The mediating effect of dissociation on the relationship between complex PTSD and social problem solving

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Statement of Originality

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Abstract

Past research has highlighted an association between complex trauma and impaired social problem solving, however, less is known about the underlying processes. This is suggested to be a barrier when developing psychological interventions targeting social problem solving for traumatised adolescents (Ahmadi Forooshani et al., 2021). This research aims better understand this association and determine whether dissociation mediates the relationship between complex PTSD and social problem solving in adolescents. Participants, aged 14-18, were recruited via online platforms to complete a survey containing the International Trauma Questionnaire – Child and Adolescent Version (ITQ-CA; Cloitre et al., 2018), Adolescent Dissociative Experiences Scale - II (A-DES; Armstrong et al., 1997), and the Social Problem-Solving Inventory for Adolescents (SPSI-A; Frauenknecht & Black 1995). A sample of 332 adolescents, that met the ITQ-CA criteria for complex PTSD, were included in this study. A mediation analysis revealed that dissociation partially mediated the relationship between complex PTSD and social problem solving, $\beta = -.02$, $z = -3.2$, 95% CI [-.04, -.00], $p < .001$. These findings are in line with previous research that showed a strong association between complex PTSD and dissociation, and a moderate association between complex PTSD and impaired social problem solving. This research suggests that dissociation partially explains impaired social problem solving in individuals with complex PTSD. Consequently, interventions targeting social problem solving should consider both complex PTSD symptoms and dissociative symptoms. Implications and recommendations for future research are discussed.

Keywords: complex PTSD, dissociation, social problem solving, adolescents

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Chapter 1: Introduction

Research has identified social problem solving as an essential ability to effectively managing stressful life events and maintain personal wellbeing (Nezu & D'Zurilla, 2006). Social problem solving is the ability to develop solutions and cope with undesirable social or interpersonal situations (D'Zurilla & Nezu, 2010). For adolescents, poorer social problem solving is associated with emotion dysregulation, school failure, delinquency, and psychopathology. Meanwhile, stronger social problem solving is believed to act as a protective factor against mental illness (Kilian et al., 2017; Merrill et al., 2017). Interventions targeting social problem-solving abilities have met with moderate success, however less success is evident in individuals who have experienced complex trauma (Ahmadi Forooshani et al., 2022; Dunn et al., 2023). Complex trauma refers to repeated or prolonged exposure to traumatic events, often of an invasive, interpersonal nature, which overwhelms a person's ability to cope (Ford & Courtois, 2020). This can result in posttraumatic stress responses, which may lead to short- or long-term challenges. Complex post-traumatic stress disorder (complex PTSD) can develop, which consists of symptoms typically observed in PTSD as well as emotion dysregulation, self-belief, and interpersonal capacities (Cloitre et al., 2021). Importantly, adolescents with complex PTSD that also report deficits in social problem solving are often less responsive to therapeutic interventions (Merrill et al., 2017). While some of these adolescents will see improvements over time, intervention outcomes will typically be more complicated than for adolescents without a history of trauma (Ahmadi Forooshani et al., 2022). The variation in therapeutic outcomes suggest that other factors need to be investigated to understand the relationship between complex PTSD and social problem solving (Fang & Chung, 2019). Our research suggests that dissociation is associated with complex PTSD in both adults and adolescents (Haselgruber et al., 2021); it is possible that dissociation could mediate the relationship between complex PTSD and social problem

solving. Dissociation is a disruption or discontinuity in the normal integration of consciousness, memory, identity, emotion, perception, body representation, motor control, and behaviour (American Psychiatric Association [APA], 2022). It is important to understand this relationship as consideration of complex PTSD and dissociative symptoms may improve therapeutic interventions targeting social problem-solving skills.

Adolescence is a vulnerable stage of development, where exposure to complex traumatic events can significantly impact an individual's affect behaviour, sense of self, and cognitions into adult life (Miskiewicz et al., 2016; Williams, 2007). Complex trauma often occurs during childhood and may include physical abuse, sexual abuse, emotional abuse, and/or chronic neglect (Browne & Winkelman, 2007). This can impact several areas of functioning, including attachment, biology, affect regulation, dissociation, behavioural control, cognition, and self-concept (Cristofanelli et al., 2023). Studies have shown that when posttraumatic symptoms develop in adolescence or prior, then adults are more likely to exhibit more severe or treatment resistant symptoms (Stoddard, 2014). However, when interventions commence in childhood and adolescence there is a higher probability of recovery than interventions started in adulthood (Zandberg et al., 2016). Therefore, further research into this phenomenon is highly important.

