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Relational turbulence from the COVID-19 pandemic: Within-subjects mediation by romantic partner interdependence

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Abstract

Relational turbulence theory posits that external changes to the relational environment compel romantic partners to navigate transitions by establishing new daily routines as interdependent couples. The COVID-19 pandemic is an unprecedented transition fraught with difficult changes that have the potential to be especially disruptive to romantic partners' daily routines as couples alter their patterns of interdependence and adapt their everyday lives. To study the pandemic's effect as a relational transition, college students in romantic relationships ($N = 314$) completed measures of partner facilitation and interference, negative emotions, and relational turbulence as they recalled what their relationships were like prior to the pandemic (January, 2020) and then reported on their relationships during the peak of the first wave of the pandemic in the U.S. (April, 2020). On average, negative emotions (i.e., anger, fear, sadness) toward interacting with partners and relational turbulence both increased from before to during the pandemic, and partner interference was positively correlated, whereas facilitation

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was inversely correlated, with negative emotions during the pandemic. Results of a within-subjects mediation model revealed that changes in relational turbulence were explained, in part, by a decrease in partner interdependence due to the pandemic. A direct effect of the pandemic on increases in relational turbulence was also discovered.

Keywords
COVID-19, interdependence, negative emotions, relational turbulence model, relational turbulence theory

At the end of December 2019, a novel coronavirus (SARS-CoV-2) created a new respiratory disease—the so-called Coronavirus Disease 2019 (COVID-19)—which was identified as a global health threat (Fauci et al., 2020). By January 20, 2020 the first infection was confirmed in the United States (Holshue et al., 2020). The outbreak was declared a public health emergency in the United States on January 31, with the U.S. leading the world in the number of infected cases by March 26, resulting in the most coronavirus deaths in any country by April 11 (for a timeline, see Hauck et al., 2020). The COVID-19 pandemic outspread rapidly, creating serious transitions for partners navigating their romantic relationships, and of course, their lives in general.

Transitions are a natural part of relationship trajectories as changes in life circumstances often bring about relationship change as well (Solomon et al., 2010). The COVID-19 pandemic is a transition that has created daily challenges for partners which include maintaining social distancing recommendations, staying at home due to quarantine orders, remaining vigilant with hygiene and other protective behaviors, and avoiding social gatherings, among others, all of which could disrupt relationship routines. For some, the pandemic might have created more serious challenges such as health issues, death of a loved one, job loss, and other somber transitions that are known to cause relational turbulence in romantic relationships (Brisini et al., 2018) which is experienced "as a global and persistent evaluation of the relationship as tumultuous, unsteady, fragile, and chaotic that arises from the accumulation of specific episodes" (Solomon et al., 2016, p. 518).

To understand how transitions such as the COVID-19 pandemic might affect romantic relationships, it is useful to consult the programmatic research that has tested the relational turbulence model (RTM; Solomon & Knobloch, 2004) and its contemporary extension, relational turbulence theory (RTT; Solomon et al., 2016). As Solomon et al. (2016) explained, "a transition in an interpersonal relationship is a period of discontinuity between times of relative stability, during which individuals adapt to changing roles, identities, and circumstances" (p. 510). Thus, transitions disrupt the dyadic interdependence of partners by changing how they influence each other during daily routines and activities (Solomon & Knobloch, 2004). Both the RTM and RTT share the relationship parameter of interdependence, predicting that during major transitions, romantic partners' influence on each other's daily routines might change as the transition is managed and new patterns of interdependence are negotiated and established (Solomon et al., 2016). The pandemic and its unfortunate consequences provide an

opportunity to study how relationships change and function as partners renegotiate how their everyday routines will unfold. Colloquially speaking, partners might talk about the "new normal" the COVID-19 pandemic has wrought on their daily lives and discuss how their daily routines and activities will be different post-pandemic.

As a function of interdependence, romantic partners impact each other's daily routines through *facilitation*, when their partner helps daily activities become easier to accomplish, or *interference*, when their partner makes achieving everyday goals more difficult by disrupting their achievement (Solomon et al., 2016). RTT argues that partner interdependence is central to navigating a life-changing transition such as the COVID-19 pandemic and understanding how partners feel about each other through daily facilitation and interference. Pandemic-relevant examples of partner facilitation in college dating relationships include providing space and time away from the partner when needed, helping to maintain a regular sleep schedule, and encouraging hobbies; whereas partner interference examples include disrupting exercise routines, interrupting school work, or being excessively needy and time-consuming.

