



# Traumatology

Manuscript version of

## Preschooler Stressor-Related Thoughts and Worries During the COVID-19 Pandemic: Development and Validation of a Caregiver-Report Instrument

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Funded by:

- Australian Research Council
- German Research Foundation
- National Center for Research Resources
- National Institutes of Health, National Center for Advancing Translational Sciences

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**Preschooler Stressor-related Thoughts and Worries during the COVID-19 Pandemic:**

**Development and Validation of a Caregiver-report Instrument**

### Abstract

There is little evidence regarding cognitions that are associated with emotional and behavioral problems in preschoolers during stressful events such as the COVID-19 pandemic. This article presents the initial development and validation of a caregiver-report instrument, the Preschooler Stressor-related Thoughts and Worries (PSTW) scale, developed during the COVID-19 pandemic. In 2020, caregivers from two countries reported on their child's cognitions at baseline ( $T_0$ ) and three months later ( $T_1$ ; ages 3-5 years; Australia:  $N=559$ ; USA:  $N=346$ ). Exploratory factor analysis (EFA) was conducted with the Australian sample at  $T_0$  and confirmed with the USA sample at  $T_0$ . EFA suggested a one factor model including 10 items. Results of the CFA failed to clearly support this structure (CFI=.91, RMSEA=.11). Construct validity was supported by positive associations between PSTW scores and emotional and behavioral problems. While the PSTW is a promising instrument to assess preschooler cognitions related to COVID-19, further investigation of its performance in other contexts (e.g., other countries, other stressful or traumatic events) is needed.

**Key words:** preschooler, COVID-19, cognitions, worries, negative appraisals

## **Preschooler Stressor-related Thoughts and Worries during the COVID-19 Pandemic:**

### **Development and Validation of a Caregiver-report Instrument**

Early empirical data have demonstrated high rates of anxiety, depression, symptoms of posttraumatic stress disorder (PTSD), and worries in school-aged children and adolescents during the COVID-19 pandemic (e.g., Duan et al., 2020; Ravens-Sieberer et al., 2021). Increased affective symptoms, anxiety, and oppositional behavior during the COVID-19 pandemic have also been found among young children between 1 and 6 years old (Schmidt et al., 2021). Despite an increasing number of studies exploring risk and protective factors to explain increased emotional and behavioral difficulties in children (e.g., Cameron et al., 2020; Schmidt et al., 2021; Zhou et al., 2020), we know little about contributing factors in the context of the pandemic. Furthermore, investigations have thus far focused mainly on school-aged children, leaving a paucity of research regarding preschoolers' emotional and behavioral health.

**Cognitions** related to the pandemic, including worries and negative appraisals, might explain how emotional and behavioral problems develop during or following such stressful events. **While worries refer to the expectation that something bad might happen, negative appraisals refer to negative evaluations that something bad has already happened.** Such stressor-related cognitions are important predictors in several prominent theories explaining the development and maintenance of mental health problems following traumatic, stressful, or ambiguous events (e.g., Ehlers & Clark, 2000; Mathews & Mackintosh, 1998; Seligman et al., 1984). However, to date, preschoolers (3-5 years old) have been a neglected population in research on **stressor-related** cognitions and how these cognitions may affect their mental health. An obstacle to research among preschoolers has been the lack of reliable and valid standardised measures of their cognitions.

### **Cognitive models of emotional and behavioral problems following stressful events**

Considering the cognitive framework for PTSD, a sense of current threat, even in the absence of actual threat, can develop due to certain negative **appraisals** and in turn lead to mental health problems (Ehlers & Clark, 2000; Foa et al., 1999). For school-aged children, such **appraisals** might include the sense of permanent change since the event and the perception of one's own vulnerability

in a dangerous world (Meiser-Stedman et al., 2019; Meiser-Stedman et al., 2009). Based on the available literature and qualitative data from the COVID-19 Unmasked project, Vasileva et al. (2021) recently proposed a theoretical model to explain how preschoolers' stressor-related cognitions might impact child behavioral and emotional difficulties in the context of the pandemic. The model includes four **types of stressor-related cognitions** – 1) misconceptions and lack of understanding about COVID-19; 2) worries about negative outcomes (e.g., getting sick); 3) worries that changes might be permanent; and 4) perceived vulnerability. The model suggests that **stressor-related cognitions** might be important **in understanding** how preschoolers cope with stressful events. Hence, validated assessment tools are needed to further investigate the role of preschoolers' stressor-related cognitions.