To the best of our knowledge the relationship between complex PTSD and social problem solving has not been investigated. This is understandable as the two factors are not old or established concepts in the field of psychology. While the relationship between complex PTSD and social problem solving is not well established, several studies have found associations between social problem solving and both PTSD and complex trauma (Dehghan Manshadi et al., 2024; Sutherland & Bryant, 2007). These studies consistently identified a moderate to strong association between posttraumatic symptom severity and poorer social problem-solving abilities (Scoglio et al., 2022). However, it is less clear how these variables

interact. Studies have shown that interventions specifically targeting social skills, social supports, and cognitive strategies can positively affect both social functioning and trauma symptoms (Scoglio et al., 2022; Tsai et al., 2012). However, there is considerable variation in individual outcomes, which Kilian et al. (2017) believe could be explained by other risk factors that mediate the relationship between trauma and social problem solving.

A key risk factor that is associated with complex PTSD is dissociation. While dissociation is clinically and diagnostically separate from complex PTSD, more severe complex PTSD symptoms are associated with more severe dissociation (Dorahy et al., 2013). Furthermore, chronic dissociation after traumatic events was shown to have enduring negative effects across multiple domains, including cognitive functions, memory, emotion regulation, and interpersonal skills (Lanius, 2015). Dorahy et al. (2013) propose that dissociation could play a role in the aetiology, maintenance, and treatment outcomes for individuals with complex PTSD. However, more research is needed to fully understand the relationship between dissociation and complex PTSD, and how this affects individual outcomes.

The relationship between dissociation and social problem solving is less evident within the literature. While no studies have directly examined dissociative symptoms and social problem solving, there has been some research into the cognitive processes, emotion regulation, and maladaptive coping mechanisms associated with dissociation in adolescents (Cavicchioli et al., 2021; Dorahy et al., 2013; Vancappel & El-Hage, 2023). Adolescents with poorer cognitive functions, specifically, executive functioning and autobiographical memory consistently demonstrate poorer social problem-solving abilities (Bell & D'Zurilla, 2009). Similarly, Matthys and Schutter (2022) identified poor emotion regulation as a predictor of poorer social problem solving in adolescents. Dissociation is consistently associated with impaired cognitive processes and poorer emotion regulation (Dorahy et al., 2013). These

deficits are even more pronounced in dissociative disorders, including dissociative identity disorder, depersonalisation or derealisation disorder, and dissociative amnesia (Vancappel & El-Hage, 2023). This suggests a probable association between dissociative symptoms and social problem-solving abilities.

Since adolescents with greater social problem-solving abilities are more likely to exhibit good social adjustment and positive mental health outcomes, it is important to understand the factors that influence social problem solving (Bell & D'Zurilla, 2009). This research aims to better understand the relationship between complex PTSD and social problem solving, and to determine if dissociation plays a mediating role. If dissociation is a mediator, then interventions targeting social problem solving may need to concurrently target dissociative symptoms to achieve improved outcomes. This may also help practitioners to determine the best treatments for adolescents with complex PTSD that have poor social problem-solving abilities. Furthermore, this will contribute to understanding the relationship between complex PTSD and dissociation.

This literature review first discusses the key features of social problem solving, complex PTSD, and dissociation. The relationship between each of the variables will then be discussed. Finally, the variables will be considered in the context of the present study.

Social Problem Solving

Social problem solving is an important area of social functioning, which refers to the cognitive-behavioural processes used to develop solutions to cope with stressful daily problems (D'Zurilla & Nezu, 2006). It is a learning process, a general coping strategy, and a self-control process (D'Zurilla & Nezu 2010). D'Zurilla et al. (1995) describe social problem solving as a conscious, rational, effortful, and purposeful activity aimed at improving problematic situations, modifying or reducing negative emotions towards a problem, or both

at the same time. It is proposed that social problem-solving mediates the relationship between stressful life events and personal wellbeing (D'Zurilla & Nezu, 2010).