RTT argues that partners influence each other through intentional or unintentional decisions that are made daily as reactions to the pandemic transition. Consequently, these choices allow opportunities for partners to help each other in accomplishing daily routines or goals, or create tension in the relationship when they impede their accomplishment. Whether or not people involved in romantic relationships facilitate and/or interfere with their partner's daily routines has important implications for adjusting to the pandemic transition. Indeed, the World Health Organization (WHO, 2020) has recognized the importance of daily routines and activities during the pandemic, recommending that individuals "try as much as possible to keep your personal daily routines or create new routines if circumstances change" (p. 5). These recommended routines include keeping in contact with loved ones, sleeping at regular hours, eating healthy food, regularly exercising, cleaning, doing artistic activities, completing daily chores, maintaining hobbies, and so on (WHO, 2020). This pragmatic advice from the WHO, which suggests that individuals should focus on establishing and maintaining daily routines, highlights the utility of the RTM and RTT as useful guides to the study of how partner facilitation and interference might benefit or hamper the achievement of these important routines in dating relationships (Solomon et al., 2010, 2016). Accordingly, our study draws from core constructs and the relationships among them theorized in the RTM and RTT to examine how college students' interdependence (in the form of facilitation and interference in the context of romantic relationships), negative emotions, and relational turbulence are affected by the COVID-19 pandemic as a major relationship transition.

Research questions and hypotheses

For college students in romantic relationships, it is unclear how the pandemic might have altered their partners' interdependence with regard to everyday routines. On one hand, it is possible that the pandemic has served as a stressor for all relationships as life challenges provide opportunities to impede relationship goals (i.e., during the pandemic, interference might increase whereas facilitation might decrease). Conversely, it is also

possible that college students become decreasingly interdependent in their romantic relationships as they leave college campuses, continue their education online, and adjust their living arrangements (Mullen & Logan, 2020). It is possible that romantic partners would not have as much influence on the daily routines of a partner as they did when college life was active on campus and partners were more likely to be geographically proximal. Because we do not know how partner interdependence has been impacted by the pandemic for college students, we asked the first research question:

RQ1: Will romantic partner interdependence (i.e., facilitation and interference) with everyday routines change from before the COVID-19 pandemic to during the pandemic?

The RTM and RTT postulate that relational turbulence will be heightened during transitions as periods of instability (Brisini et al., 2018). Solomon et al. (2010) noted that relationships are turbulent when "transitions create change that involves the reorganization and reintegration of identities, roles, relationships, or behaviors, which may require people to alter their current conduct or the way in which they define themselves or their relationships" (p. 135). Given that the transition to the COVID-19 pandemic has affected all areas of life such as health and health care, personal finances, and the economy, along with usual activities, routines, and livelihoods (Kumar & Nayar, 2020), romantic relationships are likely affected by the chaotic and tumultuous feelings that accompany those challenges. Therefore, we predicted the first hypothesis as a change in chaotic relational states:

H1: Relational turbulence will increase from before to during the COVID-19 pandemic.

Extant research on relational turbulence has consistently documented that interference from a partner is correlated with negative emotions toward the partner including sadness, anger, and fear (Brisini & Solomon, 2019; King & La Valley, 2019; Knobloch, 2008; Knobloch et al., 2007; Knobloch & Theiss, 2010; Solomon & Brisini, 2019; Theiss & Nagy, 2010; Tian & Solomon, 2020). These findings provide the evidentiary basis of Axiom 2 of RTT, which states "interruptions from a partner, particularly those that interfere with everyday routines, heighten affective arousal" (Solomon et al., 2016, p. 515). From a discrete emotions perspective, the negative emotions expected to be most strongly elicited during the pandemic are sadness, anger, and fear (Nabi, 2002). Sadness may be the most commonly experienced negative emotion, and it is engendered by perceptions of separation, loss, and/or the failure to achieve a goal (Izard, 1977). Similarly, one of the eliciting conditions of anger is the experience of impediments to goal achievement (Lazarus, 1991). As interference from a partner during the pandemic would thwart numerous goals, both relational and otherwise, investigation of sadness and anger in this context is warranted. Further, fear is usually experienced in threatening situations that are also perceived as beyond one's control (Frijda, 1986). A partner's interference during the pandemic is likely to be perceived as both threatening and outside of one's control, thus, the examination of fear is important. Guided by Axiom 2 of RTT,

we wanted to replicate previous findings in the context of the pandemic, to demonstrate that reactivity is heightened as a byproduct of partner interference with everyday routines. Informed by the discrete emotions approach, we wanted to investigate whether or not the specific emotions of sadness, anger, and fear are amplified in this context, as those appear to be most likely instigated by a romantic partner's interference during the pandemic:

> H2a: Interference from a romantic partner will correlate positively with negative emotions (i.e., anger, fear, and sadness) toward interacting with that partner during the COVID-19 pandemic.

> H2b: Facilitation from a romantic partner will correlate inversely with negative emotions (i.e., anger, fear, and sadness) toward interacting with that partner during the COVID-19 pandemic.

Although the pandemic is decidedly stressful and should thus evoke emotional reactivity when partners exert interference, it is unclear if negative emotions will increase from before to during the pandemic (Solomon et al., 2016). The prolonged stress and anxiety from the pandemic (Lee, 2020; Miller, 2020) could reasonably be expected to increase negative affect in general, including negative emotions directed more specifically toward a romantic partner and experienced in the context of a romantic relationship. Although emotional distress is heightened during the pandemic (Montemurro, 2020), it is unclear if negative emotions experienced as a result of communicating with a partner will increase on average from the pandemic itself. Therefore, we offer a second research question:

> RQ2: Will negative emotions (i.e., anger, fear, sadness) from interacting with a romantic partner change from before the COVID-19 pandemic to during the pandemic?