### **Previous research of preschoolers' cognitions**

Few studies have investigated cognitions **associated** with emotional and behavioral problems in young children using standardised measures. Of those, most have included an ambiguous story paradigm (e.g., Creswell et al., 2011) or a story completion task (e.g., Hutchison et al., 2010) that were not related to the child's own experience but rather to standardised situations (e.g., imagining organising a party where no one arrived until a half an hour after the start time; Creswell et al., 2011). Consistently, these studies found more frequent interpretation of threat in an ambiguous situation as well as disordered thinking in children with emotional and behavioral problems compared to children without such problems (Creswell et al., 2011; Hutchison et al., 2010; Hutchison et al., 2016; Stuijzand et al., 2018). Although these studies provide valuable insights about child **cognitions** related to emotional and behavioral difficulties, they **do not provide insight around** children's cognitions related to their own **stressful** experiences.

Quantitative studies examining young children's cognitions in relation to their own **stressful** experiences have so far focused on children who were exposed to specific experiences, such as conflicts between their parents (Ablow et al., 2009; Miller et al., 2012, 2014), or have used measures that have not yet been psychometrically validated (Schmidt et al., 2021; Vasileva et al., 2022). Studies with children exposed to parental conflicts **or maltreatment** indicated that those as young as 3 years can have **stressor-related** cognitions such as appraisals of threat and self-blame, which **were** associated with emotional or behavioral problems (Ablow et al., 2009; Miller et al., 2012, 2014; Vasileva et al.,

2022). In a COVID-19 specific study, Schmidt et al. (2021) found that more negative appraisals of the pandemic were associated with increases in affective, anxiety, and defiant symptoms in children ages 1 to 6 years. To assess child appraisals, the authors developed an index of three caregiver-reported yes/no questions about child appraisals of potential negative effects for the child, family, and caregivers. However, this dichotomous assessment using only three items may not assess the full range of [stressor-related cognitions](#). Although the study provides initial insights about young children's [stressor-related cognitions](#) during the COVID-19 pandemic, a more comprehensive measure assessing the distribution of child worries and negative [appraisals](#) is needed.

### **The current study**

This study aimed to develop and examine the psychometric validity of a caregiver-report measure of stressor-related cognitions in preschool children (3-5 years old) in the context of the COVID-19 pandemic. In line with the theoretical framework presented by Vasileva and colleagues (2021), we included items to assess children's worries and negative appraisals. We hypothesized that these constructs would be associated with more negative experiences during the COVID-19 pandemic and more severe child emotional and behavioral problems. We also explored age and gender differences in COVID-19 related cognitions.

## **Methods**

### **Procedure**

These data were collected as part of the COVID-19 Unmasked Global Collaboration (De Young et al., 2021), which assesses the wellbeing of children aged 1 to 5 years during the COVID-19 pandemic. The ethics committees at each site approved the study procedures. The current study included samples of caregivers recruited from Australia and the USA with children aged 3 to 5 years. Caregivers were recruited through the teams' existing programs and partnerships, contacting organisations, and advertisements in newspapers and social media channels. Caregivers were eligible to participate in the larger study if they had a child between the ages of 1 and 5 years old and were able to complete the online survey in English (note that we only included data from 3–5-year-olds in this manuscript because it was assumed that this age group has sufficient cognitive abilities to develop negative cognitions). Data collection occurred from 11<sup>th</sup> May 2020 to 4<sup>th</sup> August 2020 in Australia

and from 27<sup>th</sup> July 2020 to 8<sup>th</sup> January 2021 in the USA. After completing the baseline assessment ( $T_0$ ), caregivers received invitations to participate in 3-, 6- and 12-month follow ups. In the current study, we extracted data from two time points ( $T_0$  = baseline,  $T_1$  = 3-month follow-up).