The theoretical framework developed by D'Zurilla and Nezu (1990) consists of two factors and five subfactors: problem orientation (positive and negative orientations) and problem-solving style (rational, impulsivity/carelessness, and avoidant problem-solving styles). Problem orientation refers to general cognitions and attitudes when faced with a challenge, which is framed by past experiences and self-appraisals (Alvarez et al., 2022). Problem-solving style refers to the cognitive-behavioural activities used to manage stressful situations and develop solutions (Alvarez et al., 2022). A person with strong social problem-solving abilities is likely to use information from past experiences, evaluate possible options, and feel confident in their abilities make suitable choices. Meanwhile, a person with poorer social problem-solving abilities is likely to experience self-doubt, make choices without considering possible consequences, and avoid committing to a decision. An individual's abilities are strongly determined by interactions within the family, parents' problem-solving strategies, parenting techniques, and social relationships (Laszlo, 2015).

Deficiencies in social problem solving are associated with depression, anxiety, substance abuse, and suicide attempts (Bell & D'Zurilla, 2009). In adolescents, these deficiencies may present as interpersonal problems, emotion dysregulation, and mental illness (Merril et al., 2017). Deficiencies rarely self-correct, meaning that social problem-solving difficulties in adolescence are highly correlated with impairments in adulthood (Gerin et al., 2024). These difficulties can emerge early in childhood and adolescence, often giving indications of possible social problem-solving trajectories.

Social problem solving can be improved by education and psychotherapy; however, this is reliant on cognitive capacities and emotion regulation abilities (Nezu et al., 2013). In an analysis of intervention strategies, Nezu et al. (2013) found that individuals with

deficiencies in cognitive domains were less responsive to interventions. Chronic suppression of cognitive capacities, including autobiographical memories and negative emotion suppression, are associated with poor social problem-solving (Ahmadi Forooshani et al., 2022). This is believed to be because a person does not have complete access to their cognitions, memories, and emotions when faced with problems or challenges. In adolescent studies, alongside cognitive deficits, exposure to trauma was consistently associated with poorer social problem solving (Ahmadi Forooshani et al., 2022).

Complex PTSD

Complex PTSD can develop after exposure to a traumatic event or events, typically of a prolonged or repetitive nature; this may include physical abuse, sexual abuse, emotional abuse, and chronic neglect (Kazlauskas et al., 2023). It is typically (but not always) associated with complex traumatic exposures in childhood, frequently of an interpersonal nature (Dorahy et al., 2013; Jones et al., 2018). These events can compromise the individual's identity, self-worth, personality, emotion regulation, relational connections, and intimacy (Mucci & Scalabrini, 2021). Complex PTSD is associated with poor physical and mental health symptoms, with links to depression, anxiety, suicide attempts, and non-suicidal self-injury in both adolescence and adulthood (Goldstein et al., 2023; Shin et al., 2021). If symptoms develop before or during adolescence, they are likely to continue into adulthood (Chiu et al., 2024).

The understanding of complex PTSD and its validity as a disorder has been debated for many years. It was first proposed by Herman (1992) to conceptualise the sequelae and psychological impacts of prolonged, repeated trauma, which differed from traditional observations of single event induced PTSD. Complex PTSD is not currently recognised as a distinct disorder in the *Diagnostic and Statistical Manual-5 text revision* (DSM-5-TR), instead it is included within the PTSD framework (APA, 2022). However, the World Health

Organisation (WHO) included it as a distinct diagnosis in the *International Classification of Diseases 11*th *edition* (ICD-11: WHO, 2019). The ICD-11 formulation of PTSD requires exposure to a trauma, defined as a threatening or horrific event or series of events, as well as the presence of three symptom clusters: re-experiencing the traumatic event in the present, avoidance of traumatic reminders, and persistent sense of current threat (Mucci & Scalabrini, 2021; WHO, 2019). In addition to the three PTSD clusters, complex PTSD includes three further symptom clusters referring to disturbance in self-organisation, that is; affect dysregulation (e.g., problems managing emotion), negative self-concept (e.g., beliefs about self as worthless), and disturbances in relationships (e.g., avoidance of relationships; van Dijke et al., 2015; WHO, 2019). The type of trauma experienced is considered a risk factor rather than a prerequisite for differential diagnosis, however, complex PTSD occurs more commonly following prolonged or repeated trauma that is interpersonal in nature and is inescapable (Redican et al., 2021). An individual can be diagnosed with PTSD or complex PTSD, not both simultaneously. In addition, some form of functional impairment is required for diagnosis.

