Associations Between Pain Catastrophising and Functional Disability in Adolescents with Chronic Pain: A Test of Indirect Pathways

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Table of Contents

List of Figures

List of Tables

Declaration

This dissertation contains no material which has been accepted for the award of any other degree or diploma in any University, and, to the best of my knowledge, contains no materials previously published except where due reference is made. I give permission for the digital version of my dissertation to be made available on the web, via the University's digital repository, the Library Search and also through web search engines unless permission has been granted by the school to restrict access for a period of time.

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Date: November 2023

Contribution Statement

Before the commencement of this thesis, the data had already been collected by clinicians and researchers at the Women's and Children's Hospital, and ethics approval had already been granted. Accordingly, my supervisors submitted the requisite amendment to the pre-existing ethics approval for the data that was used in this project. In writing this thesis, my primary supervisor and I collaborated to generate research questions of interest and to determine the study design. I conducted the literature review and contributed ideas for refining the scope, aims and particulars of the project. My primary supervisor and I worked together to prepare and tidy the data before conducting statistical analyses in SPSS. I performed the statistical analyses and interpreted the results with guidance from my supervisor, and I generated all tables and figures in the thesis. I wrote all aspects of this thesis and my primary and secondary supervisors assisted with manuscript drafts and revisions.

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Author Note

This article is intended for submission to The Journal of Pediatric Psychology which adheres to the APA 7 reference style. At present the article has been written to the Master of Psychology (Health) Research Report requirements of 6,000-8,000 words but will be edited prior to submission to meet the 5,000-word limit specified by The Journal of Pediatric Psychology.

Abstract

Objective. Functional disability is a devastating consequence of chronic pain. Pain catastrophising (a cognitive process) is often positively associated with functional disability, though the mechanisms underlying this association remain to be elucidated. Few studies have explored whether psychosocial factors play an intermediate role in explaining how pain catastrophising leads to pain-related disability in adolescents with chronic pain. This project investigates whether the relationship between pain catastrophising and functional disability is mediated through anxiety, depression, and self-efficacy in a clinical sample of adolescents with mixed chronic pain conditions. ***Methods.*** In a cross-sectional design, 45 adolescents between 10 and 17 years of age (75.6% females) were referred to a tertiary-level chronic pain program and completed a battery of questionnaires assessing their levels of pain catastrophising, self-efficacy, functional disability and symptoms of anxiety and depression. ***Results.*** Higher levels of pain catastrophising were found to share strong positive bivariate associations with functional disability, anxiety and depression, and a strong negative association with self-efficacy. In turn, greater symptoms of anxiety and depression were strongly associated with greater functional disability, while lower self-efficacy shared a strong negative association with greater functional disability. Greater levels of pain catastrophising were found to predict greater functional disability, and parallel mediation analysis revealed that lower self-efficacy fully mediated this relationship, but anxiety and depression did not. ***Conclusion.*** This novel finding suggests that the critical mechanism by which catastrophising influences disability is through one's confidence in their ability to perform activities when in pain. Theoretical and clinical implications are discussed.

Keywords: Chronic pain, adolescent, self-efficacy, pain catastrophising, functional disability, internalising mental health symptoms.

1.1 Overview

Pain is an unpleasant sensory and emotional experience that alerts the individual to actual or potential bodily harm, prompting behavioural adaptations to evade the causative stimulus thus allowing rest and recuperation (Asmundson et al., 2012; World Health Organization (WHO), 2019). For most individuals pain is temporary, resolving when the noxious stimulus is removed, and healing has occurred. For others however, pain becomes long-lasting and difficult to treat (Zernikow et al., 2012). Pain that recurs, or persists for longer than three months, is considered to be 'chronic', and may be a consequence of an ongoing illness, previous tissue injury, or of unknown aetiology (Liossi & Howard, 2016; World Health Organization (WHO), 2019). Importantly, chronic pain is not merely a symptom of an underlying organic pathology, but rather an internationally recognised medical condition with its own set of diagnostic criteria (see ICD-11 for chronic pain classifications; WHO, 2019). Unlike acute pain, chronic pain is not adaptive and often leads to considerable emotional distress and physical dysfunction. Chronic pain is complex and like most medical conditions it often arises from a combination of factors or events. Even in instances where there is a clear precipitant to chronic pain (e.g., physical injury), there remains a unique set of physiological, psychological and social factors that influence the duration, intensity and impact of it (Gatchel et al., 2007; Liossi & Howard, 2016). A better understanding of how various biopsychosocial factors interact and influence chronic pain could provide valuable insights into underlying mechanisms and potential treatment targets. Such knowledge would be of potential benefit to children and adolescents living with the condition as they are a group that are often understudied and undertreated, despite being at high risk of long-term negative outcomes (Eccleston et al., 2021; Walker et al., 2010; Walker et al., 2012).

Functional impairment and functional disability are important outcomes of chronic pain in both the paediatric and adult populations. In the paediatric chronic pain literature, pain catastrophising is often positively associated with functional disability (Crombez et al., 2003; Wojtowicz et al., 2014), but the mechanisms underlying this association remain unclear. Pain catastrophising is a cognitive process that is associated with a range of psychosocial factors which also share associations with functional disability. Whilst previous studies have attempted to explain the relationship between catastrophising and disability in adult chronic pain populations, few studies have explored whether specific psychosocial factors play an intermediary role in explaining how pain catastrophising leads to pain-related disability in adolescents with chronic pain. This thesis will attempt to address this gap in the research by examining the indirect effects of pain catastrophising on functional disability in adolescents through internalising mental health symptoms and psychological resilience factors.

1.2 Adolescent Chronic Pain

Chronic pain is increasingly common amongst children and adolescents with epidemiological research suggesting median prevalence rates of 11-38% (King et al., 2011). The prevalence of paediatric chronic pain tends to be higher in females and typically increases with age (King et al., 2011). Chronic pain impacts all aspects of life, placing significant burden on the individual (Eccleston et al., 2008), their family (Groenewald et al., 2014; Jordan et al., 2007) and society (Groenewald et al., 2014). Adolescents with chronic pain often report poorer social (Eccleston et al., 2008; Forgeron et al., 2010), emotional (Vinall et al., 2016), academic (Alsaggaf & Coyne, 2020) and physical functioning (Rabbitts et al., 2014), with 5% reporting being disabled or severely impacted by their chronic pain (Huguet & Miró, 2008; Miró et al., 2023). Indicators of pain-related disability in adolescents include not only a loss of engagement with age-appropriate activities (physical and social) but difficulty performing those of daily living too (Walker & Greene, 1991). Adolescence is a

key developmental period which can be profoundly disrupted by chronic pain, indeed, research has shown that when adolescent chronic pain is left untreated it can lead to a range of long-term complications including developmental stagnation (Zernikow et al., 2012), poor socio-demographic prospects (Murray et al., 2020), compromised mental health (Hotopf et al., 1998; Walker et al., 2012) and continuation of chronic pain into adulthood (Walker et al., 2010; Walker et al., 2012).