## Participants

For the Australian sample, 1130 caregivers of children between 1 and 5 years consented to participate, 602 of whom were caregivers of children between the ages of 3 and 5 years. Of these, 42 cases were excluded due to missing data on questions regarding child cognitions. There were no significant differences in child or caregiver age and gender between excluded and included participants ( $ps > .05$ ). Characteristics of the final sample ( $N = 559$ ) are presented in Table 1. A total of  $n = 233$  caregivers participated again at  $T_1$  and answered all questions about child cognitions. There were no significant differences in child or caregiver age and gender between those who participated at both time points versus participants who dropped out after the  $T_0$  assessment ( $ps > .05$ ). For the purposes of factor analysis and scale computation, we coded the "Unable to tell" option in the questions about child cognitions as equivalent to missing data (see a further description under the methods section). Fifty-one caregivers (9.1%) who answered one or more PSTW items with "Unable to tell" were therefore excluded from further analyses; the final sample for the analysis was  $N = 508$ . No differences in child age and gender were found in the answers of caregivers who indicated "Unable to tell" for at least one item compared to those who did not ( $ps > .05$ ).

In the USA, 629 caregivers of children ages 1 to 5 years participated in the study, 400 of whom were caregivers of children ages 3 to 5 years. Of these, 54 (13.5%) cases were excluded due to missing data on questions regarding child cognitions. There were no significant differences in child or caregiver age and gender between excluded and included participants ( $ps > .05$ ). Characteristics of the final USA sample ( $N = 346$ ) are also presented in Table 1. At  $T_1$ ,  $n = 127$  (36.7%) answered all cognition questions. No significant differences were found in child and caregiver age and gender between participants completing both the  $T_0$  and  $T_1$  assessment and those completing only  $T_0$  ( $ps > .05$ ).

Furthermore, there were no differences between the two samples on child gender, child age, or caregiver age ( $ps > .05$ ). The Australian sample included slightly more female caregivers and

biological parents than the USA sample ( $\chi^2 = 4.33, p = .038$ ;  $\chi^2 = 8.49, p = .0035$ , respectively). There were few diagnoses of COVID-19 in both samples, with more diagnoses in the USA sample ( $n = 0$  vs.  $n = 4$  for children,  $n = 0$  vs.  $n = 8$  for caregivers; no statistical comparison was possible).

## Measures

**Preschooler Stressor-related Thoughts and Worries.** The Preschooler Stressor-related Thoughts and Worries (PSTW) questionnaire (Vasileva & De Young, 2020) was developed for the purpose of the COVID-19 Unmasked study. Questions were based on theoretical models of PTSD (Ehlers & Clark, 2000) and empirical evidence about preschoolers' cognitions associated with anxiety or depression (Creswell et al., 2011; Hutchison et al., 2010). The initial 12 items assessed worries (8 items), perceived permanent change (2 items), and perceived vulnerability (2 items). Supplementary Table 1 provides explanations of adaptations from the initial pool of items (see De Young et al., 2021). The lack of understanding and worries questions were derived from another survey (Waite et al., 2020) and were adapted to reflect worries relevant for preschoolers (including worries about separation from caregiver; Muris et al., 2000). The other items were developed after reviewing existing measures of posttraumatic cognitions in children and adolescents (R. Meiser-Stedman, personal communication, November, 2019; Meiser-Stedman et al., 2009; Stallard & Smith, 2007). Only items that were considered relevant for the COVID-19 pandemic were included in the PSTW item pool (see Supplementary Table 2 for the final PSTW items).

