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Contents lists available at ScienceDirect

Journal of Contextual Behavioral Science

journal homepage: www.elsevier.com/locate/jcbs

Empirical Research

Modeling suicide risk among parents during the COVID-19 pandemic: Psychological inflexibility exacerbates the impact of COVID-19 stressors on interpersonal risk factors for suicide

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ARTICLE INFO

Keywords:

Coronavirus

COVID-19

Suicide

Interpersonal theory of suicide

Psychological flexibility

Psychological inflexibility

ABSTRACT

Public health researchers have raised the concern that both the 2019 coronavirus disease (COVID-19) pandemic and the ensuing public health response will increase interpersonal stressors associated with suicide risk. The Acceptance and Commitment Therapy (ACT) framework conceptualizes psychological flexibility as an important way to reduce the impact of painful and even catastrophic events on psychological suffering. The current study examines psychological flexibility as a potential moderator of the prevailing interpersonal model of suicide risk. METHODS: A sample of 1003 parents (73% female, 82% Caucasian 86% in romantic relationships) were recruited as part of a larger study on the COVID-19 pandemic and family functioning from March 27th to the end of April 2020, the height of the United States' "first wave." Participants completed measures of psychological flexibility (the Multidimensional Psychological Flexibility inventory; MPFI), interpersonal constructs (perceived burdensomeness and thwarted belongingness), desire for death, COVID-19 related stressors (resource strain and loss due to COVID-19). RESULTS: Moderated-mediation path models highlighted a significant indirect association between COVID-19 stressors and desire for death mediated by perceived burdensomeness to others. This indirect pathway was moderated by psychological inflexibility such that links were strongest at high levels of inflexibility and weak or non-significant at low levels of inflexibility. Results were generally consistent across five of the six facets of inflexibility. DISCUSSION: The findings highlight the value of targeting psychological inflexibility as an important strategy to reduce suicide risk during the COVID-19 pandemic. Implications of patterns of results across different facets for treatment approach are discussed.

1. Introduction

The coronavirus disease 2019 (COVID-19) pandemic has resulted in a historic public health response across nearly every nation in the world. In the United States, different states and municipalities have attempted to implement various "social distancing" strategies including public awareness campaigns, closures of select services, and widespread stay-at-home orders (Abouk & Heydari, 2020). While preliminary evidence suggests these interventions produce notable reductions in COVID-related fatalities (Fowler, Hill, Levin, & Obradovich, 2020), past research into psychological functioning during quarantines suggest such measures can increase depressed mood and lower general well-being (Brooks et al., 2020). Public health leaders have raised the further

concern that these mental health impacts of social distancing may result in increased suicide risk (Gunnell et al., 2020). As early modeling suggests that the most effective public health response will require intermittent social distancing for the next two years (Kissler, Tedijanto, Goldstein, Grad, & Lipsitch, 2020), it is critical for healthcare providers to understand key pathways to suicidal thinking and potential protective factors that can be promoted to reduce suicide risk. The present study uses data gathered in a sample of parents recruited during the early weeks of the United States' social distancing efforts to provide key insights from a contextual behavioral science perspective. Specifically, it examines how common COVID-19 related stressors may contribute to interpersonal risk for suicide and how psychological flexibility and inflexibility may moderate (i.e., buffered and exacerbated respectively)

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E-mail address: Dev.Crasta@va.gov (D. Crasta).<https://doi.org/10.1016/j.jcbs.2020.09.003>

Received 30 June 2020; Received in revised form 25 August 2020; Accepted 3 September 2020

Available online 8 September 2020

2212-1447/Published by Elsevier Inc. on behalf of Association for Contextual Behavioral Science.

this link.

1.1. A contextual behavioral science perspective

The first conceptual framework guiding the current study is drawn from Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999, 2011). ACT is a third-wave therapy that deviates from traditional cognitive approaches in that it does not use techniques that challenge negative thoughts (e.g., cognitive restructuring). Instead, ACT conceptualizes difficult thoughts and feelings as a natural part of the human experience to be flexibly embraced rather than excised or changed. ACT therefore focuses on responses to the difficult thoughts/feelings, targeting a set of six rigid responses collectively identified as “psychological inflexibility:” (1) experiential avoidance (attempting to suppress unpleasant experiences), (2) self-as-content (overidentifying with negative thoughts), (3) cognitive fusion (getting caught up in difficult thoughts), (4) lack of present moment awareness (being inattentive or “on autopilot” throughout daily life), (5) lack of contact with values (allowing difficult experiences to distract from deeper goals and priorities), and (6) inaction (getting stuck in setbacks and difficult experiences). ACT instead promotes “psychological flexibility,” a set of six adaptive responses: (1) acceptance (approaching all experiences openly), (2) self-as-context (maintaining a broader perspective in the face of negative thoughts), (3) defusion (allowing difficult feelings to arrive and pass), (4) present moment awareness (maintaining mindfulness), (5) contact with values (striving to prioritize deeper goals and priorities), and (6) committed action (taking steps toward those values despite setbacks). ACT has been shown to be effective at promoting wellbeing and reducing distress across a wide array of presenting problems, disorders, and contexts (see A-Tjak et al., 2015 for meta-analysis). A meta-analysis focused on ACT-informed parenting interventions found they similarly can address a range of child problems and furthermore reduce parents’ own depressive symptoms and parenting stress (Byrne, Ghrada, O’Mahoney, & Brennan, 2020). A growing body of work supports the idea that individual dimensions of psychological flexibility and inflexibility serve as key mechanisms explaining ACT treatment gains (e.g., Arch et al., 2012; Fledderus, Bohlmeijer, Smit, & Westerhof, 2010).

Contextual behavioral science and suicide. There have been multiple attempts by ACT theorists to conceptualize suicidal behavior through the lens of psychological flexibility (Barnes, Smith, Monteith, Gerber, & Bahraini, 2017; Chiles, Strosahl, & Roberts, 2018; Hayes, Pistorello, & Biglan, 2008). Although the models differ in some respects, all distinguish between psychological inflexibility domains associated with poor emotional control (experiential avoidance, cognitive fusion, self-as-content) and those associated with behavior restriction (lack of present moment awareness, lack of contact with values, inaction). From this perspective, poor emotional control domains can be conceptualized as risk factors that increase the likelihood that a given event will result in severe emotional suffering or psychopathology (Hayes et al., 2008). Barnes et al. (2017) further theorized the three forms of psychological inflexibility associated with behavior restriction would be associated with a difficulty arriving at alternative solutions to address severe distress (e.g., valued behaviors) beyond self-directed violence. The current study sought to build on this body of work by identifying psychological flexibility and inflexibility as key skills that can shape the impact of the COVID-19 pandemic on suicide risk.