Partner interdependence is theorized to explain chaotic relational states (Solomon & Knobloch, 2004; Solomon et al., 2016) and ample research from the RTM and RTT has documented that relational turbulence is correlated negatively with facilitation from a partner (e.g., McLaren et al., 2011, 2012; Solomon & Priem, 2016) but correlated positively with interference from a partner (e.g., Knobloch, 2007; Knobloch et al., 2018; Theiss & Nagy, 2012). Goodboy et al. (2020) conducted a meta-analysis and reported average correlations of facilitation ($r = -.380$) and interference ($r = .345$) with relational turbulence. Although these correlations between partner interdependence and relational turbulence are established, it is important to consider how the pandemic serves as a relational transition that might cause changes in partners' influence on daily routines. That is, if patterns of everyday interdependence change from before the pandemic to during the pandemic (RQ1), this pandemic effect on partner interdependence should, in turn, predict changes in relational turbulence indirectly. This prediction of mediation is most closely informed by the original RTM scholarship where partner interference and facilitation are direct predictors of relational turbulence (Brisini & Solomon, 2018;
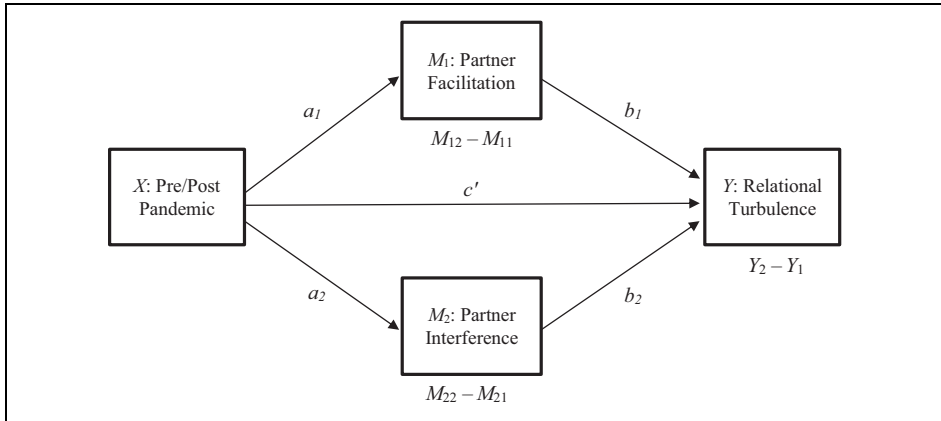
Figure 1. Conceptual diagram of within-subjects parallel mediation model.

McLaren et al., 2011; Solomon & Priem, 2016), which remains consistent with RTT as partner interdependence is a causal precedent for relational turbulence (Solomon et al., 2016). Therefore, we offer the following hypothesis as a test of within-subjects mediation (see Figure 1 for the conceptual mediation model):

H3: The COVID-19 pandemic will change patterns of romantic partner interdependence (i.e., facilitation and interference), which in turn, will predict changes in relational turbulence.

Method

Participants and procedures

Partners in romantic relationships were recruited by seeking voluntary participation from college students enrolled in communication studies courses during the end of April, 2020. We sampled college students because their dating relationships have provided the foundation for studying relational turbulence (Goodboy et al., 2020). The sample consisted of 315 individuals who were currently involved in romantic relationships (117 men, 195 women, 1 nonbinary, 2 did not indicate sex) ranging from 18 years old to 67 years old ($M = 21.009$, $SD = 4.460$) who reported on their partners (194 men, 117 women, 3 nonbinary, 1 did not indicate sex). Thirteen of the romantic relationships were same-sex commitments. Participants identified their race/ethnicity as Black ($n = 18$), Asian ($n = 6$), Hispanic ($n = 6$), Native American ($n = 2$), Middle Eastern ($n = 31$), mixed race ($n = 6$), and White ($n = 246$). Thirty-nine participants were currently employed but their partner was not employed; 62 were not employed but their partner was currently employed; 77 participants were employed and so was their partner; and for 136 participants, neither partner was employed during the pandemic at the time of the study. As a result of the COVID-19 pandemic, 163 participants indicated they had a loss of income ($M = 57.844\%$, $SD = 35.320\%$) and 76 had lost their jobs. Sixty-eight

participants were designated as essential workers and 82 partners had essential worker designations. Participants identified their relationship as casually dating ($n = 138$), seriously committed ($n = 165$), or engaged to be married ($n = 11$; 1 did not identify) with an average relationship length of 23.280 months ($SD = 27.519$, range $= 239$ months).

Participants completed an online questionnaire measuring facilitation and interference from a partner; negative emotions including anger, fear, and sadness as a result of interacting with the partner; and relational turbulence; along with demographic items. Based on repeated measures procedures provided by Brisini et al. (2018) to examine relationships in transitions, these measures were completed twice in two halves of the questionnaire. In the first half, participants were instructed to complete the measures in reference to their relationship before the pandemic began. They were provided with instructions to "report about your relationship with your romantic partner as it was prior to the COVID-19 pandemic (during the month of January, 2020, before the pandemic started)" with item stems and reminders throughout the questionnaire for participants to recall their relationship as it was in the recent past. In the second half of the questionnaire, participants were given the same repeated measures with new instructions to complete measures about their relationship "during the past month of the COVID-19 pandemic" with more item stems and reminders throughout the survey so participants would report on their current relationship as it is now during data collection at the peak of the first wave of the pandemic in the U.S. (end of April, 2020).[1] In other words, participants reported what their relationship was like 4 months prior to the pandemic and what it was like currently during the data collection at the peak of the pandemic in the U.S. This was done to observe "the impact of *change* in (rather than *level* of) relational turbulence" (Scott & Stafford, 2018, p. 22).