Items were rated on a 4-point Likert scale (0 = "Not at all" to 4 = "Very much"). We included an "Unable to tell" option because little is known about preschoolers' cognitions and whether or not caregivers are able to rate them. It was reasoned that if many caregivers were to answer an item with "Unable to tell", there might be a measurement problem for this item. On average, 1.1% answered with "Unable to tell" with no differences across items, and thus we elected to include all items (Supplementary Figure 1 shows item frequencies of the PSTW initial items at  $T_0$ ).

**Child mental health.** The Patient-Reported Outcome Measurement Information System Early Childhood (PROMIS-EC) was used to assess mental health outcomes for 1- to 5-year-old children (Blackwell et al., 2020). We administered the full version of the anxiety measure (8 items, e.g., "My child seemed scared or fearful") and short-forms of the following problem domains:



anger/irritability (4 items, e.g., “My child became frustrated easily”), depressive symptoms (4 items, e.g., “My child seemed sad”), and sleep disturbance (4 items, e.g., “My child had difficulty falling asleep”). Caregivers rated their children’s behavior over the past week on a 5-point-Likert scale from 1 = “Never” to 5 = “Always”. Higher scores indicated more problems in each domain. [Recent studies indicated good reliability and initial evidence of validity for the PROMIS-EC](#) (Lai et al., 2022; Sherlock et al., 2022). Internal consistency for the subscales in the Australian sample [of 3-to 5-year-old children](#) ranged between  $\alpha = .84$  and  $\alpha = .91$  at  $T_0$ . In the USA [3- to 5-year-old](#) sample, internal consistency ranged between  $\alpha = .80$  and  $\alpha = .87$  at  $T_0$ .

**COVID-19 related negative impact.** The Pandemic Impact Questionnaire: Early Childhood (PIC-EC; De Young et al., 2021) included 15 questions developed for the purpose of the COVID-19 Unmasked study to assess the extent to which the COVID-19 pandemic negatively impacted daily routines, lifestyle, and activities experienced by the child (e.g., “My child has not been able to see, play with, or show affection for close family members or friends”), the caregiver (e.g., “I have lost my usual social support”), and the family (e.g., “Our family has experienced financial hardship from the COVID-19 pandemic”). Caregivers rated the degree of impact or disruption on a 5-point Likert scale from 0 = “Not at all” to 4 = “Very much”. Higher scores indicate stronger negative impact of the pandemic and related restrictions. In this study, the internal consistency of this scale at  $T_0$  was  $\alpha = .83$  in both samples [including 3- to 5-year-old children](#).

### **Statistical analysis**

Data were analysed using IBM SPSS and AMOS. We took a two-pronged approach to managing missing data. First, we used listwise deletion of all cases that were missing any items on the PSTW. We did this because for further analyses items answered with “Unable to tell” were also coded missing and were therefore not missing at random. Next, we imputed individual mean scores for participants in which at least 50% of data was present on a given subscale of the PROMIS-EC and PIC-EC following the convention of the COVID-19 Unmasked Global Collaboration (De Young et al., 2021). [For each scale, between 0.36% and 4.14% of participants had missing values that were imputed.](#)

To examine the factor structure of the items, we used exploratory factor analysis (EFA) with principal axis factoring with the Australian sample. We chose a factor structure based on: 1) eigenvalues greater than 1, 2) visual examination of the scree plot and 3) theoretical considerations regarding interpretability of the factors. Item factor loadings needed to be greater than .50 to be included in a factor. If there were cross loadings differing at .30 or lower, the item was excluded. Next, the final factor structure was validated using confirmatory factor analysis (CFA) with maximum likelihood estimation in the USA sample at T<sub>0</sub>. Absolute fit indices (RMSEA  $\leq$  0.10;  $\chi^2/df \leq 5$ ) as well as incremental fit indices (CFI  $>$  .90) were used to estimate the model fit (Brown & Cudeck, 1993; Hu & Bentler, 1999; Schumacker & Lomax, 2004).