While complex PTSD is not internationally recognised, growing evidence supports the validity of its own diagnostic category (Cloitre et al., 2021; Hyland et al., 2020a). Previously, research had suggested that complex PTSD shared too many symptoms that could be better explained by other disorders, including PTSD, mood disorders, and borderline personality disorder (Resick et al., 2012). However, more recent studies have reported evidence for the validity of ICD-11 complex PTSD and PTSD factor structure in both adults and adolescence (Haselgruber et al., 2020; Kazlauskas et al., 2020). A meta-analysis of studies comparing complex PTSD and PTSD showed clear differences in symptom clusters between the two categories, with factor analysis determining two distinct categories as the best structural representation (Redican et al., 2021). Distinguishing complex PTSD as a

distinct diagnosis is important as the aetiology, maintenance, treatments, and outcomes vary significantly from PTSD (Haselgruber et al., 2020).

The consequences of complex trauma experienced in childhood and adolescence can be severe in the short- and long-term. After a traumatic event or events, adolescents may develop posttraumatic symptoms such as personal and interpersonal dysfunction, depression, dissociation, and hypervigilance (Browne & Winkelman, 2007). This may also cause long term disruptions to development in cognition, self-concept, personality, and impulse control (Chiu et al., 2024; Williams, 2007). In a meta-analysis, Stoddard (2014) identified several long-term sequelae of childhood traumatic stress, including impairments in affect regulation and behaviour control, learning disabilities resulting from difficulties maintaining cognitive focus, and the development of dysfunctional social behaviours. This is supported by the findings of McLean et al. (2013), which also identified these posttraumatic impairments as predictors of poor school performance, interpersonal problems, and psychological disturbances. Gilman et al. (2016) found that adult survivors of childhood trauma were more likely to experience relationship difficulties, and experience higher levels of interpersonal stress. Furthermore, adults that experienced their first trauma before puberty were more likely to develop severe depressive symptoms, attempt suicide, be hospitalised due to a psychiatric disorder, and engage in substance abuse (Gilman et al., 2016).

Prevalence and Risk Factors

It is estimated that between 56% and 84% of people will experience a traumatic event or events before the age of 18 (Chiu et al., 2024). This percentage is often higher in minority populations, for example, a study of Indigenous Australians found that 97.3% had experienced a traumatic event before the age 18 (Nasir et al., 2021). Not all those individuals will develop complex PTSD or another trauma-based disorder; instead, Kazlausakas et al. (2023) propose that a complex balance of risk factors and protective factors contribute to

individual outcomes. Key risk factors associated with developing complex PTSD include multiple traumas, sexual trauma, school and family problems, avoidant coping strategies, and female gender (Khamis, 2021; Redican et al., 2022). Previous psychopathology and neurodivergence have also been identified as contributors in developing complex PTSD (Carpita et al., 2024). Meanwhile, social supports, positive family relationships, and socioeconomic status were identified as protective factors (Daniunaite et al., 2021). However, these studies were cross-sectional in design, which limits any inferences in causal pathways. Further longitudinal studies would be needed to better understand how risk and protective factors relate to complex PTSD symptoms over time. Nevertheless, these risk and protective factors have been identified as important in therapeutic interventions to improve posttraumatic symptoms in adolescents.

It is difficult to ascertain an exact prevalence rate of complex PTSD in adolescent populations due to underdiagnosis and variations in diagnostic protocols. Studies of probable complex PTSD in non-clinical adolescent samples showed a prevalence of 3.4% in Ireland (Redican et al., 2022), 4.1% in Italy (Rossi et al., 2022), and 12.3% in Lithuania (Kazlauskas et al., 2022). Prevalence rates are proposed to differ by country and location due to cultural attitudes towards children, particularly regarding physical and sexual aggression towards children (Maercker et al., 2022). Most studies (including the present study) estimate prevalence in the general population using self-report measures such as the International Trauma Questionnaire – Child and Adolescent version (ITQ-CA), which, when completed in isolation, can only determine probable complex PTSD based on symptoms (Kazlauskas et al., 2023). The ITQ-CA has high internal reliability and construct validity and is widely used to determine probable complex PTSD in children and adolescents (Haselgruber et al., 2020). For formal diagnosis, a clinical interview is needed, so the actual prevalence of complex PTSD in adolescents within the general population may differ. Within clinical samples, the

prevalence rates can be as high as 40% (Maercker et al., 2022), however, this estimate is based on studies using very small sample sizes.