1.2. The potential impact of the COVID-19 pandemic on suicide risk

Given that a wide range of possible mental health conditions have been associated with quarantines, it is important to adopt a transdiagnostic approach towards conceptualizing the ways that the pandemic can contribute to suicide. The Interpersonal Theory of Suicide (IPTS; Van Orden et al., 2010) provides an excellent framework for these purposes by focusing on psychosocial factors contributing to suicide.

IPTS draws from psychosocial theories that emphasize “basic psychological needs” such as the “need for competence” (i.e., to effectively impact one’s own life and the lives of others in valued ways; Ryan & Deci, 2000) and the “need to belong” (i.e., to feel close and connected to others; Baumeister & Leary, 1995). Focusing on the extreme absence of these “needs,” IPTS maintains that a desire for death begins to emerge in response to either *perceived burdensomeness* –feeling so flawed as to be a liability for others – and *thwarted belongingness* –feeling deprived from reciprocally caring relationships. Although the theory highlights other psychological factors such as hopelessness and acquired capability for suicide (i.e., reduced fear of death and increased pain tolerance) as determining the severity of this desire for death (ranging from passive wish for death to actual attempts), IPTS considers the two constructs as sufficient conditions for desire for death in any of its forms (Van Orden et al., 2010). From a contextual behavioral science perspective, the difficult experiences of perceived burdensomeness and thwarted belongingness would more likely be characterized as negative self-evaluations rather than “needs.” However, we will refer to them collectively as “interpersonal needs” throughout the manuscript to remain consistent with IPTS terminology.

Perceived burdensomeness from COVID-19. In the context of the COVID-19 crisis, economic stress has been identified as a potential consequence of social distancing that could impact suicide risk at a population level (Reger, Stanley, & Joiner, 2020). A review of past research on recessions offers tentative support for the impact of large-scale economic recessions on the suicide rate (Oyesanya, Lopez-morinigo, & Dutta, 2015). An even stronger link has been observed between unemployment rates and suicide even during eras that are not classified as recessions by other metrics (Nordt, Warnke, Seifritz, & Kawohl, 2015). This is concerning as current projections predict that the COVID-19 pandemic will lead to a 13-million person rise in global unemployment (International Labour Organization, 2020). The earliest impact of the COVID-19 crisis on employment was experienced by parents, many of whom reported worsening mental health after the beginning of the COVID-19 crisis along with loss of child-care and food insecurity (Patrick et al., 2020). Early school closures had an especially strong impact on mothers of school age children, who were disproportionately likely to take leave from work before family friendly workplace policies (e.g., remote work) or public policies (e.g., supplemental unemployment benefits) were established (Heggeness, 2020).

Thwarted belongingness from COVID-19. Thwarted belongingness can be strongly driven by both the affective experience of loneliness and the concrete loss of key supports (Van Orden et al., 2010). A cross-sectional survey of adults in the United States found that 43% met clinical cut-offs for severe loneliness only *three weeks into their adoption of social distancing guidelines* (Killgore, Cloonan, Taylor, & Dailey, 2020). The tremendous fatality rate due to the COVID-19 pandemic has already led to a staggering number of losses at the population level and it is quite likely that those will increase as time progresses. Simulations taking into account the age distribution of COVID-19 deaths and typical kinship network structure in the United States suggest that if the illness reaches 40% prevalence in the population, approximately 2% of adults would experience the loss of a parent and 6% would experience the loss of a grandparent directly to COVID-19 (Verderly & Smith-Greenaway, 2020).

1.3. Introducing a contextual behavioral science lens into IPTS

Taken together, the worldwide COVID-19 outbreak can be seen as a population-wide challenge to interpersonal needs by introducing financial stresses that may lead to greater perceived burden and a mounting degree of loss that can diminish networks of reciprocal relationships. IPTS’ transdiagnostic model of suicide risk can be complemented by the transdiagnostic conceptualizations of psychological flexibility used in ACT. The current study therefore sought to model these associations by applying the contextual behavioral science lens to two key windows for intervention in IPTS: (1) the link between concrete

events and interpersonal needs and (2) the link between interpersonal need strain and desire for death.

The role of cognitive flexibility in reducing strain to interpersonal needs. IPTS shares contextual behavior science's emphasis on responses to challenging events (e.g., within-person *perceptions* of burdensomeness and belonging) rather than focusing on the events themselves (e.g., those associated with the COVID-19 pandemic). Contextual behavioral science would further assert that inflexible approaches to emotional control transform isolated experiences into critical evaluations (self-as-content thinking) or absolute judgments (cognitive fusion) to be effortfully avoided (experiential avoidance). Consistent with this, experiential avoidance and cognitive fusion have been shown to predict greater strain on interpersonal needs (Hapenny & Fergus, 2017; Roush, Brown, Mitchell, & Cukrowicz, 2019). In contrast, psychological flexibility represents a set of skills to approach the hardships of the COVID-19 crisis in an open and accepting manner, gently experiencing them while maintaining a broader perspective. This may be especially important for parents, who may feel especially helpless to provide for their children or keep them safe. For example, both defusion and acceptance were highlighted as possible mechanisms of an ACT-based program helping parents of children with life-threatening illnesses process their guilt and sense of uncertainty (Burke et al., 2014). Thus, psychological flexibility might buffer links between COVID-19 related stress and threats to interpersonal needs, effectively reducing perceptions of burdensomeness and thwarted belongingness despite the marked upheaval and stress introduced by COVID-19.

The role of cognitive flexibility in buffering against consequences of thwarted interpersonal needs. While IPTS theorizes that perceived burdensomeness and thwarted belonging are sufficient causes for a desire for death, a contextual behavioral science perspective would assert that these negative self-evaluations would only be seen as threatening to the extent that individuals experience them as "needs" for well-being at all, rather than difficult thoughts that one can respond to in many ways. Consistent with this prediction, flexible responses such as mindfulness (Buitron, Hill, & Pettit, 2017; Collins, Best, Strizke, & Page, 2016) and pursuing personal values (Bahraini et al., 2013) weaken the impacts of interpersonal need strain on task persistence or suicidal ideation. In contrast, thwarted belongingness demonstrates stronger links to suicidal ideation for those who value interpersonal relationships (i.e., who are failing that value; Monteith, Pease, Forster, Homaifar, & Bahraini, 2015). The role of valued action as a last defense against maladaptive responses has been particularly highlighted by ACT theorists addressing parenting during the COVID-19 crisis. While the authors highlight multiple dimensions of psychological flexibility (including present moment awareness, acceptance, and defusion), they note that valued and committed action (i.e., maintaining contact with values and taking committed actions based on those values) may be especially crucial to help parents who "are really struggling [...] move forward in an adaptive way" (Coyne et al., 2020, p. 5). Taken as a set, this growing body of work suggests psychological flexibility might buffer against interpersonal need strain's impact on maladaptive thoughts of death or suicide.