Reliability (internal consistency and test-retest-reliability) and validity indices were investigated in both samples. Cronbach's  $\alpha$  of  $\geq .70$  was considered acceptable based on previous literature (Taber, 2018). We measured construct validity, particularly convergent validity, by investigating Pearson's correlations between the PSTW scale and the child problem domains of the PROMIS-EC (anger/irritability, anxiety, depressive symptoms and sleep disturbance) at T<sub>0</sub> in both the Australian and the USA samples. Predictive validity was analysed through Pearson's correlations between the PSTW scale at T<sub>0</sub> and child problem domains in PROMIS-EC at T<sub>1</sub>. Finally, we explored associations between the PSTW scale and age as well as gender differences using Pearson's correlations and *t*-tests, respectively.

## Results

### Factor structure

All 12 items were included in an EFA using the Australian sample. An initial investigation showed that a factor analysis was suitable (KMO = .90, Significant Bartlett's test of sphericity ( $p < .001$ )). Two items ("My child has mentioned that they have changed since the COVID-19 outbreak"; "My child's play or drawings have COVID-19 related themes") were excluded because they had loadings lower than .50. Thus, 10 items were retained for subsequent analyses. Based on an eigenvalue greater than 1 and on the visual examination of the scree plot, a one-factor structure appeared to fit the data best. The factor was named "Stressor-related Thoughts and Worries" and explained 41.11% of the total variance. We attempted to validate the final factor structure using a

confirmatory factor analysis in the USA sample. Results indicated borderline model fit at T<sub>0</sub>: the fit was acceptable when compared to a null model (CFI = .91) but questionable when using absolute fit indices testing the discrepancy to a saturated model (RMSEA = .11;  $\chi^2/df = 4.78$ ). Factor loadings based on the AU sample and standardised regression weights based on both samples are summarized in Table 2. Efforts to improve the fit are summarized in Supplementary Figure 2.

### **Evidence of Reliability and Validity**

Internal consistency at T<sub>0</sub> was good in both samples (Australia:  $\alpha = .86$ , USA:  $\alpha = .87$ ). Test-retest reliability in both samples indicated moderate correlations between T<sub>0</sub> to T<sub>1</sub> (Australia:  $r_{tt} = .65$ ;  $p < .001$ ; USA:  $r_{tt} = .73$ ).

In both samples, higher PSTW scores at T<sub>0</sub> correlated with higher problems in all mental health domains (Australia:  $r = .27$  to  $r = .64$ , all  $ps < .001$ ; USA:  $r = .28$  to  $r = .57$ , all  $ps < .001$ ). Table 3 presents the correlations between the PSTW and child mental health subscales, age and COVID-19 impact at T<sub>0</sub> and T<sub>1</sub>). Descriptively, the correlations were strongest for anxiety. In both samples, higher scores on the PSTW scale at T<sub>0</sub> correlated positively with all child problem domains at T<sub>1</sub> (Australia:  $r = .19$  to  $r = .49$ , all  $ps < .01$ ; USA:  $r = .27$  to  $r = .42$ , all  $ps < .01$ ; see Table 3).

### **Age and gender analysis**

In both the Australian and USA samples, higher PSTW scores were associated with older child age (Australia:  $r = .11$ ,  $p < .01$ ; USA:  $r = .24$ ,  $p < .001$ ). There were no gender differences (Australia:  $t = 1.03$ ,  $df = 505$ , USA:  $t = -.54$ ,  $df = 328$ ;  $ps > .05$ ).

## **Discussion**

This study aimed to develop and validate a caregiver-report assessment instrument of stressor-related cognitions in 3- to 5-year-old children in the context of the COVID-19 pandemic. Current findings suggest that, despite the **poor** fit of the CFA, the PSTW is a promising short measure of preschoolers' stressor-related worries and negative appraisals related to the COVID-19 pandemic **with good psychometric properties**. The cognitions assessed by the PSTW may have relevance for other similarly stressful **or traumatic** events. The PSTW is the first known standardised caregiver-report instrument to assess preschooler cognitions that may be associated with emotional and behavioral difficulties. Thus, the PSTW could be a useful tool in research and clinical care following

stressful child experiences. Although we could not support the model fit in the CFA, the current findings can inform future studies in the field of preschooler cognitions in the context of stressful events.