Measures

With the exception of the relational turbulence measure, all scales[2] used a 6-point Likert response format ranging from (1) strongly disagree to (6) strongly agree. Composite reliability for all scales was assessed using Hayes and Coutts' (2020) OMEGA macro to estimate coefficient omega for all measures using Hancock and An's (2020) formula with bootstrapping from 5,000 samples. Omega is a more accurate estimate of scale reliability than alpha for unidimensional scales and should be preferred by communication scholars because, in general, alpha does not equal reliability (Goodboy & Martin, 2020). Omega is interpreted just like alpha as it quantifies (more accurately) the percentage of variance that is measurement error.

Partner facilitation was measured using the 5-item Facilitation from a Partner Scale (Solomon & Brisini, 2017). A sample item includes "My romantic partner helped me use my time well." Coefficient ω was .901 [95% CI: .877, .921] for the pre-pandemic measure and was .927 [95% CI: .909, .943] during the pandemic.

Partner interference was measured using the 5-item Interference from a Partner Scale (Solomon & Brisini, 2017). A sample item includes "My romantic partner interfered with whether I achieved the everyday goals I set for myself." Coefficient ω was .902 [95% CI: .874, .923] for the pre-pandemic measure and was .928 [95% CI: .906, .945] during the pandemic.

Negative emotion was measured using items from Knobloch et al. (2007) originally developed by Dillard et al. (1996). Negative emotions were assessed with the stem "[Prior to the COVID-19 pandemic] or [During the past month of the COVID-19 pandemic], when I have interacted with my partner I have felt . . ." followed by 3 items measuring anger (i.e., angry, mad, annoyed), 4 items measuring fear (i.e., afraid, scared, fearful, frightened), and 4 items measuring sadness (i.e., sad, depressed, sorrowful, gloomy). For anger, coefficient ω was .883 [95% CI: .851, .911] for the pre-pandemic measure and was .911 [95% CI: .886, .931] during the pandemic. For fear, coefficient ω was .970 [95% CI: .956, .980] for the pre-pandemic measure and was .968 [95% CI: .956, .979] during the pandemic. For sadness, coefficient ω was .953 [95% CI: .935, .967] for the pre-pandemic measure and was .912 [95% CI: .886, .933] during the pandemic.

Relational turbulence was measured using the 4-item Relational Turbulence Scale (McLaren et al., 2011). This scale used a 6-point semantic differential format with bipolar adjectives such as chaotic/stable and peaceful/stressful. Coefficient ω was .901 [95% CI: .867, .927] for the pre-pandemic measure and was .897 [95% CI: .863, .922] during the pandemic.

Data analysis

Paired samples t-tests were used to compare means of repeated measures of partner interdependence, negative emotions, and relational turbulence before versus during the COVID-19 pandemic (RQ1, RQ2, H1). Pearson correlations were used to test H2. To test H3, a within-subjects mediation model (Judd et al., 2001) was estimated using MEMORE (Mediation and Moderation Analysis for Repeated Measures Designs) version 3.4.1 (Montoya & Hayes, 2017) to test the indirect effect of the pandemic on relational turbulence through partner interdependence (facilitation and interference served as parallel mediators, controlling for each other). MEMORE constructs averages and differences in repeated measures and provides bootstrapping to generate 95% confidence intervals for indirect effects to test mediation as described by Judd et al. (2001) where the same participant is measured on both the mediator and outcome in two situations (in our case, repeated measures of interdependence and turbulence recalled before and during the pandemic). Thus, MEMORE allows us to determine if changes in our mediators (pre versus during pandemic facilitation and interference) are associated with changes in relational turbulence from before to during the pandemic. We used 5,000 bias-corrected bootstrap samples for indirect effects. To complement the conceptual diagram of the within-subjects parallel mediation model displayed in Figure 1, the statistical diagram for the model is offered in Figure 2.

Results

Correlations between all study variables are provided in Table 1.