1.4. The present study

Despite the rich theory linking different aspects of flexibility and inflexibility to suicide, only some components have been examined in relation to suicide risk. Similarly, although different aspects of psychological flexibility have been linked to different components of the IPTS in past studies, there has never been research that integrates flexibility/inflexibility across the IPTS model of suicidal desire. The COVID-19 outbreak provides an opportunity to address both gaps in a large population of parents experiencing a shared set of challenges to core interpersonal needs. Toward that end, an online sample of 1003 parents was recruited during the first five weeks of United States social distancing efforts. The study specifically focused on the challenges faced

by parents of school-aged children to help capture the additional disruption caused by school closings in response to the pandemic (adding to the interpersonal strain experienced by those parents). Taking two key COVID-19 related psychosocial stressors expected to increase risk at a population level (resource stress and COVID-19 losses; Reger et al., 2020), the present analyses examines their ability to predict desire for death as mediated by threats to interpersonal needs. Based on the ACT conceptualizations of suicidal thinking as a product of inflexible response to stressors (Barnes et al., 2017; Chiles et al., 2018; Hayes et al., 2008), the study modeled psychological flexibility as a potential moderator of the IPTS mediated pathway. Based on recent measurement work (Rolffs, Rogge, & Wilson, 2018), we conceptualized psychological flexibility as two separate dimensions, flexibility and inflexibility. Additionally, as theoretical conceptualizations of ACT and suicide posited unique roles for different facets of inflexibility (Barnes et al., 2017), secondary analyses examined moderated mediation by each dimension.

Hypothesis 1. Based on IPTS conceptualizations, we hypothesized that parents experiencing greater COVID-19 related life-stresses would report greater thwarting of core interpersonal needs (i.e., higher perceived burdensomeness and thwarted belongingness).

Hypothesis 2. Based on the robust links between IPTS constructs and suicide in the literature, we further hypothesized that thwarting of interpersonal needs would be associated with more frequent thoughts of death and/or self-harm.

Hypothesis 3. Integrating the first two hypotheses into the full IPTS model, we predicted that the IPTS constructs would significantly mediate the link between COVID-19 related life-stresses and thoughts of death, resulting in significant indirect paths.

Hypothesis 4. Building on ACT conceptualizations of suicidal thinking, we theorized that the overall mediated path would be moderated by psychological flexibility and inflexibility. Specifically, we hypothesized that parents with greater psychological flexibility would experience a weaker links between COVID-19 stresses, thwarted interpersonal needs, and suicidal thoughts (Hypothesis 4A) whereas parents with greater psychological inflexibility would experience stronger links at each level of the same mediated pathway (Hypothesis 4B). Although the secondary analyses on specific dimensions of inflexibility were exploratory, we expected facets of inflexibility related to emotional control might exacerbate the initial impact of stressful events on thwarted interpersonal needs whereas those related to behavioral control might exacerbate links between thwarted interpersonal needs and suicidal thoughts.

2. Methods

2.1. Procedures

All materials and procedures for the current study were evaluated and approved by an IRB. Participation involved completing a 35–45 min online survey (presented as the "Social Distancing and Family Dynamics Study") and participants were recruited from March 27th to the end of April 2020, the five weeks when the widest number of states were adopting social distancing measures. To be eligible, participants had to: (1) be at least 18 years of age (to provide their own consent) and (2) have at least one 5–18 year old child living in the home with them for at least 3 days a week (to capture the disruption caused by school closings in response to the pandemic). Approximately half (51.0%) of our sample was recruited from ResearchMatch, a registry of individuals living within the United States willing to be contacted about research (pulling for individuals of a slightly higher education who are more intrinsically interested in supporting research). The next largest portion were recruited from targeted recruitment sources such as emails to listservs (14.9%) and Mechanical Turk (10.7%), a crowdsourcing tool that

allowed us to advertise to United States citizens (pulling for individuals with slightly lower income who are willing to complete surveys for small monetary incentives). The remainder of our participants were recruited from internationally visible sites including posts on [Reddit.com](https://www.reddit.com) (14.7%), social media (e.g., Facebook, Twitter; 7.6%), and news coverage of the project (1.2%). Participants received individualized feedback at the end of the survey as the primary recruitment incentive. Participants recruited from Mechanical Turk also received \$0.75 as an incentive.

2.2. Participants

A total of 1003 parents completed the survey. Respondents were primarily from the United States (97.3%), female (72.5%), in romantic relationships (85.6%), and Caucasian (82.4%), with 5.7% African American, 4.9% Latinx, 2.2% Asian or Pacific Islander, 1.8% Native American, and 3.0% other or biracial. Parents were typically in their 30's or 40's ($M = 40.9$, $SD = 8.5$) and most had 1 to 3 children in their homes ($M = 1.8$, $SD = 1.0$). The sample was well educated, with 40.0% of parents having graduate degrees, 33.1% having bachelor's degrees, 24.9% have some college or trade school training, and 4.3% having high school or less.

2.3. Measures

Desire for death. The ninth item of the Patient Health Questionnaire (hereafter, PHQ-9 Item#9) is a common screener for suicide risk in non-severe settings such as outpatient mental health clinics (Simon et al., 2013) and primary care clinics (Louzon, Bossarte, McCarthy, & Katz, 2016). The PHQ-9 Item#9 asks participants to rate how often they experienced “Thoughts that you would be better off dead or of hurting yourself in some way” over the previous two weeks. The double-barreled item is inclusive of both passive death ideation and more specific thoughts of self-harm that IPTS theorizes would both follow from thwarted interpersonal needs. Responses were rated from 1 (*Not at all*) to 4 (*Nearly every day*).

Interpersonal need strain. We selected eight items from the Interpersonal Needs Questionnaire that demonstrated strong loadings on the target factors in the non-clinical samples used to validate the longer forms of the measure (Van Orden, Cukrowicz, Witte, & Joiner, 2012). The four perceived burdensomeness items were “The people in my life would have been better off if I were gone,” “the people in my life would have been happier without me,” “I thought the people in my life wished they could be rid of me,” and “I thought I made things worse for the people in my life.” The four thwarted belongingness items were, “I felt disconnected from other people,” “I felt like I belonged (reversed),” “I felt that there were people I could turn to in times of need (reversed),” “I felt close to other people (reversed).” Responses were rated on a 7-point scale (*Not at all true* to *Extremely true*) and averaged so that higher scores represented greater interpersonal need strain ($\alpha_{\text{Perceived Burdensomeness}} = .95$; $\alpha_{\text{Thwarted Belongingness}} = .86$).