These findings contribute to existing literature about the assessment of cognitions when coping with stressful or traumatic events (Meiser-Stedman et al., 2019; Meiser-Stedman et al., 2009; Stallard & Smith, 2007) by providing an instrument for preschoolers. Previously, it has been debated whether young children can develop negative cognitions following stressful events because of their still-developing cognitive abilities (e.g., Salmon & Bryant, 2002). The PSTW scale, however, was able to assess cognitions related to emotional and behavioral problems in preschoolers. These quantitative results extend previous qualitative findings of the study showing examples for child stressor-related cognitions (Vasileva et al., 2021). Although the samples included a relatively narrow age range, older children had higher PSTW scores, which might reflect the rapid cognitive development at this age (e.g., related to metacognitive development; Flavell, 2000). However, the age effect was small in our sample ( $r = .11$ ). Future research is needed to explore how stressor-related cognitions are related to child cognitive development.

The EFA was in line with the theoretical model for preschoolers' cognitions in the context of COVID-19 (Vasileva et al., 2021) by identifying worries and negative appraisals that were associated with child emotional and behavioral problems. However, the CFA indicated poor fit. It has been reported previously that RMSEA is sensitive to sample size and might wrongly indicate poor fit when testing a model with small degrees of freedom (Kenny et al., 2015). This might be related to the small number of items that were initially chosen to detect different cognitions (e.g., worries, perceived vulnerability, perception of permanent change since the stressful event). For instance, when developing measures to assess posttraumatic cognitions, two factors were found in samples of school-aged children and three factors in adult samples (Foa et al., 1999; Meiser-Stedman et al., 2009). The PSTW included only 10 items and lacked power to detect different aspects of child cognitions that were theoretically proposed (Vasileva et al., 2021), such as misconceptions and lack of understanding, worries and perceived vulnerability. The scale can instead therefore be used as a screening tool for negative cognitions that might be associated with mental health problems in children. Other

instruments need to be developed for a more comprehensive and differentiated assessment of preschoolers' cognitions [by refining the items and including additional constructs](#). Furthermore, the [poor](#) fit in the USA sample might reflect differences in the Australian and the USA samples that were not readily apparent in the available data. For instance, there might have been different levels of perceived threat due to different political, social, or individual responses to the pandemic. [Furthermore, the pandemic and related restrictions were changing rapidly in each country, so that there might be effect of the timeslot in which data was collected](#). The factor structure therefore needs to be [further](#) investigated in other [context \(e.g., other countries\)](#).

The PSTW showed evidence of good reliability and validity. The internal consistency of the scale was good, with  $\alpha = .86$  and  $\alpha = .87$  for both samples. Furthermore, considering that the situation at multiple levels - within the home, in the community, at state and national levels - during the pandemic was changing rapidly, which might have affected child worries and thoughts, the moderate test-retest reliability of the scale [are within](#) acceptable [ranges](#).

Our results also indicate adequate convergent and predictive validity. The PSTW total score correlated with all child mental health domains at both assessment time points. Similarly, Schmidt et al (2021) found significant associations between negative appraisals of COVID-related consequences and both internalising and externalising child mental health problems. In validation studies for an instrument assessing [posttraumatic cognitions](#) of school-aged children (CPTCI), correlations greater than 0.6 were found for affective and internalising problems and greater than 0.4 for externalising problems (de Haan et al., 2017). Similarly, we found descriptively higher correlations for anxiety and depression symptoms than for irritability.