Dissociation

In recent years, more research has tried to understand dissociation and its role in psychopathology. The ICD-11 defines dissociation as an involuntary disruption or discontinuity in the normal integration of identity, sensations, perceptions, affects, thoughts, memories, and/or behaviour (WHO, 2018). This aligns with the DSM-5-TR, which also emphasizes the loss of high-order integrative and regulative capacities (APA, 2022). Dissociation can be viewed as a spectrum of behaviours ranging from milder forms that cause minimal interferences in awareness (e.g., daydreaming or absorption) to pathological or pervasive forms (e.g., disconnection from self or the world; Caviccioli et al., 2021). Clinical presentations of dissociation may include a variety of symptoms, including experiences of depersonalisation, derealisation, flattened affect, amnesia, absorption, interruptions in awareness, flashbacks of traumatic events and identity alterations (Lanius, 2015). Some dissociative experiences can be short-lived, resolving independently over a matter of days or weeks (Loewenstein, 2018). Other dissociative experiences can last longer, with sometimes permanent alterations to one's identity, self-concept, and memory (Loewenstein, 2018).

Dissociation can be significantly debilitating. More severe dissociative symptoms are associated with poorer cognitive functions, poorer autobiographical memory, affect dysregulation, and difficulties in interpersonal relationships (Dorahy et al., 2015). Individuals with dissociative disorders are likely to experience suicidal ideation and non-suicidal self-injury (Dorahy et al., 2013). Pathological dissociation (elevated dissociative symptoms that cause impairment to an area of functioning) is associated with high levels of functional, social, and occupational impairment, as well as poorer life satisfaction (Cavicchioli et al.,

2023). However, Dorahy et al. (2015) claim that therapeutic practices often overlook the significance of dissociation.

From a psychobiological perspective, dissociation is a response that enhances survival both during and after threat experiences (Hamer et al., 2024). From this perspective, when exposed to a threat, an individual may respond with fight, flight, or freeze. Dissociation occurs during "freezing" when a person develops inner distancing to disconnect from the fearful stimulus (Dorahy et al., 2013). This provides a critical escape from the emotional and physical distress attached to an overwhelming traumatic experience and moderates emotional distress by disrupting integration of painful psychiatric processes (Lanius, 2015; Lyons-Ruth, 2008). "Freezing" is a particularly common response in repeatedly abused children and adolescents, as fighting back or escape may feel impossible (Jones et al., 2018).

While dissociative experiences can self-reintegrate in memory and emotion, this is not always the case. Ford and Courtois (2020) warn that dissociation can become an automated response to anticipating and coping with ongoing threats. This response can generalise to other stimuli or situations that act as triggers to the same response, thus leading to more long-lasting, pervasive dissociation (Ford & Courtois, 2020). Vancappel and El-Hage (2023) describe this as an extension of classical conditioning where any high emotional situation can prompt a dissociative response. Consequently, unresolved dissociative responses will often worsen over time.

Comorbidity in Adolescence

Dissociative experiences are relatively common in the general population but are particularly notable and ubiquitous among populations with psychiatric illnesses (Kamen et al., 2012). In a study of dissociative symptoms in the population, Lyssenko et al. (2018) found elevated dissociative symptoms across every mental illness group, compared to the population norms. Elevated dissociative symptoms were found in each mental illness

category, including dissociative disorders (*M* = 35.3), PTSD (*M* = 32.6), affective disorders (*M* = 19.4), schizophrenia (*M* = 19.1), personality disorders (*M* = 16.6), and eating disorders (*M* = 14.5), compared to healthy samples (*M* = 11.57; Lyssenko et al., 2018). In clinical studies of individuals with dissociative disorders, 79% to 100% exhibited another mental health condition, including PTSD (83% to 96%), depression (83% to 96%), substance abuse (92% to 100%), and suicidal ideation (60% to 80%; Loewenstein, 2018). However, these values may be underestimated as dissociative disorders are believed to be underdiagnosed (Loewenstein, 2018).