COVID-19 stressors. Stress regarding a lack of access to key resources due to the COVID-19 pandemic was assessed by asking participants “how much you were worried or stressed about” the following three items over the past week: “finances/bills,” “the stability of your own job (or your partner's job)” and “the availability of essentials (e.g., food, toilet paper, cleaning supplies).” Items were rated on a 1 (*Not at all*) to 6 (*Completely*) scale and averaged such that higher scores reflected greater stress during the previous week ($\alpha = .73$). The experience of COVID-19 loss was assessed with a single item asking participants, “Has anyone in your life passed away from COVID-19?” coded on a dichotomous 0 (*No*) or 1 (*Yes*) scale.

Psychological flexibility and inflexibility. Parents completed the 60-item Multidimensional Psychological Flexibility Index (MPFI; Rolffs et al., 2018) to assess the 12 dimensions of flexibility and inflexibility targeted in ACT. Participants were asked to consider the last week and responded on a 1 (*Never TRUE*) to 6 (*Always TRUE*) point scale. Responses on each 5-item subscale were averaged so that higher scores indicated higher levels of the construct being assessed: acceptance ($\alpha = .90$), present moment awareness ($\alpha = .92$), self-as-context ($\alpha = .92$), defusion ($\alpha = .92$), contact with values ($\alpha = .90$), committed action ($\alpha = .92$), experiential avoidance ($\alpha = .92$), lack of present moment awareness ($\alpha = .95$), self-as-content ($\alpha = .95$), cognitive fusion ($\alpha = .95$), lack of contact with values ($\alpha = .94$), and inaction ($\alpha = .95$). The 30 flexibility items were also averaged to create a global flexibility composite ($\alpha = .96$) and the 30 inflexibility items were averaged to create a global inflexibility composite ($\alpha = .96$).

2.4. Analytic strategy

In order to fully integrate prior findings from IPTS theory and ACT in the context of the COVID-19 pandemic, we created a unified moderated-mediation path model within a structural equation modeling (SEM) framework using Mplus 7.11. As shown in Fig. 1A, in our primary model, global flexibility and inflexibility (using the MPFI 30-item composite scores) were tested as moderators to all paths of the mediation model linking COVID-19 related stress to desire for death. Specifically, both global flexibility and inflexibility were allowed to moderate the individual indirect paths (W^*A and W^*B) and direct paths (Path W^*C) of the IPTS mediation model using a “total effect moderation model” as recommended by Edwards and Lambert (2007). Each scale was centered prior to creating interaction terms. The simple slopes of the mediated paths (A, B, and A^*B) were estimated at 15th and 85th percentile scores on each significant mediator. The 99% confidence intervals for each of the indirect paths were estimated within 1000 bootstrapped samples. As global inflexibility demonstrated robust moderation effects, the primary model was followed by a series of six secondary models in which global inflexibility was replaced with a specific dimension of inflexibility (see Fig. 2) using the corresponding 5-item MPFI subscale scores. This allowed us to identify the specific forms of psychological inflexibility showing the strongest moderation (i.e., exacerbation) of the links between COVID-19 stress and desires for death.

3. Results

3.1. Sample characteristics

Although 79.2% of the sample reported having no thoughts of being better off dead or hurting themselves in the last 2 weeks, 71 parents (7.1%) reported having those thoughts several days, 45 (4.5%) more than half the days, and 31 (3.1%) nearly everyday, with 62 parents (6.2%) leaving that question unanswered. Thus, the sample captured many parents struggling with thoughts of death or self-harm within the most severe month of the COVID-19 pandemic. As shown in Table 1, parents generally reported moderately high levels of flexibility, with a mean of 3.94 ($SD = 0.77$) corresponding to a typical response of “Often TRUE” on the 6-point scale for items asking about engagement of psychologically flexible skills. Parents reported moderately low levels of inflexibility ($M = 2.67$, $SD = 0.88$), corresponding to the most common answers of “occasionally” and “rarely” on their use of inflexible responses to difficult or challenging experiences. Parents also reported intermediate levels of resource stress, ($M = 2.97$, $SD = 1.29$) typically answering “Somewhat” to the items assessing levels of worry and stress associated