RQ1 inquired if romantic partner interdependence with regard to everyday routines changed after the COVID-19 pandemic. Results of paired samples t-tests revealed that both partner facilitation ($t = 8.335$, $d = .470$) and interference ($t = 4.213$, $d = .379$) decreased as partners became less interdependent. H1 predicted that relational
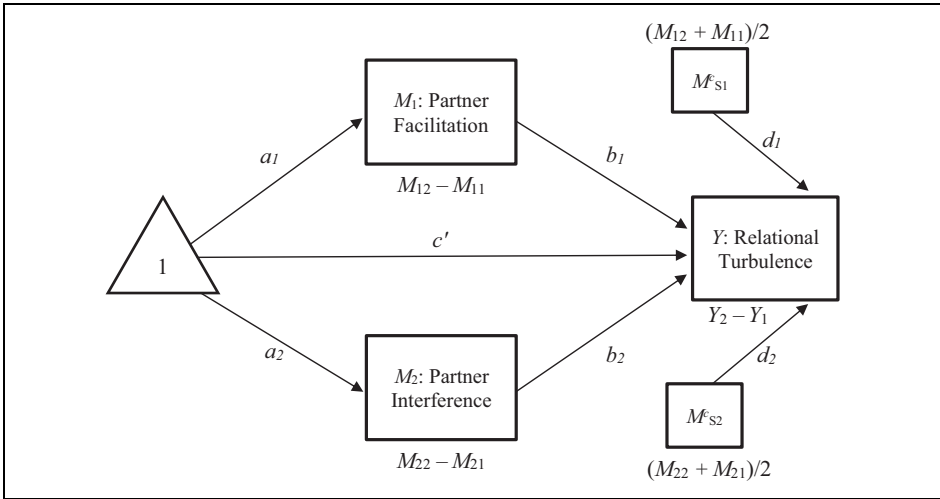
Figure 2. Statistical diagram of within-subjects parallel mediation model. *Note*. The superscript ^{c} indicates mean centered.

turbulence would increase during the pandemic. A paired samples *t*-test supported this hypothesis; on average relational turbulence was greater from before to during the pandemic ($t = -6.686$, $d = .377$). H2a and H2b predicted that during the pandemic, interference would correlate positively with anger, fear, and sadness toward interacting with the partner, and facilitation would correlate inversely with these negative emotions. H2a was confirmed as interference was correlated positively with anger ($r = .473$ [CI: .371, .565]), fear ($r = .495$ [CI: .378, .598], and sadness ($r = .444$ [.335, .542]). H2b was confirmed as facilitation was correlated inversely with anger ($r = -.269$ [CI: $-.386$, $-.151$]), fear ($r = -.212$ [CI: .322, $-.098$], and sadness ($r = -.290$ [$-.402$, $-.174$]).

RQ2 inquired if negative emotions that accompany interacting with a romantic partner would be heightened during the peak of the first wave of the pandemic as compared to before the pandemic. Paired samples *t*-tests indicated an average increase in anger ($t = -3.585$, $d = .201$), fear ($t = -3.132$, $d = .176$), and sadness ($t = -4.937$, $d = .278$) when interacting with partners. Full statistical reporting of the repeated measures before and during the pandemic are reported in Table 2, along with effect sizes for increases and decreases among variables.

Hypothesis 3 was a within-subjects mediation test in line with the RTM/RTT, predicting that if the pandemic yielded changes in romantic partner interdependence, those changes (in facilitation and interference, independently) would in turn explain the hypothesized increases in relational turbulence predicted in H2. Results of a within-subjects mediation analysis with 5,000 bias-corrected bootstrap samples revealed evidence for mediation; the increase in relational turbulence was explained, in part, by a decrease in partner interdependence due to the pandemic (see Figure 2 for path coefficients). Compared to before the pandemic, partners decreased their interdependence during the pandemic, and by doing so, slightly reduced relational turbulence by

Table 1. Zero-order correlations with confidence intervals (N = 315)

Variables	1	2	3	4	5	6
1. Partner Facilitation	—	-.271[-.396, -.144]	-.269[-.386, -.151]	-.212[-.322, -.098]	-.290[-.402, -.174]	-.380[-.485, -.274]
2. Partner Interference	-.475[-.581, -.362]	—	.473[.371, .565]	.495[.378, .598]	.444[.335, .542]	.438[.345, .529]
3. Anger	-.419[-.524, -.312]	.493[.383, .594]	—	.628[.543, .703]	.716[.640, .780]	.595[.498, .681]
4. Fear	-.310[-.432, -.190]	.428[.298, .543]	.686[.602, .753]	—	.724[.644, .791]	.494[.389, .590]
5. Sadness	-.392[-.496, -.282]	.471[.353, .576]	.800[.742, .847]	.829[.771, .877]	—	.633[.549, .707]
6. Relational Turbulence	-.548[-.635, -.455]	.509[.415, .598]	.617[.519, .708]	.510[.382, .631]	.630[.532, .719]	—

Note. Confidence intervals are in brackets using 5,000 bootstrap samples (bias-corrected accelerated). Correlations before COVID-19 are below the diagonal; correlations during COVID-19 are above the diagonal.

Table 2. Paired samples differences.