1.3 Pain Catastrophising

Pain catastrophising is viewed as a negative cognitive process that is activated during an actual or anticipated painful event (Petrini & Arendt-Nielsen, 2020; Quartana et al., 2009; Sullivan et al., 1995). It is commonly characterised by the tendency to ruminate on or magnify the threat of pain and to feel helpless in the context of that pain (Quartana et al., 2009; Sullivan et al., 1995). As a pain-specific psychological response, catastrophising has been identified as one of the most powerful predictors of poor functional outcomes in adult chronic pain populations (Martinez-Calderon et al., 2019). Whilst paediatric chronic pain is relatively understudied, similar findings are beginning to emerge in the scientific literature for this population (Miller et al., 2018). Several cross-sectional and longitudinal studies have identified pain catastrophising as a predictor of functional disability in paediatric populations. Early research found that pain catastrophising predicted both functional disability and pain intensity in a clinical sample of paediatric chronic pain patients (Crombez et al., 2003). A subsequent study confirmed similar findings in a sample of school students, and a separate sample of youth with chronic pain, however, negative affect did not predict functional disability in either of these groups (Vervoort et al., 2006). Further research showed that high levels of pain catastrophising predict functional disability beyond the role of pain severity in a sample of adolescents with Inflammatory Bowel Disease (IBD) (Wojtowicz et al., 2014). More recently, Schneider et al., (2022) found baseline levels of pain catastrophising to

uniquely predict functional disability at 4-months follow up, above and beyond a range of other baseline factors (demographic, clinical and psychosocial) in a sample of adolescents with chronic sickle cell disease pain.

Pain catastrophising has also been linked to functional disability as an intermediary variable. It has been found to mediate the relationship between pain and adolescent disability. Furthermore, pain catastrophising mediates protective parenting responses and functional disability as well, with this relationship supported in both cross-sectional and longitudinal research designs (Guite et al., 2011; Welkom et al., 2013). Additionally, Feldman et al. (2022) identified pain catastrophising as a longitudinal mediator between pain severity and functional disability in a sample of adolescents with IBD. These studies highlight the central role of pain-related catastrophic thinking in influencing functional outcomes, however there is a limited understanding of the mechanisms linking the two factors in paediatric populations.

1.4 Anxiety and Depression Symptoms

Given that pain is characterised by emotional and sensory components, it is unsurprising that chronic pain is often linked to mood disturbance. Mental health conditions such as anxiety and depression are known to have high rates of prevalence and co-occurrence with chronic pain, and it's possible these conditions may be mutually maintained by common neurobiological, cognitive and behavioural factors (Hotopf et al., 1998; Simons et al., 2012; Soltani et al., 2019; Walker et al., 2012). Internalising mental health symptoms such as anxiety and depression have the potential to significantly hinder functional ability, leading to continuing chronic pain.

Within the paediatric chronic pain literature, depression and anxiety have been shown to share associations with both pain catastrophising and functional disability. A recent meta-analysis examined the impact of pain catastrophising on functional outcomes for youth with

chronic pain, finding that catastrophising shared strong associations with anxiety and depression, and a moderate relationship with functional disability (Miller et al., 2018). In a separate review, Sinclair et al. (2016) also found that depression, anxiety and pain catastrophising were consistently associated with high levels of disability in paediatric chronic pain samples. Depression has been found to predict functional disability in several studies (Gauntlett-Gilbert & Eccleston, 2007; Kashikar-Zuck et al., 2001), with evidence suggesting that depressed mood may have a greater influence on functional disability than the sensory experience of pain itself (Kashikar-Zuck et al., 2001). Interestingly, in a sample of adolescents with chronic pain-related disability, depression, but not anxiety, was found to independently predict functional disability (Gauntlett-Gilbert & Eccleston, 2007). Conversely, other studies have found that anxiety does indeed predict functional disability in adolescents with chronic pain. For example, Tran et al. (2015) found that anxiety uniquely predicted functional disability in adolescents with chronic pain, however, the same relationship was not observed for younger children with chronic pain. The authors of this study also established that although catastrophising and anxiety are associated, they remain distinct constructs. Further research has also shown that children and adolescents who received interdisciplinary rehabilitation for their chronic pain experienced reductions in anxiety and catastrophising a month post discharge, and interestingly, reductions in anxiety were shown to predict an increase in functional ability (Benore et al., 2015).

A recent study by Brosbe et al. (2022) was the first to examine anxiety and depression symptoms as potential mediators of the relationship between pain catastrophising and functional disability in a sample of children and adolescents with chronic pain. Using a cross-sectional research design, the authors established that depression and pain intensity partially mediated the relationship of pain catastrophising on youth and parent self-reported functional disability, whereas anxiety did not. Potential methodological flaws of their study include the

data being collected over an 11-year period, which could introduce the risk of history effects that could ultimately influence outcomes. Furthermore, there was a broad age range of participants (8-17 years) from a developmental perspective, which was neither explored nor controlled for by the authors.

1.5 Pain Self-efficacy

Pain-related self-efficacy relates to one's belief in their ability to function normally when experiencing pain (Bursch et al., 2006). Pain self-efficacy is considered a psychological resilience factor that is associated with a number of positive pain outcomes in children, adolescents and adults with chronic pain. For example, in a sample of children and adolescents with chronic headache, higher levels of pain self-efficacy were associated with less functional disability (Kalapurakkel et al., 2015). Similarly, a separate study involving youth with chronic headache, found that the inverse was true also (Carpino et al., 2014). Furthermore, strong negative associations were observed between self-efficacy and fear, disability, depression and school functioning, while modest correlations were observed with pain intensity, leading the authors to conclude that self-efficacy can promote positive outcomes in youth with headache regardless of pain levels (Carpino et al., 2014). Evidence also suggests that higher ratings of pain self-efficacy are associated with less catastrophising in both children and adult chronic pain populations (Perry & Francis, 2013; Stahlschmidt et al., 2019).

Previous research conducted in the adult and paediatric chronic pain literature has identified pain self-efficacy as a mediator for the relationship between pain and disability (Lee et al., 2015), pain-related fear and pain intensity (Woby et al., 2007), pain-related fear and functional disability (Carpino et al., 2014; Woby et al., 2007) and pain-related fear and school functioning (Carpino et al., 2014). Further research among adults experiencing chronic non-specific lower back pain has found that self-efficacy mediates the relationship between

pain catastrophising and functional disability (Varela & Van Asselt, 2022). Based on current evidence, self-efficacy, depression and anxiety symptoms, have emerged as variables which warrant further exploration as mediators of the relationship between pain catastrophising and functional disability in adolescents with chronic pain.

1.6 Fear-Avoidance Model of Chronic Pain

Several models have been developed within the biopsychosocial framework which offer a theoretical account of how pain leads to disability. The fear-avoidance model (FAM) was initially developed to explain the processes through which acute musculoskeletal pain can become chronic (Vlaeyen & Linton, 2000) and has since been adapted for use in paediatric chronic pain populations (Asmundson et al., 2012; Simons & Kaczynski, 2012). The original model indicates that an individual who is experiencing pain will take one of two divergent pain pathways: that of recovery, or the path of chronic pain. The point at which FAM bifurcates into these two distinct pathways occurs where the individual cognitively appraises the significance and meaning of their pain. This model posits that if an individual appraises a painful stimulus as threatening, this triggers catastrophic thinking. Such catastrophic misinterpretations of pain lead to the development of pain-related fear of movement/(re)injury and pain-related anxiety, which subsequently leads to behavioural avoidance of activity and results in physical disuse, depression and functional disability. Pain catastrophising is an integral component of FAM and is considered a cognitive risk factor for functional disability.