Dissociative disorders and pathological dissociation are believed to be underdiagnosed in adolescents (Jans et al., 2008). This can be detrimental as symptoms typically worsen in adulthood, while interventions in adolescents can be highly effective (Vonderlin et al., 2018). Often therapeutic practices will only focus on dissociation when symptoms are severely disturbing, however, emerging research has suggested that even in moderate levels, dissociation can interfere with interventions targeting co-occurring conditions (Haselgruber et al., 2021). Nesbit et al. (2022) found that targeting dissociative symptoms in therapy was associated with symptom reduction for individuals with schizophrenia. Similarly, interventions targeting posttraumatic symptoms that also targeted dissociation were shown to be more effective in adolescents with both PTSD and chronic dissociation, than treatments focusing solely on posttraumatic symptoms (Woolard et al., 2024). This sets a precedent to suggest that problematic dissociation should be treated in conjunction with posttraumatic symptoms, and that ignoring dissociative symptoms may be problematic for treatment interventions.

Complex PTSD and Dissociation

The relationship between dissociation and posttraumatic stress disorders is well documented in the literature. Increased dissociation is consistently associated with increased

posttraumatic symptoms in both adult and adolescent populations (Dorahy et al., 2013). In a recent meta-analysis, 12 studies examined the correlation between dissociation and posttraumatic symptoms in adolescence, with all studies showing a positive correlation (r = .42 to .73) between these variables (Hamer et al., 2024). In these studies, individuals with complex PTSD demonstrated increased dissociative symptoms compared to individuals with PTSD and those not meeting the criteria for a trauma-based disorder (Hamer et al., 2024). Van der Hart et al. (2005) originally proposed that dissociation could help distinguish between complex PTSD and PTSD; however, dissociation is not present in all cases of complex PTSD. Instead, it is proposed that dissociation is independent, but frequently comorbid with complex PTSD (van Dijke et al., 2015).

Research suggests a moderate comorbidity between pathological dissociation and complex PTSD; however, due to varying classifications for dissociation and different formulations of complex trauma, PTSD, and complex PTSD, there are varying estimates of prevalence (Hyland et al., 2019). Current estimates suggest that pathological dissociation is present in 4.9% of adolescents within the general population, compared to 19-25% of adolescents that have experienced complex trauma (Hagan et al., 2015; Woolard et al., 2024). However, dissociative disorders and dissociative symptoms are believed to be underdiagnosed, especially in child and adolescent populations, so actual prevalence could be greater (Hagan et al., 2015).

One possible explanation for the association between complex PTSD and dissociation is their shared aetiology. Dissociative disorders, including dissociative amnesia, depersonalisation or derealisation disorder, and dissociative identity disorder, are typically associated with traumatic childhood experiences (Eilers et al., 2021). In a review of studies on dissociative disorders, 94% to 100% of individuals diagnosed with dissociative disorders had a history of childhood trauma (Maercker et al., 2022). This is supported by an analysis of

65 studies of general and clinical populations that found that dissociation was most common in survivors of childhood abuse (Vonderlin et al., 2018). However, a shared aetiology does not fully explain the ongoing association between complex PTSD and dissociation, as not all individuals that experience trauma develop pathological dissociation or complex PTSD. After exposure to trauma, a person may develop dissociation, complex PTSD, both or neither, which suggests that other variables influence individual outcomes.

An alternate explanation for the association between dissociation and complex PTSD is through consideration of the maintenance of complex PTSD. Guzman Torres et al. (2023) proposed that dissociation was instrumental in the maintenance of posttraumatic stress disorders, as it can act as an avoidance mechanism and can disrupt information processing. It is proposed that dissociative symptoms hinder the processing of trauma, interfering with integration of experiences into memory networks, thus prolonging stress reactions (Taft et al., 2009). Dissociation is also associated with avoidance behaviours and maladaptive cognitive patterns, which can prevent negative emotions from trauma being processed and integrated (Fang & Chung, 2019). These maladaptive coping mechanisms can also act to sustain the effects of trauma (Taft et al., 2009).