Variable	Pre COVID-19		Post COVID-19				
	M	*SD*	*M*	*SD*	*r*	*t*(314)	d_{RM}
Partner Facilitation	4.592	.946	4.112	1.279	.614	8.335	.470
Partner Interference	2.401	1.101	2.159	1.145	.593	4.213	.239
Anger	2.356	1.100	2.545	1.308	.709	−3.585	.201
Fear	1.745	1.043	1.898	1.203	.710	−3.132	.176
Sadness	2.006	1.160	2.295	1.269	.638	−4.937	.278
Relational Turbulence	2.091	1.097	2.506	1.254	.569	−6.686	.377

Note. All paired samples correlations and *t* tests are significant at *p* < .001.
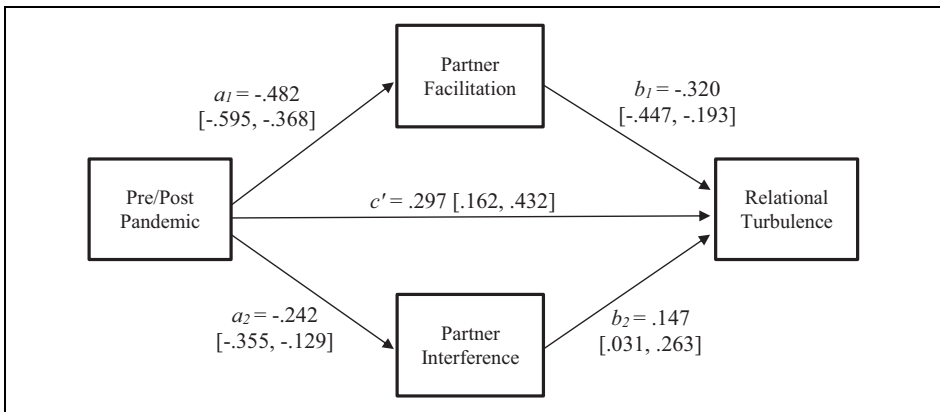

Figure 3. Within-subjects parallel mediation model ($N = 314$). *Note.* All path coefficients are significant at p < .05.

interfering less with daily routines ($a_1b_1 = -.036$ [$-.083, -.002$]), but to a larger degree, also created more relational turbulence by not facilitating as much ($a_2b_2 = .154$ [.079, .244]). Moreover, controlling for interference and facilitation, the pandemic had a direct and positive effect on relational turbulence ($c' = .297$ [.162, .432]). Figure 3 displays unstandardized path coefficients for the model.

Discussion

In an effort to better understand how dating relationships are affected by the COVID-19 pandemic, this study provided tests consistent with the RTM/RTT and demonstrated that this pandemic affected college students' interdependence in their romantic relationships, their experience of negative emotions in those relationships, and ultimately the stability of those relationships. Specifically, compared to how romantic relationships were recalled before the pandemic, during the pandemic, on average, interference and facilitation from a partner in everyday routines declined, negative emotions toward the

partner were amplified, and relational turbulence became more prevalent. Collectively, these results confirm RTT's claim that transitions create changes to relational environments that modify patterns of interdependence, which ultimately give rise to more chaotic relational states (Solomon et al., 2016).

The decrease in partner interdependence might be explained by college students' restrictions for contact during the pandemic. That is, their partner's ability to facilitate or interfere with daily routines becomes less influential if their overall contact and time spent together has decreased due to pandemic-related constraints. Put simply, romantic partners might see each other less, providing fewer opportunities to interfere or facilitate. A post-hoc analysis provided evidence for this explanation of decreased interdependence; on average, partners saw each other 4.400 times a week before the pandemic ($SD = 2.199$), which decreased to an average of 3.220 times a week during the pandemic ($SD = 2.496$); $t(300) = 7.305$, $p < .001$, $d = .420$. This limited contact explanation could explain the decreases in interdependence from before to during the pandemic. For instance, some students might have moved back home and now live with a parent or parents after college campuses discontinued in-person educational offerings and switched to online instruction (Sahu, 2020). Post-hoc descriptive statistics revealed additional evidence for this limited contact explanation as partners reported increases in geographical separation after the pandemic started. Prior to the pandemic, 50.2% of partners were geographically within 15 minutes of their partner ($n = 158$), whereas during the pandemic, only 28.3% of partners remained within a 15-minute travel proximity ($n = 89$). From these post-hoc contact explorations revealing decreased weekly contact with and increased geographical distance from partners, we believe that partner interdependence declined because of new living situations that were required as romantic partners moved from college campuses and were no longer enrolled in on-campus courses or experiencing an on-campus college life.

The within-subjects mediation model revealed parallel indirect effects for partner interdependence (both interference and facilitation) on relational turbulence, as well as a direct effect of the pandemic itself on relational turbulence. With regard to the former, increases in relational turbulence were explained in part by decreases in facilitation and interference. That is, slightly less relational turbulence was experienced to the extent that partners interfered less with daily routines during the pandemic, but at the same time, relational turbulence increased more to the extent that partners did not facilitate as much with daily routines either. These opposite indirect effects are in line with the wealth of research demonstrating that interference creates turbulence whereas facilitation diminishes it (e.g., McLaren et al., 2011, 2012; Solomon & Priem, 2016). However, a direct effect revealed that, controlling for changes in partner facilitation and interference, the pandemic itself was associated with a change in more relational turbulence above and beyond partners' decreases in interdependence. Pandemic stressors, independent of partner interdependence, appear to disrupt the stability of romantic relationships. Although relational research on the pandemic is limited as of this writing, preliminary findings suggest that stressors from the pandemic, including social isolation, financial strain, and perceived stress, are associated with lower romantic relationship quality (Balzarini et al., 2020).