Whilst FAM offers a theoretical basis for the hypothesis that anxiety and depression mediate the relationship between pain-catastrophising and functional disability, current models of chronic pain are yet to give a complete or comprehensive account of the factors that are known to contribute to pain-related disability (Wideman et al., 2013). In recognising the limitations of FAM, researchers have called for future revisions of this model to

incorporate concepts such as self-regulation, motivation, and goal setting (Crombez et al., 2012). Some researchers have amended the existing model to include factors that have emerged in the literature as important in the development and maintenance of chronic pain. For example, in the adult chronic pain literature, Woby et al. (2007), proposed the incorporation of self-efficacy. In their study, the authors combined the measures for pain related fear and pain catastrophising to form a single measure of pain related fear, rationalising that these two psychological factors are consistently related to functional disability in their chronic pain population of interest (Woby et al., 2007). This modified FAM suggests that when pain related fear (catastrophising and fear of movement) leads to low self-efficacy, then avoidance behaviour is more likely to occur. Conversely, when fear does not lead to a reduction in self-efficacy, then avoidance, and ultimately, functional disability, is less likely to occur. Carpino et al. (2014) examined the mediating role of self-efficacy in the relationship between pain related fear and functional outcomes in children and adolescents with headache, with results supporting the proposed modification to the FAM to include self-efficacy as a protective factor.

1.7 The Current Study

The chronic pain literature repeatedly emphasises how the development and maintenance of chronic pain stems from complex interactions between a range of interrelated biopsychosocial factors. Taken together, pain catastrophising, self-efficacy, depression and anxiety symptoms all play important roles in the development and maintenance of chronic pain and associated functional disability; however, it remains unclear as to how these factors interact. One previous study has examined anxiety and depression as possible mediators of the impact of catastrophising on functional disability in adolescents with chronic pain, but to our knowledge, no studies have examined self-efficacy as a potential mediator of this relationship in adolescents with chronic pain. Therefore, the current project will examine self-

efficacy, depression, and anxiety symptoms as potential mediators of the relationship between pain catastrophising and subjective functional disability in a clinical sample of adolescents with mixed chronic pain conditions. A better understanding of how pain catastrophising impacts functional disability is of theoretical interest as it may provide empirical evidence for mechanism or chronic pain theories, and of clinical interest, as it may identify potential targets for intervention.

To demonstrate this relationship, a single mediation model has been hypothesised (see Figure 1). As suggested by the proposed model, pain catastrophising (X) may have a direct effect on functional disability (Y), and indirect effects through self-efficacy (M^1), anxiety symptoms (M^2) or depression symptoms (M^3). From this model, the following hypotheses have been made:

Hypothesis 1: Greater pain catastrophising will predict greater functional disability.

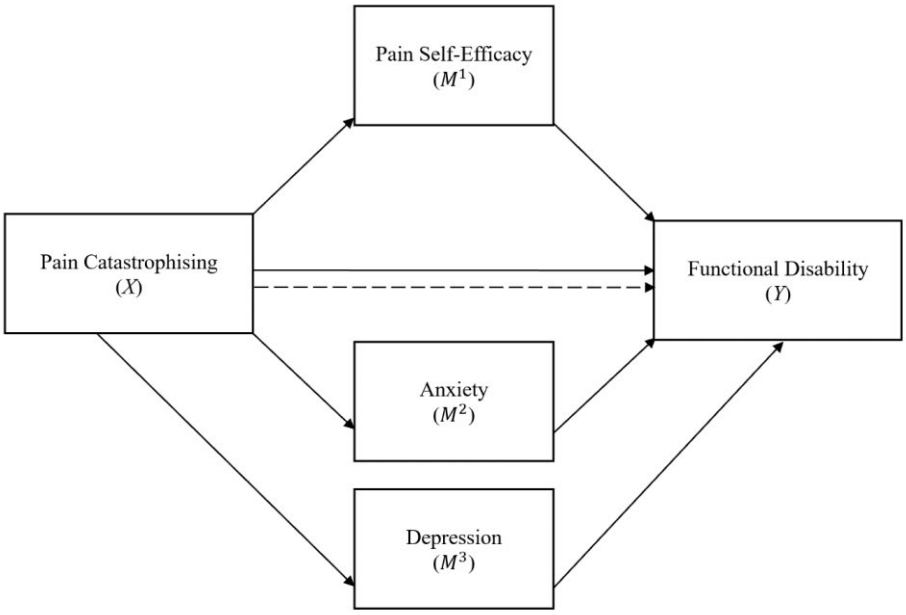
Hypothesis 2: Self-efficacy will serve as a mediating variable of pain catastrophising and functional disability. Specifically, lower self-efficacy will mediate the relationship between high pain catastrophising and increased functional disability.

Hypothesis 3: Depression symptoms will serve as a mediating variable of pain catastrophising and functional disability. Specifically, higher depressive symptoms will mediate the relationship between high pain catastrophising and increased functional disability.

Hypothesis 4: Anxiety symptoms will serve as a mediating variable of pain catastrophising and functional disability. Specifically, higher anxiety symptoms will mediate the relationship between high pain catastrophising and increased functional disability.

Figure 1

The Hypothesised Parallel Mediation Model



2 Method

2.1 Participants and Setting

Participants were adolescents with chronic pain who attended the Paediatric Chronic Pain Service (PCPS) of the Women's and Children's Hospital (WCH), Adelaide, Australia between August 2019 and March 2023. Adolescents aged 10 to 17 years were eligible to participate if they were patients of the WCH PCPS and had agreed to take part in a 1-day workshop, the 'Comfort Ability®' programme - a psycho-educational initiative that teaches adolescents and their parents/caregivers various cognitive behavioural strategies to better manage chronic pain (Coakley & Bujoreanu, 2020; Coakley et al., 2018). Individuals were excluded from the study if they were younger than 10 years of age, or older than 18 years of age. Of the 132 adolescents who were eligible to participate in the study, 51 participants provided consent. Six participants were excluded from the final sample due to incomplete questionnaires. Data from 45 adolescents, who completed 100% of the outcome measures were included in the analyses. The final sample comprised 11 (24.4%) males and 34 (75.6%)

females within the age range of 10-17 years (*M*=14.6, *SD* =1.9). The majority of participants were born in Australia (*n* = 42, 93.3%), 2 participants (4.4%) were born abroad, and 1 participant (2.2%) did not report their birthplace. Of the forty-three individuals who reported their Indigenous status, 2.3% (*n* = 1) identified as Aboriginal and 2.3% (*n*= 1) identified as Torres Strait Islander. Eighty-two percent (*n* = 37) of participants reported the source and duration of their main pain. Of these, the majority had been experiencing pain with no known cause (54.1%), and for longer than 12 months (64.9%). One participant reported a duration of pain less than 3 months; however, because this information was collected upon referral to the PCPS, the decision was made to include this data in the analyses as there is often a significant time delay (weeks to months) between referral and multidisciplinary team assessment for admission into Comfort Ability. The most frequently reported primary pain areas of this sample were the lower limbs (33.3%), abdomen (20%) and head and neck (15.6%). Clinical characteristics of the sample including co-morbid mental health conditions and pre-existing disabilities, are presented in Table 1.

Table 1

Clinical characteristics of the sample

Clinical Characteristics	*n* (responses)	*n* (%)
Co-morbid Health Condition	45	
Mental health		17 (37.8%)
Chronic disease		14 (31.1%)
Cancer		0
Co- morbid Disability	45	
Sight		2 (4.4%)
Hearing		0
Intellectual		0
Physical		4 (8.9%)
Pain Region	42	
Head and Neck		7 (16.7%)
Torso		3 (7.1%)
Upper limb		2 (4.8%)
Abdomen		9 (21.4%)
Lower Limbs		15 (35.7%)
Back		6 (14.3%)
Pain Source	37	
Injury		3 (8.1%)
Illness		5 (13.5%)
No known cause		20 (54.1%)
Other		9 (24.3%)
Pain Duration	37	
Less than 3 months		1 (2.7%)
3-12 months		12 (32.4%)
Greater than 12 months		24 (64.9%)
Pain Description	43	
Always present (the same intensity)		5 (11.6%)
Always present (pain level varies)		28 (65.1%)
Often present (pain free <6hrs/day)		8 (18.6%)
Occasionally present (1-3 times/day)		1 (2.3%)
Rarely present (every few days/weeks)		1 (2.3%)

Note: Total N = 45*; n* (responses) = the number of responses from total sample (*N*=45)

An a priori power analysis was conducted using G*Power 3.1 (Faul et al., 2009), and indicated that observations from 33 participants would provide sufficient power (power = 0.80), to detect a large effect (f^2= 0.58), with 7 predictors and a significance criterion of α = 0.05. This effect size estimate is based on a previously reported mediation effect size (e.g., Brosbe et al., 2022).