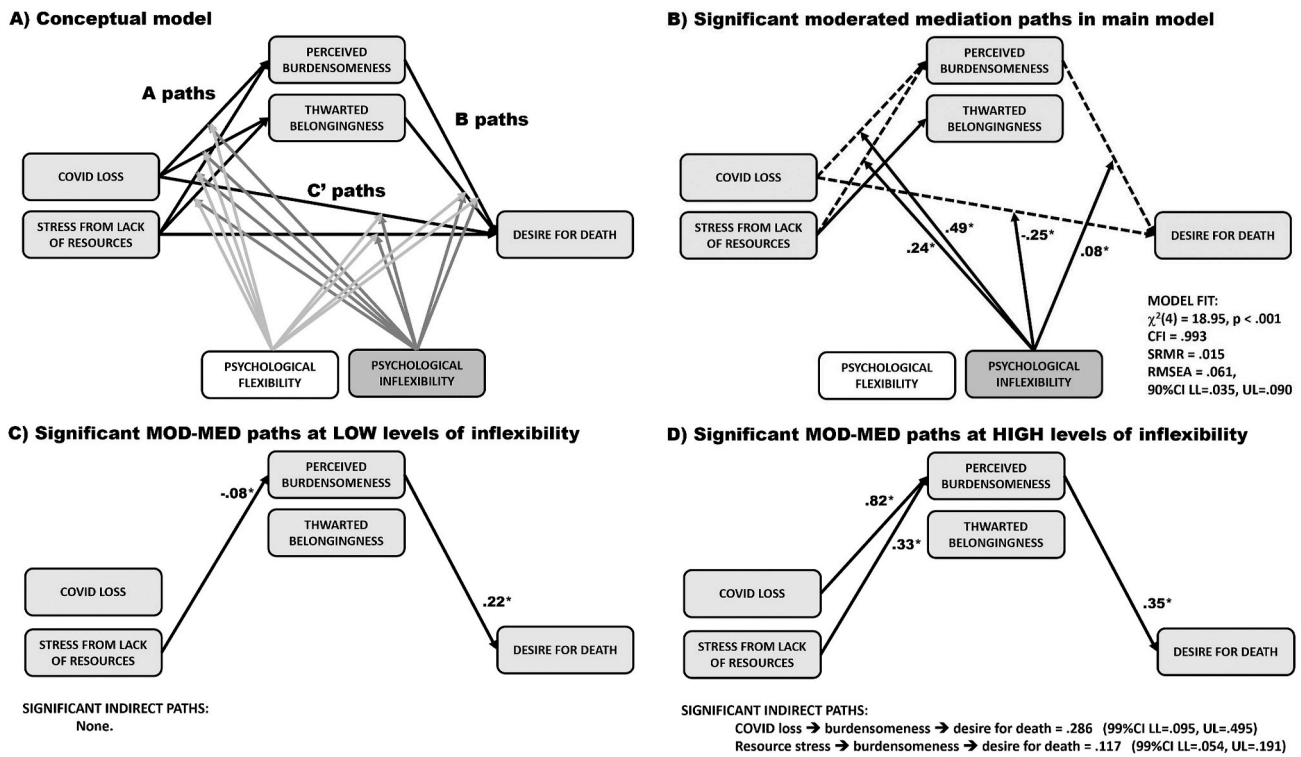


Fig. 1. Results of the main moderated-mediation path model. Notes. Unstandardized path coefficients shown. * $p < .05$.

Table 1
Means, standard deviations, and correlations among the key scales in the model.

Class of variables	Descriptives			Correlations											
	Range	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
Specific variables															
Outcome															
1 Desire for death	1 to 4	1.27	0.70												
Mediators: Interpersonal Needs															
2 Perceived burdensomeness	1 to 7	1.60	1.21	.71											
3 Thwarted belongingness	1 to 7	3.20	1.43	.27	.33										
Predictors: COVID-19 Stressors															
4 COVID-19 loss	0 to 1	.06	.25	.18	.31	.00									
5 Resource stress	1 to 6	2.97	1.29	.28	.33	.24	.12								
Moderators: Flexibility & Inflexibility															
6 Global flexibility	1 to 6	3.94	0.77	-.03	-.03	-.47	.05	-.01							
7 Global inflexibility	1 to 6	2.67	0.88	.53	.60	.42	.22	.37	-.30						
8 Experiential avoidance	1 to 6	3.47	1.07	.13	.18	.05	.08	.20	-.01	.51					
9 Lack of present moment awareness	1 to 6	2.70	1.08	.34	.41	.31	.17	.24	-.28	.70	.24				
10 Self as content	1 to 6	2.36	1.17	.48	.59	.37	.21	.31	-.19	.84	.35	.45			
11 Cognitive fusion	1 to 6	2.78	1.24	.43	.48	.39	.14	.33	-.29	.85	.30	.46	.73		
12 Lack of contact with values	1 to 6	2.33	1.06	.51	.55	.39	.21	.30	-.31	.83	.26	.56	.63	.63	
13 Inaction	1 to 6	2.38	1.17	.53	.56	.40	.22	.34	-.29	.87	.25	.54	.68	.76	.76

Note. Correlations with absolute values $|r| \geq .08$ were significant at the $p < .05$ level. Correlations with absolute values $|r| \geq .40$ have been bolded for ease of interpretation.

with lack of resources from COVID-19. Finally, 64 parents (6.4%) reported having had someone in their lives pass away from COVID-19, suggesting that we were successful in recruiting parents with personal experience of loss from COVID-19. Taken together, these results suggest that the sample represents a diverse range of individual experiences with the pandemic.

As shown in Table 1, the constructs being examined showed bivariate correlations in the expected directions. The two measures of interpersonal needs were correlated at $r = .33$, suggesting they would likely have

unique variance to contribute to the model. The specific facets of inflexibility on the MPFI demonstrated moderately strong associations with one another, supporting their use in separate secondary models rather than as simultaneous predictors. The remaining correlations were moderate in magnitude, suggesting lower levels of collinearity. Taken as a set, these bivariate correlations suggest appropriately intermediate levels of collinearity supporting the use of the proposed multivariate model.

Table 2
Results of the primary path model.

Construct being predicted (portion of model)	Standardized (β) and unstandardized (b) path coefficients		
Type of predictors (portion of model)			
Specific variables	B	b	p
Predicting perceived burden (mediator)			
with psychological flexibility (controls)			
Global flexibility	.045	.070	.177
Global inflexibility	.421	.582	<.0005
with COVID-19 stressors (A paths)			
COVID-19 loss	.077	.374	.097
Resource stress	.128	.120	<.0005
testing moderation of A paths by flexibility			
FLEX by COVID-loss	.074	.479	.207
FLEX by Resource stress	.032	.036	.447
testing moderation of A paths by inflexibility			
INFLEX by COVID-loss	.124	.487	.007
INFLEX by Resource stress	.227	.237	<.0005
Predicting thwarted belongingness (mediator)			
with psychological flexibility (controls)			
Global flexibility	-.372	-.685	<.0005
Global inflexibility	.271	.442	<.0005
with COVID-19 stressors (A paths)			
COVID-19 loss	-.047	-.274	.144
Resource stress	.151	.167	<.0005
testing moderation by flexibility			
FLEX by COVID-loss	-.003	-.020	.913
FLEX by Resource stress	-.027	-.035	.399
testing moderation by inflexibility			
INFLEX by COVID-loss	-.012	-.057	.679
INFLEX by Resource stress	-.036	-.044	.300
Predicting desire for death (outcome)			
with psychological flexibility (controls)			
Global flexibility	.060	.055	.083
Global inflexibility	.194	.155	<.0005
with mediators (B paths)			
Perceived burdensomeness	.492	.284	<.0005
Thwarted belongingness	.036	.016	.312
testing moderation of B paths by flexibility			
FLEX by Perceived burdensomeness	-.014	-.008	.806
FLEX by Thwarted belongingness	.014	.008	.681
testing moderation of B paths by inflexibility			
INFLEX by Perceived burdensomeness	.184	.076	.036
INFLEX by Thwarted belongingness	.012	.008	.750
with COVID-19 stressors (C' paths)			
COVID-19 loss	.003	.009	.911
Resource stress	.010	.005	.713
testing moderation of C' paths by flexibility			
FLEX by COVID-loss	-.074	-.276	.071
FLEX by Resource stress	.006	.004	.854
testing moderation of C' paths by inflexibility			
INFLEX by COVID-loss	-.108	-.246	.020
INFLEX by Resource stress	.024	.015	.606

Note. The model demonstrated adequate fit: $\chi^2(4) = 18.95, p < .001, CFI = .993, SRMR = .015, RMSEA = .061, 90\% CI LL = .035, UL = .090$. Significant coefficients have been bolded for ease of interpretation.