During the pandemic, college students reported an increase in negative emotions toward communicating with their romantic partners including more anger, fear, and sadness. This increase in negative emotions might be indicative of partners' daily emotional welfare being compromised as a byproduct of the pandemic. Lades et al. (2020) found when individuals stayed home during the pandemic and did not pursue outside activities, they experienced more negative affect. However, partner interference was strongly associated with these negative emotions, which is in line with previous research in other transitional contexts (Brisini & Solomon, 2019; Knobloch et al., 2007; Knobloch & Theiss, 2010; Solomon & Brisini, 2019). From a discrete emotions perspective, such negative affect may result because partner interference behaviors are perceived as threatening, uncontrollable attempts to impede one's goals (Nabi, 2002). Axiom 2 of RTT received support as individuals felt more anger, fear, and sadness when interacting with their partner when routines were interrupted by them during the pandemic.

The findings from this investigation extend the purview of RTT to the novel context of a global health emergency and demonstrate support for the theory's utility in the specific context of a pandemic. This research furthers a line of relatively recent scholarship which applies and tests the mechanisms of RTT when romantic partners are experiencing situations that are out of the ordinary, further illustrating RTT's efficacy in explaining both normative and nonnormative relational experiences (e.g., Tian & Solomon, 2020). With regard to the latter, some findings emerged here which appear to be unique to the particular context under study. For example, although transitions typically evoke increased interference and attendant negative emotions from a partner (see Solomon et al., 2010), here we found that both forms of partner interdependence decreased from before to during the pandemic. It seems clear (and others have concluded) that interference is complex and unique to the transition in question (Harvey-Knowles & Faw, 2016), as some transitions naturally lend themselves to more—or in this case, less—partner interdependence, given the stringent social distancing guidelines that have characterized the pandemic in the U.S. Although partner interference is a negatively valenced construct in RTT, and thereby the reduction of interference should lead to concomitant reductions in the experience of relational turbulence, here that effect appears to have been offset by the concurrent experience of decreased partner facilitation (again, likely due to the inherent social distancing constraints of the pandemic for the college student daters in this sample, most of whom were geographically distant). In this investigation, we observed an increase in relational turbulence, which was indirectly affected by decreased partner facilitation and directly exacerbated by the nature of the pandemic itself.

Further, the findings from this study highlight the complex role of interdependence processes within RTT, and provide some evidence for the ways in which partner interference and facilitation work together (or in this case, work against each other) to impact the experience of relational turbulence in college student dating relationships. From RTT's perspective, the least amount of turbulence should result when partner facilitation is high while partner interference is low. Here, partner interference decreased, yet so did partner facilitation. Thus, although RTT suggests that partner facilitation may at times serve a sort of buffering function against interference or the

effect of transitions, this buffering effect could not be realized (despite the decrease in partner interference) because the pandemic constrained the ability to facilitate (and to interfere with) a partner's daily routines. Perhaps because of this, the findings from this study suggested that the pandemic itself as compared to interdependence processes had the strongest impact on the experience of relational turbulence. It is important to note that the nuances of these findings regarding interdependence processes are expected to be context-dependent, as the majority of college student daters who comprised this sample were geographically distant during the pandemic. It is likely that a different pattern of results would emerge for married or cohabiting couples with regard to interdependence processes, for whom it is unlikely that both partner facilitation and interference would decrease during this extended time of social distancing, working remotely, homeschooling children, etc. For married and cohabiting couples, interdependence processes are expected to play a stronger role in the experience of relational turbulence during a pandemic (Knoster et al., 2020).

The collective results reveal several practical implications for romantic relationships of all types, including marital relationships, during the pandemic. First, it is important to recognize that transitions are times rife with relational turbulence for couples as changes to external environments produce chaotic relational states (Solomon et al., 2010). Life, in general, has been chaotic since the pandemic began and has created stressors external to interdependent relationships that carry over into it and naturally affect its quality (Balzarini et al., 2020). It is important for partners to recognize that their romantic relationships may be strained from the pandemic, and they might expect negative affect and tumultuous sensitivities for their relationships as these are processes theorized to result from the experience of transitions (Solomon & Knobloch, 2004). Second, in order to more successfully navigate the pandemic, and to navigate extreme or nonnormative relational episodes more generally, it is important for relational partners to adapt to the "new normal" by establishing neoteric patterns of interdependence that encourage relational stability. This could include establishing new daily routines and/or maintain existing ones for psychosocial benefits (WHO, 2020). These daily routines are not all instrumental or occupational; they include hobbies as well, which have been identified as particularly important for maintaining emotional well-being during the pandemic (Lades et al., 2020).