2.2 Research design

This study is non-experimental quantitative research employing cross-sectional correlation and mediation analyses. This study presents questionnaire data which were collected for clinical purposes.

2.3 Procedure

Adolescents were initially referred to the WCH PCPS by a general practitioner, paediatrician, or medical specialist for interdisciplinary assessment and treatment of their chronic pain. On referral, adolescents and their caregivers completed a variety of routine questionnaires which were undertaken as part of the paediatric electronic Persistent Pain Outcomes Collaboration (paedePPOC) standardised data collection program run by the University of Wollongong, Australia (Lord et al., 2019). These data are collected from pain management services across Australia, analysed and reported back to each service biannually for the purpose of making meaningful comparisons of patient populations, outcomes, and service delivery. In addition, each service has access to their individual patient data for clinical purposes. Parents and caregivers provided demographic information on their child's age, sex, ethnicity, co-morbid conditions and country of birth, and adolescents provided descriptive information about their pain.

One month prior to attending the Comfort Ability workshop, families were provided with a battery of questionnaires which contained self-report measures for adolescents with chronic pain and their parents/caregivers. Adolescents' responses to the questionnaires

described below were recorded either on paper, or electronically using REDcap (Harris et al., 2019; Harris et al., 2009), a secure online data collection application. Questionnaires took approximately 10-20 minutes to complete, and all questionnaires were completed by participants in their own time, without clinicians present. Adolescents and their parents/caregivers completed the requisite questionnaires prior to attending the Comfort Ability workshop, and this data was stored securely on password protected computers.

Clinicians of the WCH PCPS identified individuals who were eligible for the study and provided them with a study information sheet and consent form either before or after attending the workshop. Families who were invited to participate in the study were given the opportunity to ask clinicians questions about the study, and those who wished to take part in the study signed informed consent. Parental/caregiver consent and adolescent assent were provided if the adolescent was below 16 years of age, and consent was provided by the adolescent if they were aged 16 years and above. Only data from families that consented to participate in research were included in this study. Ethics approval was granted by the Women's and Childrens Health Network Human Research Ethics Committee.

2.4 Measures

2.4.1 Functional Disability.

The Functional Disability Inventory (FDI) is a 15-item self-report measure of limitations in children's and adolescent's physical and psychosocial functioning secondary to their physical health (Walker & Greene, 1991). Respondents are asked to rate the level of difficulty experienced in the past two weeks when performing every-day activities such as walking up the stairs, being at school all day, eating regular meals and watching TV. Items are scored using a 5-point Likert scale between 0 (no trouble) and 4 (Impossible). Total FDI scores are calculated by summing the ratings for each item, and range from 0-60, with higher scores indicating greater disability. Clinical reference scores for minimal, moderate and high

disability are 0-12, 13-29 and >30, respectively (Kashikar-Zuck, 2011). The FDI has demonstrated reliability and validity for assessing function in paediatric chronic pain samples (Claar & Walker, 2006; Kashikar-Zuck et al., 2011).

2.4.2 Pain Catastrophising

The Pain Catastrophizing Scale-Child (PCS-C; Crombez, 2003) is a 13-item, self-report tool designed to assess adolescents' degree of catastrophic thinking about their pain. Using a 5-point Likert scale from 0 (not at all) to 4 (all the time), respondents' rate how frequently they experience certain thoughts and feelings when they have pain. Total scores range from 0-52 with higher scores reflective of higher levels of catastrophic thinking about pain. Three subscale scores are included for rumination, magnification and helplessness and clinical reference scores are: low (0–14), moderate (15- 25) and high (26-52). The PCS-C was adapted from the adult PCS (Sullivan et al., 1995), and has demonstrated validity and reliability in youth with chronic pain (Crombez et al., 2003). PCS total scores were used in this study.

2.4.3 Anxiety and Depression Symptoms

The Revised Child Anxiety and Depression Scale – Short Version (RCADS-25) (Ebesutani et al., 2012) is a brief screening instrument for anxiety and depression, adapted from the original 47-item RCADS (Chorpita et al., 2000). The questionnaire contains 15 questions based on anxiety and 10 questions based on depression, as per DSM- IV criteria. Respondents rate how often they experience symptoms using a 4-point Likert scale from 0 (never) to 3 (always). The questionnaire has an overall score that is converted to a t-score, and two subscales: total anxiety and total depression. Higher total and subscale scores reflect a greater degree of symptom severity. Scores used in this study were limited to the anxiety and depression subscale T-scores.

2.4.4 Pain Self-Efficacy

The Pain Self-Efficacy Scale (PSES-C; Bursch et al., 2006) is a brief 7-item instrument that measures adolescent's belief in their ability to function normally when experiencing pain (Bursch et al., 2006). Respondents are asked to rate how sure they are that they can carry-out a range of activities when they have pain, using a 5-point Likert scale from 1 (very sure) to 5 (very unsure). Example items include "How sure are you that you can do well in school when you have pain?" and "How sure are you that you can be with friends when you have pain?". Higher scores indicate lower self-efficacy. This questionnaire has demonstrated reliability and validity in paediatric pain patients (Bursch et al., 2006).

2.5 Statistical methods

Data screening was undertaken prior to performing the statistical analyses and involved checking for missing values and recoding erroneous values. Missing data were identified for the participant demographic and clinical characteristics only, and not for the main study variables. The decision was made to recode the PSES by reversing the scores for ease of interpretation of the results. For the recoded PSES, low scores indicate low self-efficacy, and high scores indicate high self-efficacy.

All statistical analyses were conducted using IBM Statistical Package for the Social Sciences (SPSS) Version 27. Descriptive statistics were used to report the demographic and clinical characteristics of the sample and summarise the continuous variables under review (i.e., functional disability, pain catastrophising, self-efficacy and anxiety and depressive symptoms). Pearson bivariate correlation analysis was performed to establish associations between the variables of interest. Based on this analysis, a multiple mediator model was tested with pain catastrophising as the predictor variable, functional disability as the outcome variable and anxiety symptoms, depression symptoms and self-efficacy as the mediator variables. Covariates were nominated based on their associations with the variables of interest. Parallel multiple mediation was conducted using Model 4 of Hayes PROCESS

Macro version 4 for SPSS (Hayes, 2022). Bootstrapping was performed with 10,000 samples to increase the robustness of the results and statistical significance was determined if the 95% bootstrap confidence interval for the indirect effects did not cross zero.

3 Results

3.1 Test of Normality

Prior to testing the proposed model, the data was screened for deviations from normality. Analysis of histograms, Q-Q plots, kurtosis and skew revealed that the distributions for pain catastrophising and functional disability were normally distributed, with depression showing some negative skew, and anxiety and self-efficacy showing some positive skew. Given that the skewness for each variable was <1, the decision was made to proceed without further transformation of variables.

3.2 Descriptive Statistics

Descriptive statistics for the main study variables and covariates are presented in Table 2, and include the means, standard deviations, ranges, and medians. On average, participants experienced sub-clinical levels of anxiety symptoms, borderline clinical levels of depression symptoms, moderate levels of functional disability, and high levels of pain catastrophising.