3.2. Main effects of COVID-19 stress on interpersonal risk variables (hypotheses 1–3)

The primary moderated mediation path model (testing global flexibility and inflexibility as moderators) demonstrated adequate fit: $\chi^2(4) = 18.95, p < .001, CFI = .993, SRMR = .015, RMSEA = .061 (90\% CI LL = .035, UL = .090)$. As shown in Table 2, Hypothesis 1 was partially supported with financial strain being significantly associated with greater levels of both perceived burdensomeness and thwarted

belongingness even after accounting for the controls of psychological flexibility and significant moderation effects. As seen in the bottom half of Table 2, Hypothesis 2 was also only partially supported in the main model, with only burdensomeness predicting desire for death after controlling for psychological flexibility and inflexibility. The indirect pathway formed by significant paths from financial stress to perceived burdensomeness to desire for death was also significant ($B = .034; 99\%CI [0.012, 0.066]$). However, each path in this mediation model showed significant interaction terms with psychological inflexibility (Table 2). Although this provides partial support for the indirect impact of COVID-19 stress through IPTS needs proposed by Hypothesis 3, it suggests this pathway must be understood in the context of its moderation by inflexibility.

3.3. Moderation of mediation path by psychological inflexibility (Hypothesis 4)

The full impact of the interaction terms in Table 2 can be seen in Fig. 1B, where psychological inflexibility moderates links between both forms of COVID-19 stress and perceived burdensomeness (A paths in a mediation model), the path between perceived burdensomeness and desire for death (a B path in a mediation model), as well as the residual direct link between experiencing a personal loss due to COVID-19 and a desire for death (the C' path in a mediation model). The direction of these coefficients suggested that high levels of inflexibility would serve to intensify or exacerbate the proposed mediational paths linking COVID-19 stress to desire for death through perceived burdensomeness and correspondingly weaken the direct links between COVID-19 loss and desire for death (Hypothesis 4B). Consistent with this, the simple slope analyses presented in Table 3 and Fig. 1C demonstrate that for parents low on psychological inflexibility, the indirect links between COVID-19 stress and desire for death through perceived burdensomeness are non-significant or even weakly negative (i.e., resource stress predicting slightly lower desire for death via slightly lower perceived burdensomeness). In contrast, as seen in Fig. 1D, the model predicted that for parents high on psychological inflexibility, the indirect links between COVID-19 loss and desire for death through perceived burdensomeness are significant and positive. Thus, at high levels of inflexibility, both losing someone to COVID-19 and stress about potential lack of resources predicted stronger perceptions of burdensomeness, which in turn predicted greater desire for death. After controlling for the moderation by psychological inflexibility, psychological flexibility did not emerge as a significant moderator in this model.

3.4. Moderation by specific forms of inflexibility

As shown in Fig. 2, although all six dimensions of inflexibility significantly moderated the mediational model, the pattern of moderation differed across these more specific constructs. To begin, five of the six individual dimensions of inflexibility moderated links between both forms of COVID-19 stress and perceived burdensomeness (the A path). The emotional control dimensions of inflexibility (i.e., experiential avoidance, self-as-content and cognitive fusion) demonstrated notably strong moderation effects on those links whereas lack of present moment awareness failed to emerge as a significant moderator of those paths. In contrast, the link between perceived burdensomeness and desire for death (B path), was only significantly moderated by lack of contact with values and inaction. This suggests that these behaviorally restrictive dimensions of inflexibility intensified the links between perceived burdensomeness and desire for death during the early phases of the COVID-19 pandemic in the U.S. As shown in Table 3, when the mediational

Table 3
Moderated mediation results with bootstrapped confidence intervals for indirect effects showing significant moderation by inflexibility.

Moderator (dimension of inflexibility)	COVID-19 stressor → Perceived burden		Perceived burden → Desire for death		Indirect Effect (99% CI)		
	A	P	B	p	A*B	LL	UL
Levels of the moderator							
Specific paths examined							
Global Inflexibility							
LOW global inflexibility							
COVID-19 loss → burden → desire for death	-.036	.913	.224	.002	-.008	-.218	.245
Resource stress → burden → desire for death	-.079	.014	.224	.002	-.017	-.051	.000
HIGH global inflexibility							
COVID-19 loss → burden → desire for death	.810	<.0005	.352	<.0005	.286	.095	.495
Resource stress → burden → desire for death	.332	<.0005	.352	<.0005	.117	.054	.191
Experiential Avoidance							
LOW experiential avoidance							
COVID-19 loss → burden → desire for death	.371	.441	.420	<.0005	.155	-.461	.727
Resource stress → burden → desire for death	.188	<.0005	.420	<.0005	.079	.024	.172
HIGH experiential avoidance							
COVID-19 loss → burden → desire for death	1.731	<.0005	.412	<.0005	.712	.267	1.189
Resource stress → burden → desire for death	.322	<.0005	.412	<.0005	.132	.082	.199
Self as Content							
LOW self as content							
COVID-19 loss → burden → desire for death	-.674	.008	.276	.002	-.185	-.527	-.027
Resource stress → burden → desire for death	-.047	.213	.276	.002	-.013	-.057	.013
HIGH self as content							
COVID-19 loss → burden → desire for death	1.083	<.0005	.384	<.0005	.417	.181	.680
Resource stress → burden → desire for death	.324	<.0005	.384	<.0005	.125	.058	.199
Cognitive Fusion							
LOW cognitive fusion							
COVID-19 loss → burden → desire for death	-.046	.892	.304	<.0005	-.014	-.292	.381
Resource stress → burden → desire for death	-.002	.972	.304	<.0005	.000	-.038	.039
HIGH cognitive fusion							
COVID-19 loss → burden → desire for death	1.449	<.0005	.396	<.0005	.575	.282	.918
Resource stress → burden → desire for death	.333	<.0005	.396	<.0005	.132	.056	.222
Lack of Contact with Values							
LOW lack of contact with values							
COVID-19 loss → burden → desire for death	-.034	.928	.216	<.0005	-.007	-.208	.280
Resource stress → burden → desire for death	-.058	.155	.216	<.0005	-.013	-.048	.009
HIGH lack of contact with values							
COVID-19 loss → burden → desire for death	.834	<.0005	.356	<.0005	.298	.098	.534
Resource stress → burden → desire for death	.405	<.0005	.356	<.0005	.144	.072	.216
Inaction							
LOW inaction							
COVID-19 loss → burden → desire for death	.081	.840	.168	.012	.014	-.149	.367
Resource stress → burden → desire for death	-.145	<.0005	.168	.012	-.025	-.064	-.001
HIGH inaction							
COVID-19 loss → burden → desire for death	.736	.001	.348	<.0005	.256	.051	.491
Resource stress → burden → desire for death	.406	<.0005	.348	<.0005	.141	.073	.211

Note. A = predictor to mediator path coefficient, B = mediator to outcome path coefficient. The confidence intervals were estimated with bootstrapping.