The findings demonstrated that child cognitions associated with poor mental health could be assessed through caregivers' report. Although caregiver-report assessments of coping strategies following stressful events might not overlap completely with children's own views (e.g., Humphreys et al., 2017), there is extensive research demonstrating that preschoolers' functioning can be measured reliably and validly through caregiver report (e.g. CBCL, Achenbach, 1999; Young Child PTSD Checklist, Scheeringa, 2013). Only a minority of caregivers who completed the PSTW stated that they were unable to answer the questions about child cognitions (on average 1.1% across items)

demonstrating the potential of the PSTW to detect young children's cognitions that predict poor mental health using caregiver-report. For future use of the PSTW, we recommend using the 5-point Likert scale without the "Unable to tell" option. This option was designed only to explore caregivers' difficulties estimating their children's cognitions, because there was little known in this area. We did not find any specific items to be particularly difficult for caregivers to answer. Also, we could not find any caregivers' characteristics that were associated with more difficulties to answer the questions.

### **Limitations**

Several limitations should be noted when interpreting these findings. Any convenience sample, including ours, likely involves self-selection bias. Both samples were predominantly mothers. In addition, data collection was ongoing during different stages of the pandemic and rapidly evolving restrictions. Furthermore, caregiver responses in the survey could be biased by their own worries and mental health. A standardized clinical interview might have been more reliable to assess the outcomes. Previous studies have highlighted limitations of using caregiver-report to assess internalising outcomes in children (e.g., Humphreys et al., 2017). Owing to the need to be answerable by caregivers, items were limited in their capacity to assess internalised cognitions (e.g., avoiding thoughts about the stressful event), which might be better assessed with self-report measures. Furthermore, some PSTW items overlap with constructs of mental health problems, such as being more scared of things or having nightmares. It was not possible to analyse the direct effect of child or caregiver COVID-19 infection on child worries and thoughts because there was very low prevalence of COVID-19 in these samples. Additionally, predictive validity was based on a 3-month time frame and during a period of continuous change and disruption. Future studies could investigate if child cognitions predict emotional and behavioral problems in the long term. In this context, the instrument was developed to assess stressful events that are of limited time frame, but the COVID-19 pandemic has been going on for two years at the time this manuscript was written.

### **Conclusion**

In this study, we examined the psychometric properties of a caregiver-report instrument, the Preschooler Stressor-related Thoughts and Worries scale. The PSTW was used to assess preschoolers'

worries and negative appraisals related to a stressful event (i.e., the COVID-19 pandemic). Despite the [poor](#) fit in the CFA, findings suggest that these worries and negative appraisals were associated with, and predictive of, child emotional and behavioral problems. The PSTW can be used in future research and clinical care to identify how children exposed to stressful events cope with their worries and negative appraisals. The PSTW was developed specifically to assess [cognitions](#) related to COVID-19 but could potentially be adapted for other stressful or traumatic events. Future research is necessary to further validate the measure in different contexts (e.g., higher COVID-19 prevalence, natural disasters, other countries) and to investigate if the assessed cognitions are associated with long-term mental health consequences. It is necessary to further explore reasons for the poor fit. Potentially, increasing the degrees of freedom and using homogenous samples (e.g., regarding the level of perceived threat in the sample, narrow age-range or homogenous cognitive development) might [increase the internal validity of the study and might have led to better](#) fit. While the PSTW in its current form could be rather used as a screening tool, a more comprehensive assessment could provide a more differentiated assessment of [cognitions](#). [Furthermore, a combination of self- and proxy-report measures might increase the validity of the assessment.](#)