Table 2

Descriptive Statistics of Variables in the Mediation Analysis

Variable	*M*	*R*	*SD*	*Mdn*
Pain Catastrophising (PCS-C)	41.89	47	12.10	42
Functional Disability (FDI)	27.29	52	11.76	29
Depression (RCADS-25)	66.20	39	13.41	70
Anxiety (RCADS-25)	54.58	50	14.16	51
Self-Efficacy (PSES-C)	19.16	28	6.4	18
Age	14.16	7	1.90	14

Note: N = 45*; M* = mean*; R* = Range*; SD* = Standard Deviation*; Mdn* = Median

3.3 Bivariate Correlation Analyses

Pearsons bivariate correlations were performed between the study variables of interest and are summarised in Table 3. Higher levels of pain catastrophising were positively correlated with functional disability, anxiety and depression (large effect sizes), and negatively associated with self-efficacy (large effect size). Each of the potential mediators of the proposed model were significantly associated with the outcome in the expected directions. Higher levels of anxiety and depression symptoms on the RCADS-25 measure were associated with greater functional disability, and lower self-efficacy was associated with greater functional disability (large effect sizes). Participant age shared a significant negative association with self-efficacy, meaning that older adolescents tended to have lower self-efficacy. Age also shared a significant positive association with depression and anxiety, indicating that older adolescents tended to experience higher levels of anxiety and depression symptoms. Given these observed associations, age was selected as a covariate for the mediation analysis. Participant sex (male or female) was included in the bivariate correlation analysis and shared a significant association with age only, therefore was not included as a covariate for the mediation analysis. Whilst most study variables were correlated with each

other, examination of the Pearsons corelation matrix revealed no evidence of multicollinearity between any of the predictor variables.

Table 3

Pearson's Correlation Matrix Between Main Study Variables

	Variable	1	2	3	4	5	6	7
1	Functional Disability	-						
2	Depression	.74**	-					
3	Anxiety	.63**	.69**	-				
4	Pain Catastrophising	.58**	.50**	.71**	-			
5	Self-Efficacy	-.79**	-.76**	-.65**	-.68**	-		
6	Age	.216	.40*	.34*	.19	-.39*	-	
7	Sex	-.057	-.132	-.032	.163	.014	.321*	-

Note: **p <0.01. *p <0.05.

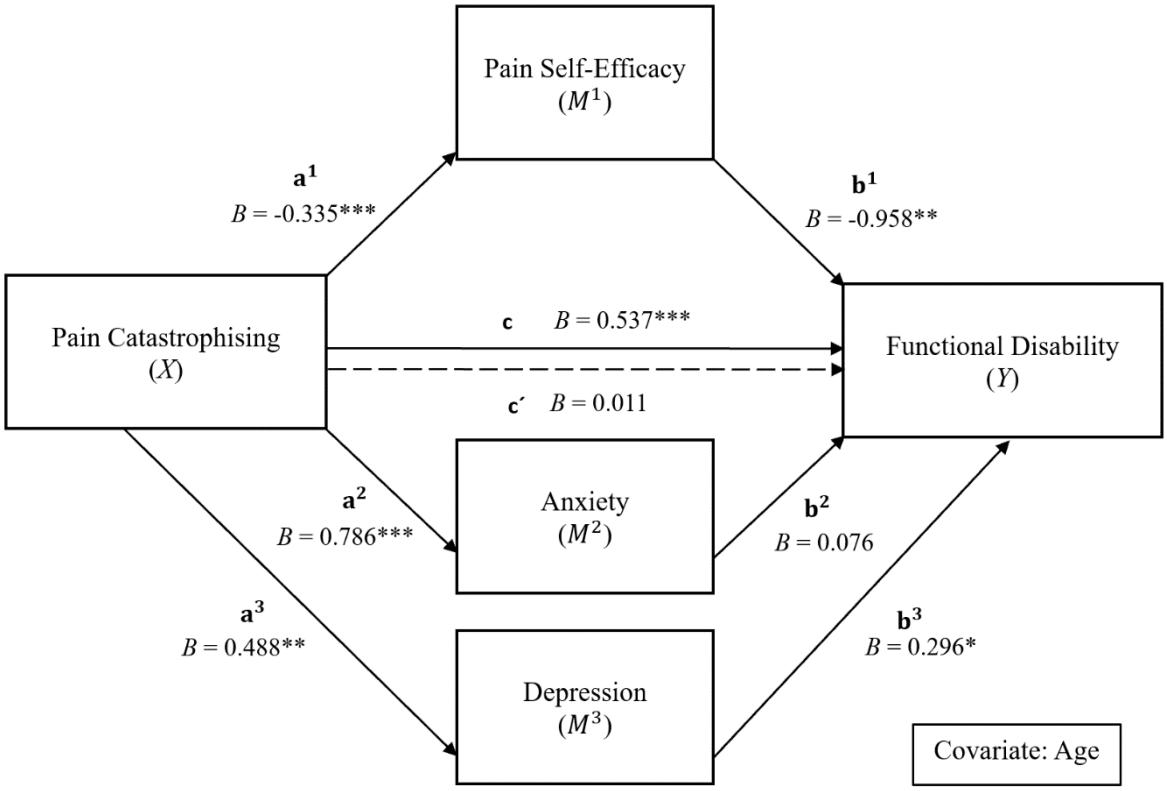
3.4 Test of Mediation

Parallel mediation was performed to assess whether anxiety symptoms, depression symptoms and self-efficacy served as mediators between pain catastrophising and functional disability, with participant age assigned as a covariate. Figure 2 presents the unstandardised coefficients for each path. The model accounted for a total of 70% of the variance in functional disability (F (5,39) = 18.03, p<.001). Pain Catastrophising significantly predicted functional disability when excluding the mediators (Path c; B = 0.54, p<0.001). Adolescents who exhibit higher levels of pain catastrophising were significantly more likely to have lower self-efficacy (path a^1; B = 0.34, p <0.0001) and lower self-efficacy was subsequently related to greater functional disability (path b^1; B = - 0.96, p < 0.01). When controlling for age and including all potential mediators, the indirect effect of pain catastrophising on functional disability through self-efficacy was statistically significant (B = 0.32, 95% CI [0.119, 0.520]),

thus supporting hypothesis 2. Conversely, the indirect effect through depression (B = 0.14, 95% CI [-0.004, 0.312]), and anxiety (B = 0.06, 95% CI [-0.116, 0.390]), was not significant, therefore hypotheses 3 and 4 were not supported. When including all 3 potential mediators, the direct effect of pain catastrophising on functional disability was not significant (Path c´; B = 0.01), indicating full, rather than partial mediation has occurred.

Figure 2

Parallel Mediation Model



Note. This figure depicts the parallel mediation model with unstandardised coefficients for each path. ***p< 0.001. **p<0.01. p<*0.05

4 Discussion

The current project investigated whether the relationship between pain catastrophising and functional disability was mediated through self-efficacy, anxiety and depression in a clinical sample of adolescents with mixed chronic pain conditions. To our knowledge, this was the first study to explore self-efficacy as a possible mediator (in combination with symptoms of anxiety and depression) between pain catastrophising and functional disability in adolescents with chronic pain. As hypothesised, greater levels of pain catastrophising were found to predict greater functional disability. Importantly, when testing the indirect effects of pain catastrophising on functional disability, self-efficacy was found to fully mediate this relationship, thus supporting hypothesis 2. However, contrary to hypotheses 3 and 4, there was no evidence that anxiety or depression mediated the relationship between pain catastrophising and functional disability in adolescents with chronic pain when also accounting for levels of self-efficacy. Overall, results suggest that the positive association between pain catastrophising and functional disability are fully conveyed statistically via lowered pain self-efficacy. Further, previous reports suggesting anxiety and depression may be important mediators of the impact of pain catastrophising may in fact be better accounted for by changes in pain self-efficacy.