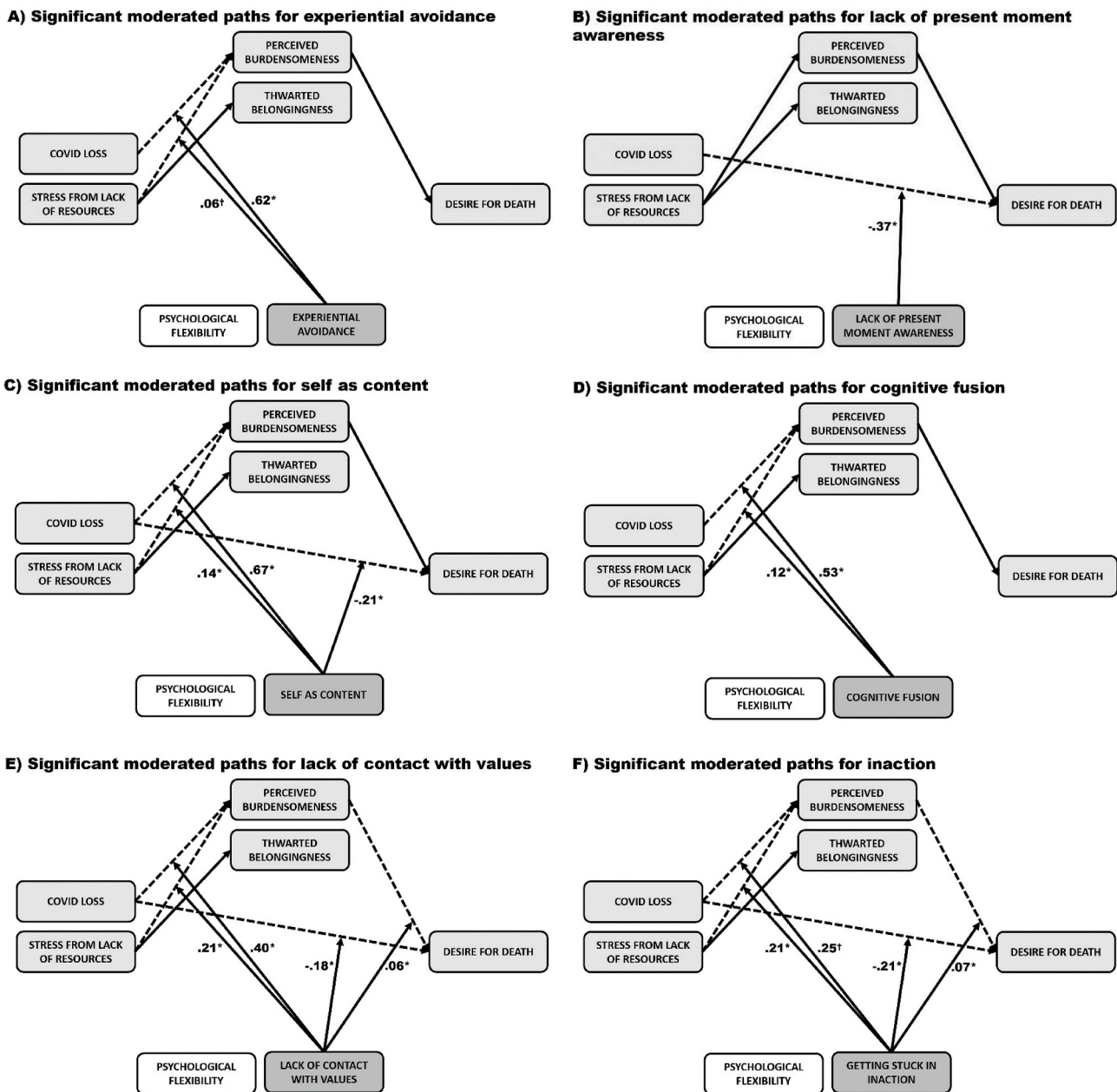


Fig. 2. Significant moderation effects that emerged within the secondary moderated-mediation models. Notes. Unstandardized path coefficients shown. [†]p < .10; *p < .05.

paths are estimated at low (15th percentile) and high (85th percentile) levels of each of the 5 dimensions of inflexibility showing moderation of at least one of the indirect paths, a similar pattern emerges to that seen for global inflexibility. Thus, at low levels of experiential avoidance, self-as-content, cognitive fusion, lack of contact with values, or inaction, the indirect paths are either non-significant or weakly negative. However, at high levels of these forms of flexibility, significant indirect paths emerged in which both forms of COVID-19 stress predicted greater perceived burdensomeness, which in turn predicted greater desire for death. The most pronounced indirect paths for COVID-19 loss predicting desire for death through burdensomeness emerged at high levels of experiential avoidance while the most pronounced indirect paths for resource stress was lack of contact with values, highlighting them as

potential suicide risk factors and points of intervention during the COVID-19 pandemic.

4. Discussion

The above findings highlight the important links between increasingly common stressors during the COVID-19 crisis and two levels of suicidal cognitions (i.e., interpersonal need strain and desire for death). Thus, the results offered support for the first three hypotheses derived from the IPTS mediational model, but extended that work by highlighting psychological inflexibility as a key risk factor that can intensify the effects of COVID-19 stress on desire for death. In addition to being consistent with the theoretical models of suicide both within IPTS and

ACT, the results offer important avenues for clinicians to both monitor for and address potential suicide risk in their clients during current and future implementations of region-wide social-distancing protocols.

4.1. Implications

The psychosocial stressors of COVID-19 increase risk for suicide by increasing perceptions of burdensomeness. Although a meta-analysis of the IPTS literature has found perceived burdensomeness tends to show stronger associations with suicidal ideation than thwarted belongingness (Chu et al., 2017), the difference in magnitude is generally much smaller than seen in the present study. Research from an evolutionary standpoint suggests that individual perceptions of burdensomeness are more likely to lead to suicide in the context of scarce resources available to kin whether in the form of low household income (Brown, Dahlen, Mills, Rick, & Biblarz, 1999) or the community-wide threat of the COVID crisis. This may explain why perceived burdensomeness might have emerged as such a robust mediator in the current models. These same conditions may in turn lead to a “pulling together” effect where individuals feel belonging to a common cause during this COVID crisis (Reger et al., 2020), potentially diminishing the role of thwarted belongingness as a mediator in our models.