Third, in order to more effectively manage intense relational experiences, romantic partners should put in extra efforts to facilitate their partners' daily routines, and actively try not to interfere with them. It is possible that only so much facilitation can be reasonably and safely enacted during the pandemic (and further, some research with the RTT in the context of intense relational episodes suggests that facilitation does not always lead to positive outcomes; Tian & Solomon, 2020), so college student partners in particular—as opposed to spouses, for example—might acknowledge they have less overall influence on their partners' daily routines since the pandemic commenced. Fourth, romantic partners should realize that their reactivity during the pandemic and other extreme relational experiences is likely to be exacerbated, and this reactivity may manifest in the form of more extreme or perhaps even volatile emotions, cognitions, and communicative behaviors (Solomon et al., 2010, 2016). Such extreme reactions have implications for a variety of relational processes, including seeking/providing social

support and engaging in conflict. As such, romantic partners should be cognizant of the far-reaching impact of intense experiences such as the current global health pandemic on everyday functioning in the relationship. Being aware of the potential for such reactivity may encourage partners to pause and reassess rather than overreact and engage in communication or other behaviors that could possibly damage the relationship.

Although important insights about the pandemic's impact on the stability of romantic relationships emerged from this investigation, the findings must be interpreted in light of the limitations that were present. The primary limitation of this research was the reliance on recollections of the romantic relationship pre-pandemic (January, 2020) with a data collection that took place during the pandemic (April, 2020). Partners reported on what their relationship was like 4 months prior and then reported on how their relationship was currently during the peak of the pandemic. This method of reporting on the relationship during a previous time and at the time of the survey has been used by previous relational turbulence scholars (Brisini et al., 2018). However, asking participants to report on "then and now" repeated measurements in the same survey presents recall limitations for modeling within-participant "change." Yet, to design a study with two time points, we would have needed prior knowledge that a global pandemic was imminent to have collected data before it began. Thus, our repeated measurements in the same survey are a proxy for change, but cannot actually measure true changes over time, and there is a chance that recall bias was an issue (i.e., a particular fondness for "before times"). Another limitation is the college student sample which might have derived different effects due to physical separation from college campuses. As such, future researchers should examine pandemic effects in marriages and test RTT within cohabitating contexts, which might offer different conclusions from more established patterns of interdependence in shared living arrangements.

Future researchers should also continue to study major transitions as opportunities to model relational turbulence. Although transitions are not a scope condition for testing RTT because partner influence can and does occur at any point in a close relationship (Berscheid, 2002), transitions are periods of discontinuity where interdependence will change as the relational environment is affected (Solomon et al., 2016). Future researchers might also examine how the COVID-19 pandemic has created relational uncertainty, and in turn, resulted in biased cognitions as purported by RTT. To keep our survey brief with repeated measures, we only examined half of the relationship parameters in RTT. Relational uncertainty is at the core of RTT and deserves empirical attention as the pandemic continues. Finally, scholars should examine processes of relational turbulence in both dating and married samples to compare effects for generalizability (Brisini & Solomon, 2019). Although these two types of relationships have produced similar effect sizes in the relational turbulence literature (Goodboy et al., 2020), nonetheless, it remains important to continue studying both types of relationships.

This study explored changes in some of the relational processes proposed by RTT that were experienced by dating partners before the COVID-19 pandemic began to the peak of the first wave of the pandemic in the U.S. The findings revealed pandemic-related relational impacts in the form of decreased partner interdependence, increased experience of negative affect, and heightened relational turbulence (explained both by decreased partner interdependence and by the impact of the pandemic itself). These

results provide continued support for RTT's predictive and explanatory utility, and importantly, suggest practical mitigation strategies for couples who are coping with the ongoing global health crisis. This work provides support for Solomon and Brisini's (2019) assertion that "RTT may have the greatest value when it illuminates the challenges that confront couples coping with significant life transitions, especially those that impose economic, health, or emotional burdens" (p. 2432).

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Open research statement

As part of IARR's encouragement of open research practices, the authors have provided the following information: This research was not pre-registered. The data and materials used in the research are available. The data and materials can be obtained by emailing the first author at agoodboy@mail.wvu.edu.

Notes

1. At the time of the data collection, the pandemic spread was at its peak in the U.S. with a decline afterward. Since then, the summer of 2020 into the beginning of 2021 has shown a rapid increase in COVID-19 infection rates and deaths. Therefore, we opted to use the language "during the peak of the first wave" because confirmed infections afterward have been much more rampant in the U.S. All COVID-19 data are available at the Centers for Disease Control and Prevention website at https://www.cdc.gov/coronavirus/

2. Using robust maximum likelihood estimation, all scales were subjected to confirmatory factor analysis with items loading on their respective latent constructs in pre-pandemic and pandemic measurement models. For the pre-pandemic measurement model, the global fit was adequate: scaled χ^2 (260) = 569.953, $p < .001$, CFI = .935, RMSEA = .062 [.055, .068], SRMR = .042. For individual scale items, the standardized factor loadings were strong (all loadings above .70; Kline, 2016): interference (λ = .722–.836), facilitation (λ = .712–.910), anger (λ = .704–.951), sadness (λ = .880–.941), fear (λ = .929–.958), relational turbulence (λ = .825–.845). For the pandemic measurement model, the global fit was also adequate: scaled χ^2 (260) = 498.342, $p < .001$, CFI = .952, RMSEA = .054 [.047, .061], SRMR = .041. Again, the standardized factor loadings were strong for scale items: interference (λ = .799–.893), facilitation (λ = .789–.925), anger (λ = .793–.938), sadness (λ = .802–881), fear (λ = .912–.961), relational turbulence (λ = .825–.879).

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