The results of this study support the view that pain catastrophising has detrimental effects on the health, wellbeing and functional outcomes of adolescents with chronic pain conditions. Indeed, higher levels of pain catastrophising were found to share strong positive bivariate associations with functional disability, anxiety and depression, and a strong negative association with self-efficacy. The finding that greater pain catastrophising predicts greater functional disability is consistent with previous research that shows a positive association between these two variables in clinical samples of adolescents with chronic pain (Crombez et al., 2003; Miller et al., 2018; Schneider et al., 2022; Vervoort et al., 2006; Wojtowicz et al.,

2014). These results add to the growing number of studies which highlight the powerful influence that negative pain-related thoughts have on functional outcomes in adolescents with chronic pain and align with the biopsychosocial model of health and illness (Engel, 1977), conceptualising chronic pain as the dynamic interplay between biology, psychology and social/contextual factors (Gatchel et al., 2007; Meints & Edwards, 2018). Whilst the burden of evidence currently suggests that catastrophising is a powerful predictor of poor functional outcomes in adolescents with chronic pain, we were interested to know whether specific psychosocial variables might help to explain this association.

Findings from the mediation analysis support the prediction that lower self-efficacy mediates the relationship between greater pain catastrophising and greater functional disability in adolescents with chronic pain. There is a dearth of literature investigating the interplay of pain self-efficacy, pain catastrophising and functional disability in paediatric chronic pain populations. However, this relationship has recently been explored in adult chronic back pain populations (Varela & Van Asselt, 2022). The results from adults are consistent with the findings of this study, whereby self-efficacy fully mediates the relationship between these two variables. Our findings highlight the possibility that an individual's management of pain related catastrophic thoughts might be compromised when their belief in their ability to function despite the pain (i.e., self-efficacy) is low. Likewise, when pain self-efficacy is high, this may mitigate any impact of pain catastrophising on functional disability, supporting the idea of self-efficacy as a protective psychological resilience factor (Carpino et al., 2014; Kalapurakkel et al., 2015).

Despite sharing significant bivariate associations with the other study variables, depression did not emerge as a significant mediator in our model. This finding is at odds with that of a recent study by Brosbe et al. (2022), which identified depression as a significant mediator of the catastrophising-disability relationship in youth with chronic pain. A potential

explanation for these observed differences may lie within the measures used to assess symptoms of depression. Whilst the study by Brosbe et al. (2022) employed a measure for depression which utilised the total raw score, the measure used for depression in our study used standardised T-scores which were calculated based on gender and grade level. Although a standardised score accounts for population norms, a limitation of using the standardised score in this study was that T scores are not provided above 80 (i.e., all scores above 80 were simply classified the same). This meant that variance was unable to be measured past that point, and as a result ceiling effects were observed given a relatively high level of reported depression symptoms in the patient sample. Specifically, our results show that average depression scores were at the borderline clinical threshold for depression, which is unsurprising given that depression is known to have high rates of prevalence with chronic pain (Hotopf et al., 1998; Simons et al., 2012; Soltani et al., 2019; Walker et al., 2012).

An alternative explanation for the lack of mediation by depression is due to the inclusion of self-efficacy in the model. Given the strong correlation between depression scores and self-efficacy scores, it is possible that the effects of depression were already encompassed within the self-efficacy mediator. The general literature on self-efficacy beliefs has identified negative associations between self-efficacy and depression in adolescents, with recent longitudinal research suggesting that higher levels of depressive symptoms predicted lower levels of self-efficacy across a range of contexts (Tak et al., 2017). Future research might consider adding depression as a moderating variable to assess how varying levels of depression would influence the mediation relationship between catastrophising and disability through self-efficacy.

Finally, our study demonstrates similar patterns of results to that of Brosbe et al. (2022), in that anxiety was not significantly associated with functional disability in either of the models. This is an interesting finding that is at odds with the fear avoidance model of

chronic pain, which considers anxiety as the main emotional component implicated within this stage of the chronic pain cycle (Vlaeyen & Linton, 2000). Given the conceptual overlap that is highlighted in the literature between anxiety and depression (Eysenck & Fajkowska, 2018), Brosbe et al., (2022) concluded that it may be the case that the intermediary effects of anxiety are already accounted for by its association with depression.

4.1 Implications

The present study is one of few to explore the mechanism of depression and anxiety in the relationship between pain catastrophising and functional disability and extends this to include self-efficacy as a possible mechanism within this relationship. The findings of this study are potentially of clinical importance as they identify practical treatment targets for clinical intervention. The biopsychosocial model of pain is widely accepted as the framework by which paediatric chronic pain is conceptualised, assessed, and managed (Liossi & Howard, 2016). This model characterises pain and accompanying disability as a dynamic interplay between biology, psychology and social/contextual factors (Gatchel et al., 2007; Meints & Edwards, 2018). A broad range of cognitive and affective factors are considered key contributors to the development and maintenance of chronic pain and disability, with emerging data highlighting how such factors can influence individual variation in pain response (Martinez-Calderon et al., 2019; Meints & Edwards, 2018; Sil et al., 2020). The results of this study highlight how the co-existence of self-efficacy and pain catastrophising influence functional disability in adolescents with chronic pain, and it seems crucial that clinicians assess and treat both of these factors. Given the multi-dimensional nature of chronic pain, the current gold-standard treatment requires a multi-modal, interdisciplinary approach that prioritises functional restoration as opposed to pain reduction (Liossi et al., 2019; Tseng et al., 2014). Psychological treatment is an integral component of interdisciplinary chronic pain management, typically employing either cognitive or

behavioural strategies with the aim of improving function and decreasing distress (Fisher et al., 2022). Self-efficacy and pain catastrophising are psychosocial variables that can be treated within such a framework, the overall goal being to improve functional ability by increasing self-efficacy and decreasing pain catastrophising. Although the directionality of the relationship between self-efficacy, catastrophising and functional disability cannot be ascertained due to the cross-sectional nature of this research, the importance of addressing both pain catastrophising and self-efficacy in treatment is clear. The clinical implications presented by this study are practical and applicable within specialist interdisciplinary chronic pain clinics, and recent research in adults with widespread chronic pain suggests that self-efficacy and pain catastrophising can also be successfully addressed with psychologically informed physiotherapy (Thompson et al., 2022).

In terms of theoretical implications, these findings suggest that the critical mechanism by which catastrophising influences disability is through the individual's confidence in their ability to perform activities when in pain. Pain catastrophising is an integral component of the fear-avoidance model (FAM), and as such, it is considered a cognitive risk factor for functional disability (Vlaeyen & Linton, 2000). However, current models of chronic pain are yet to give a complete explanatory account of pain-related disability (Wideman et al., 2013). Our findings support the revised fear-avoidance model proposed by Woby et al. (2007), suggesting that self-efficacy beliefs play an important role in explaining how chronic pain leads to disability. This modified FAM postulates that pain related fear (catastrophising and fear of movement) leads to low self-efficacy, which subsequently leads to disability. Conversely, when low fear leads to increased self-efficacy, then activity avoidance behaviours and functional disability are less likely to occur.

4.2 Study Strengths

This study employs a parallel mediation model. Rather than conducting a series of simple mediation models to test potential indirect relationships, a parallel model is more representative of the fact psychosocial variables co-exist in the real world, thus enhancing ecological validity of the study.