It is also notable that COVID-19 losses did not appear to impact perceptions of belongingness in our sample. This may be because the losses are not necessarily limited to reciprocally caring relationships (e.g., potentially reflecting the loss of an acquaintance rather than a loved one). As our sample was comprised of parents, increasing bonding with family members during isolation could help compensate for loss of social connections outside of the home. However, increased time with family may also increase the salience of family conflict, intimate partner violence, and divorce, all of which have been associated with thwarted belongingness in past research (Van Orden et al., 2010). As early reports across multiple cities in the United States suggest that intimate partner violence is increasing (Boserup, McKenney, & Elkbuli, 2020), COVID-19 stress might show stronger links to thwarted belongingness as the pandemic stretches on over time, and it will be important for clinicians to monitor changes in family functioning during periods of isolations and closures.

Reducing inflexible responses can be an important strategy to reduce the link between concrete COVID-19 related stressors and self-evaluations of burdensomeness. IPTS theorists generally maintain that *perceived* burdensomeness is in most cases driven by “misperceptions amenable to therapeutic modification” (Van Orden et al., 2010, p. 584). The present manuscript highlights that psychological inflexibility might be an important driver of such misperceptions. For example, while participants who experienced a COVID-19 loss reported an increased sense of burden in general, this link was strongest for those high in avoidance. This suggests the attempts to avoid inescapable grief could leave individuals feeling like a burden to others and steer thoughts toward death as the “ultimate escape” from intolerable feelings (Hayes et al., 2008, p. 94). In contrast, the associations between stressors and burdensomeness were reduced in magnitude, non-significant, or even weakly negative at low levels of five of the six facets of inflexibility. In most cases, this reduction was sufficient to move the indirect pathway between concrete stressors and suicidal thoughts to non-significance. The findings are consistent with the treatment model of ACT for Life (Barnes et al., 2017), which hypothesizes that all six types of inflexible and rigid responding would result in helpless, reactive, and cognitively fused responses to unavoidable pain. Thus, Barnes et al. (2017) explain that the first target should be the helplessness of the “control agenda,” conflating one’s own worth with the impossible task of controlling the uncontrollable. Our current results suggest that, during a global crisis where loss of close others and financial strain mainly depend on factors beyond our control, flexibly letting go of the control agenda reduces larger feelings of worthlessness and liability to those around us.

Lack of behavioral control strengthens the link between

burdensomeness and suicidal ideation. Although weakening the link between external stresses and perceived burdensomeness may be a profound way to reduce suicide risk, it is worth noting that some may still perceive themselves as a burden for more longstanding and stable reasons. However, limiting our work to attempting to reduce perceptions of burdensomeness falls into the trap of seeing the burdensomeness as the problem to be solved. As highlighted by Chiles et al. (2018), such *emotion-focused problem solving* may lead clients back to suicidal thinking to stop the emotion (i.e., the feelings of burdensomeness).

The alternative approach is *values-focused problem solving*, helping clients respond to their emotional pain in ways that are consistent with their personal beliefs (Chiles et al., 2018). From this perspective, it is notable that of the three constructs related to “behavioral control,” it was specifically lack of contact with values and feeling stuck in inaction – but not lack of contact with the present moment – that strengthen the association between burdensomeness and desire for death. Both constructs directly interfere with the ability to engage in values-focused problem solving and suggest that clinicians should work to ensure that clients feeling overwhelmed by burdensomeness do not lose sight of their key values or lose the ability to identify new ways to serve those values.

4.2. Limitations and future directions

Although the current study represents the first study to fully integrate IPTS and ACT theories within a single model, thereby providing key insights into the elevated suicide risk associated with the COVID-19 pandemic, its findings are constrained by a number of limitations. First, although the direction of causal pathways in the current model are consistent with IPTS theory, ACT theory, and previous studies using the same constructs, the cross-sectional nature of these data cannot rule out other directions of causality. Future studies should therefore explore this model within longitudinal data to clarify the directions of causality. Secondly, although double-barreled nature of the PHQ-9 Item#9 screener is most proximal to the IPTS construct assessed in the present study (a “desire for death” inclusive of passive and active suicidal ideation), it limits the conclusions that can be drawn from the present analyses. Future research would likely benefit from using a more fine-grained measure of suicidal ideation that distinguishes between different severities (e.g., passive death ideation, active suicidal ideation, and ideation with intent) to specify the specific dimensions of psychological flexibility that are most crucial for reducing suicidal behavior rather than general suicide risk. Third, the present study’s focus on a parenting sample potentially constrains generalizability of the findings. Although the current findings might generalize to adults without children, future studies of individuals who might be living in isolation or who do not have clearly defined family units could also reveal different roles of thwarted belongingness (which may become more relevant) and perceived burdensomeness (which may become less relevant). Fourth, the sample was predominantly female, Caucasian, and well-educated. As the COVID-19 pandemic has had a disproportionate impact on low income and minority communities with respect to both financial strain (Parker, Horowitz, & Brown, 2020) and COVID-19 mortality (Gross et al., 2020), this could have limited the range of COVID-19 stress captured in our sample, thereby attenuating or weakening the links being examined. Thus, although a meaningful pattern of results emerged in the current sample, future work could determine if stronger and more robust results emerge in more diverse samples. Finally, it is worth noting that our study studied a majority United States sample early in developing its response to a global pandemic. Countries markedly diverged in the stringency of their social distancing protocols and the robustness of their social programs to maintain finances and access to supplies. Such efforts may successfully reduce COVID-19 losses and resource strain while increasing other potential stressors such as sense of isolation or uncertainty about one’s contribution to society. Thus, future studies could extend this work by examining the impact of the COVID-19

pandemic among a broader range of psychosocial stressors within more globally diverse samples that could capture the myriad impacts of this pandemic.

5. Conclusion

Taken together, the above results highlight the role of psychological inflexibility in both exacerbating the impact of concrete COVID-19 related stressors on interpersonal evaluations and subsequent desire for death. These results suggest that promoting flexibility might be one way to reduce suicide risk during the COVID-19 pandemic. Additionally, the larger links between IPTS' transdiagnostic view of suicide risk and ACT's transdiagnostic view of treatment identified in this study can serve as a platform for generating more effective interventions.

Funding

Writing of this manuscript was supported by the Office of Academic Affiliations, Advanced Fellowship Program in Mental Illness Research and Treatment, Department of Veterans Affairs.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

We would like to thank the parents who took time in the midst of a pandemic to support this research by completing our survey.

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