 2 (condition: no-helping vs. imagine helping) × 2 (story type: everyday vs. COVID-19) × 2 (age: younger vs. older) mixed analysis of covariance that included the 7-day average number of COVID-19 cases in the participants' province as a covariate in the model (see Supplemental Material, for results). The effect of condition on willingness to help was still observed, suggesting that fluctuations in COVID numbers cannot explain our results (relatedly, see Supplemental Material, for an analysis of COVID-related media consumption across Studies 1–3).

Due to testing restrictions, the present studies were conducted online. While many in-lab findings have been replicated online, older adults tested online may be higher functioning and more computer savvy than those typically tested in the lab (Merz et al., 2020). Moreover, across all three experiments, the mean age of our older adults was in the mid-60s, approximately 10 years younger than those previously tested in similar paradigms (Gaesser et al., 2017; Sawczak et al., 2019). Indeed, the present samples may represent a younger cohort of older adults, which may help explain the lack of age difference.

In conclusion, the present studies suggest that episodic simulation of helping can increase willingness to help in unprecedented scenarios posed by the COVID-19 pandemic. Age-related declines

[2] Moreover, they did not appear to be at floor, as the number of internal and external details produced by younger and older adults was significantly different from zero in both Studies 2 and 3. Study 2: younger internal, $t(95) = 13.54$, $p < .001$; younger external, $t(95) = 11.23$, $p < .001$; older internal, $t(90) = 15.53$, $p < .001$; older external, $t(90) = 11.37$, $p < .001$. Study 3: younger internal, $t(94) = 14.97$, $p < .001$; younger external, $t(90) = 13.16$, $p < .001$; older internal, $t(101) = 17.97$, $p < .001$; older external, $t(101) = 14.90$, $p < .001$.

in episodic simulation may not translate to willingness to help paradigms given older adults' increased prosocial and emotional goals; however, further research is needed to determine whether the boost to willingness to help relies on different mechanisms across the life span. Nevertheless, the present work suggests that encouraging the wider public to imagine themselves helping others may encourage prosocial behavior as we move forward and heal from the global effects of the COVID-19 pandemic.

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