In recent years, experts have expressed concerns about the lack of research and services dedicated to children and adolescents with chronic pain (Eccleston et al., 2021; Palermo, 2020). A further strength of this study was that it addressed both of these concerns by producing findings which were of academic and clinical utility. Importantly, this study provides insight into potential underlying mechanisms of the catastrophising-disability relationship and also identified key targets for clinical intervention, allowing for evidence-based redirection of clinical resources.

4.3 Limitations and Future Research Directions

Despite the methodological strengths, there are several limitations of this study which are necessary to consider. Firstly, the measures used were self-report questionnaires. Although these measures are deemed valid and reliable, they introduce risk of social desirability response bias, whereby respondents provide answers to questions in a way that is considered socially and culturally acceptable, rather than representative of their true experience (Logan et al., 2008). That said, this study examined the role of beliefs, cognitions, and internalising symptoms, which are difficult to assess outside of self-report methods.

Consent to participate in this study was sought prospectively for a small number of eligible participants, and retrospectively for the majority. The process of obtaining retrospective consent introduced the risk of selection bias and almost certainly contributed to the limited sample size. For example, it may have been the case that the families who had a positive experience with the pain service chose to provide consent for their data to be used in

the study, whereas those who had a negative experience may have elected to not participate in the study. The use of clinical data can also introduce error such as the unsystematic administration of questionnaires. In the future, these methodological limitations may be overcome by gaining prospective consent from eligible participants and taking a more structured and systematic approach to data collection.

A final and notable methodological limitation of this study is its cross-sectional design, which prevents making causal inferences or drawing definitive conclusions about the directionality of the relationships between the variables of the mediation analysis. This limitation emphasises the need for further prospective longitudinal studies to explore the temporal and sequential relationships between these variables.

Despite these limitations, the results of this study add to a growing body of literature which has determined the significant influence of psychosocial factors on chronic pain trajectories and outcomes in adolescents. Ultimately, these findings will help to advance both research and clinical intervention practices in the fields of clinical and health psychology.

4.4 Conclusion

This study examined anxiety, depression and self-efficacy as potential mediators of the relationship between pain catastrophising and functional disability in a clinical sample of adolescents with mixed chronic pain conditions. The results show that lower pain self-efficacy fully mediates the relationship between greater pain catastrophising and greater functional disability, whereas anxiety and depression do not mediate this relationship. This novel finding suggests that the critical mechanism by which catastrophising influences disability is through the individual's confidence in their ability to perform activities when in pain. The evidence provided here is of theoretical interest as it offers support for existing conceptual models of chronic pain. The results are of clinical interest as they highlight the importance of addressing both pain catastrophising and self-efficacy during the assessment

and treatment of adolescents with chronic pain, given the negative association of these psychosocial variables with functional disability. This research offers new insights into the intermediary role that self-efficacy plays in the relationship between catastrophising and disability, laying the groundwork for future longitudinal research to explore the temporal and sequential relationships between catastrophising, self-efficacy and disability in adolescents with chronic pain.

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Appendix A - Author Guidelines

The *Journal of Pediatric Psychology* is an official publication of the Society of Pediatric Psychology, Division 54 of the American Psychological Association, whose mission is to promote the health and psychological well-being of children, youth and their families through science and an evidence-based approach to practice, education, training, advocacy, and consultation. As such, the journal publishes articles related to theory, research, and professional practice in pediatric psychology.

We would like to inform our authors that we now detect plagiarism easily. *JPP* employs the CrossCheck plagiarism screening system. By submitting your manuscript to this journal you accept that your manuscript may be screened for plagiarism against previously published works.

Journal of Pediatric Psychology will not consider papers that have been accepted for publication or published elsewhere. Copies of existing manuscripts with potentially overlapping or duplicative material should be submitted together with the manuscript, so that the Editors can judge suitability for publication. The Editors reserve the right to reject a paper on ethical grounds.

Manuscript Preparation Instructions

The *Journal of the Pediatric Psychology* is an online only journal.

Cover Letter

The cover letter is an essential document and must be included with the submission of all new manuscript submissions and revisions. The cover letter should be addressed to the journal editor and include the following:

1. Manuscript title

2. Assurance that all authors agree with the content of the manuscript and order of authorship
3. Assurance the publication is not currently submitted to another journal
4. Information about duplicate and redundant publications
5. Notice of any conflicts of interest
6. Consideration for a special issue/series or if this is an invited commentary
7. Corresponding author contact information

Article Types

- Original research
- Review articles
- Invited commentaries (e.g., Student Journal Club Commentaries)

The *Journal of Pediatric Psychology* no longer accepts brief reports but will accept manuscripts that are shorter in length. Case studies and narrative reports of special cases that are more descriptive will not be considered for review.

- **Original Research**

Original Research is the most common type of journal manuscript used to publish full reports of data from original research. Authors are also encouraged to visit the Equator Network for additional information on transparent reporting of all manuscript types.

See the following articles for detailed guidance concerning preparation of manuscripts:

- Editorial: Thoughts in Improving the Quality of Manuscripts Submitted to the *Journal of Pediatric Psychology*: How to Write a Convincing Introduction;
- Editorial: How to Report Methods in the *Journal of Pediatric Psychology*;

- Editorial: How to Write an Effective Results and Discussion Section for the *Journal of Pediatric Psychology*.

1. *Cohort and observational studies*. We welcome submission of the STROBE checklist; however, these are not required.
2. *Clinical Trials*

    a. *Randomized controlled trials*: *JPP* is committed to enhancing the transparent reporting of all intervention studies. Please use the CONSORT checklist.

    i. All Randomized Controlled Trials (RCTs) must be registered at or before the time of first patient enrollment in any primary registry of the WHO International Clinical Trials Registry Platform (ICTRP) or in ClinicalTrials.gov. Provide the registry name and registry number in the cover letter and methods section.

    ii. If you are submitting a secondary data analysis from an RCT, please clearly indicate that it is a secondary data analysis in your manuscript and refer readers to the primary publication of outcomes. Consult with the editorial office if there are questions about reporting.

    b. *Pilot and feasibility trials*: Feasibility studies investigate whether something can be done and if/how it should proceed with further testing, while pilot studies test some aspect(s) of a future trial on a smaller scale. For pilot feasibility trials, we encourage authors to refer to our 2021 Editorial (Hilliard et al. 2021), which provides guidance on the reporting of pilot feasibility trials. Please use the CONSORT extension checklist.

    c. *Non-randomized trials*. A non-randomized clinical trial involves participants who are not assigned to different treatment groups by chance.
3. *Single Subject Studies*: As a journal that encourages submission of intervention studies, the Journal does accept, and encourages submission of, well-conducted single

subject studies (N-of-1 designs). It is important to note that rigorous single subject designs are considered logical equivalents of Randomized Controlled Trials and include control conditions that support conclusions of causality. Previously published examples can be found in this journal including: Bernard, Cohen, & Moffett (2009). Authors considering submissions of case reports adopting N-of-1 methodology should consult the following sources within this journal: Cohen, Feinstein, Masuda, & Vowles (2014); Cushing, Walters, & Hoffman (2014); Rapoff & Stark (2008).

References:

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- **Review articles**

1. *Topical Reviews*: Topical reviews summarize contemporary findings, suggest new conceptual models, or highlight noteworthy or controversial issues in pediatric psychology. Topical reviews are not intended to provide short data summaries or

syntheses. Rather they are intended to foster new ways of thinking about a topic area and provide a direction for future research or practice.