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Table 1

## Sample Characteristics

Demographics		Australian sample ( <i>N</i> = 559)		USA sample ( <i>N</i> = 346)	
		<i>n</i> (%)	<i>M</i> ( <i>SD</i> )	<i>n</i> (%)	<i>M</i> ( <i>SD</i> )
<b>Child</b>					
	Age (months) <sup>a</sup>		52.6 (9.5)		53.1 (9.5)
	Gender <sup>a</sup>				
	Female	290 (51.9)		159 (46.6)	
	Male	268 (47.9)		180 (52.8)	
	Prefer not to say	1 (0.2)		2 (0.6)	
	Aboriginal and/or Torres Strait Islander/Black <sup>c</sup>	9 (1.6)		18 (5.2)	
	COVID-19 diagnosis <sup>c</sup>	0 (0)		4 (1.2)	
<b>Caregiver</b>					
	Age <sup>a</sup>		35.9 (6.7)		35.4 (7.1)
	Gender <sup>b</sup>				
	Female	535 (95.7)		321 (92.8)	
	Male	19 (3.4)		22 (6.4)	
	Trans/gender diverse/Prefer not to say	3 (0.6)		3 (0.9)	
	Relationship to child <sup>b</sup>				
	Biological parent	551 (98.6)		329 (95.1)	
	Other	8 (1.4)		16 (4.49)	
	Relationship status <sup>a</sup>				
	Married/partnered	509 (91.1)		315 (91.3)	
	Other	48 (8.6)		30 (8.7)	
	COVID-19 diagnosis <sup>c</sup>	0 (0)		8 (2.3)	

Note. Displayed are valid percentages excluding missing values.

<sup>a</sup> No significant difference between the Australian and USA sample ( $p < .05$ )

<sup>b</sup> Significant difference between the Australian and USA sample ( $p > .05$ )

<sup>c</sup> Differences between the Australian and the USA sample were not tested because of different constructs or cell values of 0

Table 2

*Factor loadings and regression weights for the Preschooler Stressor-related Thoughts and Worries (PSTW) scale at T<sub>0</sub>*

Items	Australia	USA
	(n = 508) <sup>a</sup>	(n = 323) <sup>b</sup>
My child seems worried or concerned they will get sick or die from COVID-19.	.76	.82
My child seems worried or concerned they might have to go to hospital	.71	.77
My child seems worried or concerned that friends, family or animals will get sick or die from COVID-19.	.72	.81
My child seems worried or concerned they might make someone else sick.	.61	.70
My child seems worried or concerned they might be separated from me or another caregiver.	.58	.71
My child seems worried or concerned about family members being sad or scared.	.67	.73
My child has had nightmares about COVID-19.	.52	.45
My child seems worried or concerned things will never be all right again.	.62	.61
My child seems more scared of things than before the COVID-19 outbreak.	.68	.53
My child has mentioned that they need to be very careful, so they don't get sick (e.g. washing hands, not going outside).	.51	.42
Fit indices		
$\chi^2; p$	-	167,39; $p < .001$
$\chi^2/df$		4.78
CFI		.91
RMSEA		.11
PCFI		.71
TLI		.88
FMIN		0.52

<sup>a</sup>Factor loadings based on the EFA

<sup>b</sup>Standardised regression weights based on the CFA

*Note:* CFI = Comparative Fit Index; PCFI = Parsimony Comparative Fix Index; RMSEA =Root Mean Square Error of Approximation; TLI = Tucker Lewis index; FMIN = Index of Model Fit

Table 3

*Pearson's correlations of the Preschooler Stressor-related Thoughts and Worries (PSTW) scale at  $T_0$  with child mental health<sup>1</sup>, age and COVID-19 impact at  $T_0$  and  $T_1$*

PSTW scale	Australia		USA	
	$T_0$ ( $N = 557$ )	$T_1$ ( $n = 233$ )	$T_0$ ( $N = 337$ )	$T_1$ ( $n = 109$ )
<b>Total <math>M</math> (<math>SD</math>)</b>	5.99 (6.25)	5.41 (6.07)	5.71 (6.22)	6.18 (6.24)
<b>Anger/irritability</b>	.27***	.19**	.28***	.28**
<b>Anxiety</b>	.67***	.49***	.56***	.42***
<b>Depressive symptoms</b>	.51***	.34***	.41***	.37***
<b>Sleep Disturbance</b>	.39***	.34***	.38***	.27**
<b>COVID-19 related negative impact</b>	.41***	-	.41***	-
<b>Age in years</b>	.11*	-	.24***	-

<sup>1</sup> All child mental health outcomes were measured by the corresponding subscales of the Patient-Reported Outcome Measurement Information System Early Childhood (PROMIS-EC)

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$