2. *Systematic reviews and Meta-Analyses*: Systematic reviews provide a research synthesis of a body of literature using an explicit methodology to minimize bias and ensure conclusions are made from reliable findings. Authors of systematic reviews that do not include a meta-analysis must provide a clear justification in the manuscript explaining why such an analysis is not included for all or relevant portions of the report. Please note the PRISMA should be submitted with your manuscript.
3. *Scoping Reviews*: Scoping reviews determine the scope of a body of literature on a particular topic and identify the volume of the literature (i.e., available studies), and provide an overview of its focus. These are particularly helpful for emerging evidence. Please note the PRISMA-ScR should be submitted with your manuscript. Please consult this editorial (New Guidelines for Publishing Review Articles in *JPP*) which further describes guidelines for review articles.

- **Invited commentaries**

Commentaries are invited on all topics of interest in pediatric psychology, and the page length and scope should be discussed with the Editor. Un-invited commentaries will not be considered.

Reporting Guidelines

JPP requires that the relevant reporting guidelines be used for the following studies:

- Randomized trials: CONSORT
- Pilot and feasibility trials: CONSORT extension
- Non-randomized trials: TREND

- Scoping reviews: PRISMA-ScR
- Systematic reviews: PRISMA

Editable checklists for reporting guidelines may be found on the EQUATOR network site.

All intervention studies (RCTs and non-randomized trials) will undergo an additional review for transparent reporting conducted by the *JPP* Assistant Editor for Transparent Reporting. Review comments will be provided on the corresponding checklist. Authors will be required to address any identified reporting issues prior to publication.

Please clearly indicate the page numbers where each checklist item is reported in the manuscript. Please upload this checklist as supplementary material when you submit your manuscript for consideration. If a component of a checklist was not included in the manuscript, an explanation of the rationale for exclusion should be provided. Adherence to these reporting requirements provides standardization, ensures that important information has been included, and facilitates the peer review process.

We publish the final version of all required checklists as supplementary material. Thus, a final version of your CONSORT/TREND/PRISMA checklist will be requested as supplementary material prior to final acceptance of your manuscript. Please note the checklist should be reference in the methods section of your manuscript.

Organizing and Preparing Manuscripts

The *Journal of Pediatric Psychology* offers authors high-quality online publication. To ensure rapid and efficient publication, please follow the instructions below.

Type of Manuscript	Length Limit (Text, exclusive of title page, abstract, figures/tables, and references)	Total Number Figures/Tables	Maximum Number of references
Original	5,000 words (20 pages)	5	50
Reviews:			
• Topical	2,000 words	2	30
• Systematic/Scoping	6,250 words (25 pages)	8	Unlimited
Commentaries			
• Student	1,000 words	0	12
• General (Invited)	1,500 words	0	12

General Formatting

1. *File format*. Please save the main manuscript file as a .doc format.
2. *Font size and type*. Please use a standard font that is compatible with Windows, such as Times New Roman or Arial. Font size should be 12 pt.
3. *Double-spacing*. Submissions should be double-spaced throughout, with margins of at least 1 inch and font size of 12 points (or 26 lines per page, 12-15 characters per inch).
4. *Naming Files*. When naming your files, please use simple file names and avoid special characters and spaces. If you are a Macintosh user you must type the three-letter extension at the end of the file name you choose (e.g. .doc, .rtf, .tif).

Manuscript Formatting

The American Psychological Association Publication Manual (7th edition) should be used to guide manuscript formatting, with the exception of the title page and abstract as noted below.

Title Page

In addition to the APA Manual, the academic degrees of authors should be placed on the title page following their names.

Abstract

A structured double-spaced abstract of not more than 250 words should be included. The abstract should include the following parts:

a. Objective (brief statement of the purpose of the study)

b. Methods (summary of the participants, design, measures, procedure)

c. Results (the primary findings of this work)

d. Conclusions (statement of implications of these data)

Body of the Manuscript

a. *Introduction*

b. *Methods* - Informed consent and ethical treatment of study participants: Authors should indicate in the Method section of relevant manuscripts how informed consent was obtained and report the approval of the study by the appropriate Institutional Review Board(s).

c. *Results*

d. *Discussion* - Clinical relevance of the research should be incorporated into the manuscripts. There is no special section on clinical implications, but authors should integrate implications for practice, as appropriate, into papers.

Acknowledgements

Add appropriate acknowledgements, including information on the funding sources as noted below:

Funding

Details of all funding sources for the work in question should be given in a separate section entitled "Funding." The following rules should be followed:

- The sentence should begin: "This work was supported by . . ."
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- Grant numbers should be complete and accurate and provided in parentheses as follows: "(grant number xxxx)."Multiple grant numbers should be separated by a comma as follows: "(grant numbers xxxx, yyyy)"
- Agencies should be separated by a semi-colon (plus ‘and’ before the last funding agency)
- Where individuals need to be specified for certain sources of funding the following text should be added after the relevant agency or grant number "to [author initials]."

Oxford Journals will deposit all NIH-funded articles in PubMed Central. See the Complying with funder policies page for details. Authors must ensure that manuscripts are clearly indicated as NIH-funded using the guidelines above.

Tables and Figures

Tables

Tables should be included as separate pages using acceptable formats (e.g., .doc files).

Figures

Figure resolution should be no less than 300 dpi for halftone color (photo) images, 600 dpi for combination halftones, and 1200 dpi for line art. Most standard figure formats are

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Reporting and interpreting data related to Race and Ethnicity, including use of Bias-Free Language: Race and ethnicity are social constructs couched within a sociopolitical framework. Race and ethnicity are not genetic or biological categories. Care should be taken in the methods used to characterize samples in regard to race and ethnicity, reporting of this information, and interpretation of findings related to race and ethnicity categories.

Reporting of race and ethnicity (and associated intersectional factors such as culture, social structures, etc.) in the manuscript may vary across countries, languages, and cultures. Authors should provide sufficient rationale and justification for their data collection and reporting of race and ethnicity of their sample to be understood and appreciated by an international readership.

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- Terms used to describe racial and ethnic groups (including spelling and capitalization) should adhere to bias-free language for Racial and Ethnic Identity
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4. *Interpretation of race and ethnicity findings and recognizing limitations*.
    - Avoid making assumptions and conclusions that whiteness is the norm; for example, do not assume White comparison groups are needed or that racial differences found in one group are abnormal in comparison to White individuals. For further details, see Upending Racism in Psychological Science: Strategies to Change How Science is Conducted, Reported, Reviewed & Disseminated
    - Consider the structural effects of racism, and histories of exclusion, mistreatment, and exploitation on the populations included in the research and/or in relation to the findings. Authors should avoid making conclusions that may be interpreted as placing blame on minoritized populations. As it relates to interpreting the study findings, racism should be named. Authors are encouraged to identify the form (interpersonal, institutional, systemic), the mechanism by which it may be operating, and other intersecting forms of oppression (such as based on sex, gender, sexual orientation, age, regionality, nationality, religion, or income) that may compound its effects. For further details, see: On Racism: A New Standard For Publishing On Racial Health Inequities
    - Authors should clearly acknowledge limitations of samples due to their lack of racial and ethnic representation (e.g., limited generalizability due to homogeneity of the sample). If data on racism or discrimination were not collected, authors should acknowledge this limitation in the interpretation of

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Where ethically feasible, *JPP* strongly encourages authors to make all data and software code on which the conclusions of the paper rely available to readers. Authors are required to include a data availability statement in their paper. When data and software underlying the research article are available in an online source, authors should include a full citation in their reference list. For details of the minimum information to be included in data and software citations see the OUP guidance on citing research data and software.

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The following links provide additional guidance for authors and reviewers:

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- NIH Policy
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