It is proposed that complex PTSD symptoms (most significantly flashbacks and emotion dysregulation) can prompt dissociative responses (Kira et al., 2023). Kira et al. (2023) proposed that these posttraumatic symptoms greatly influenced severity of dissociation, as dissociation acted as a trauma response. However, Dorahy et al. (2014) warn against considering dissociation as a posttraumatic symptom as this can devalue the significant role of dissociation within psychopathology and as its own independent construct. Furthermore, while the correlation is strong, trauma symptoms do not fully explain variation in dissociative symptoms (Dorahy et al., 2014). This may explain why treatment outcomes are typically more complicated for individuals with both complex PTSD and dissociation,

than for individuals that just exhibit one (Woolard et al., 2024). However, this is an emerging field of research and further evidence is needed to understand the complex relationship between complex PTSD and dissociation (Hyland et al., 2020a).

The presence of dissociation with complex PTSD influences therapeutic outcomes. When chronic dissociation is present, traditional treatments for complex PTSD are less effective or have more complex outcomes (Dorahy et al., 2013). Dissociation can become a default trauma response, so any treatment method focusing on dealing with trauma, may first need to address issues with dissociation, or work on both simultaneously (Kira et al., 2023; Loewenstein, 2018). Woolard et al. (2024) argues that treatment protocols for adolescents with complex PTSD that also have problematic dissociation should treat both simultaneously, as unresolved dissociation can adversely affect treatment practices. However, further research would be needed to support this position.

Complex PTSD and Social Problem Solving

While no studies have investigated the relationship between complex PTSD and social problem solving, several have examined the effects of posttraumatic symptoms and complex trauma (Ahmadi Forooshani et al., 2022; Ahmadi Forooshani et al., 2021; Alvarez et al., 2022; Kasik, 2015). A medium sized correlation has been shown between posttraumatic symptoms and social problem solving in adolescent samples r = -.26 to -.32 (Ahmadi Forooshani et al., 2021). In a similar adolescent study, Coker et al. (2014) found a moderate association (r = -.33) between complex trauma and social problem solving. In an adult sample, a strong negative correlation (r = -.61) was found between complex trauma symptoms and social problem-solving skills (Dehghan Manshadi et al., 2024). However, this study reported flaws in the retrospective self-reporting by participants, which may explain why such a large correlation was found compared to other studies. While research supports a clear association, there is still much debate about the underlying processes involved.

Briere's self-trauma model (1996) has been used to explain the consequences of childhood trauma. Briere's model proposes that trauma causes a disruption to development. This disruption can impact cognitive development, development of self, and interpersonal relationships (Browne & Winkelman, 2007). An accumulation of stressful or traumatic events has been shown to have a significant impact on psychological, social, and physical health functioning (Alvarez et al., 2022). It is possible that these disruptions to development interrupt key processes that enable stronger social problem solving, including cognitive abilities, emotion regulation, and interpersonal skill development (Alvarez et al., 2022; Hassija et al., 2015). From this perspective, trauma disrupts the development of the necessary skills for more effective social problem-solving abilities; however, it is possible that the relationship between these variables is more complex.

The relationship between social problem solving and complex trauma becomes particularly pronounced when considering evidence-based therapeutic interventions. Interventions designed to improve social problem solving are typically less effective for traumatised youth (Ahmadi Forooshani et al., 2021). However, when both are considered and supported, individuals are more likely to see improved outcomes (Lord et al., 2023). Similarly, a meta-analysis evaluating treatments for complex PTSD showed that multicomponent interventions that targeted emotional self-regulatory strategies and coping strategies, alongside trauma-focused practices, provided the strongest reduction in posttraumatic symptoms (Maercker et al., 2022). As emotion regulation and coping are key features of the social problem-solving framework, these studies support the position that interventions targeting social problem-solving processes should consider complex PTSD symptoms.

Dissociation and Social Problem Solving

At present, there are no studies investigating the direct relationship between dissociation and social problem solving. Brand et al. (2009) claim that limited studies have been conducted on dissociation as psychological conceptualisations of dissociation have varied throughout history. Furthermore, dissociative disorders have high levels of comorbidity with other psychiatric disorders, which in the past has made it difficult to distinguish dissociation as an independent construct (Brand et al., 2009). Consequently, dissociation is an emerging area of research. In the absence of studies examining the direct association, it is possible to propose a probable association by considering the features of social problem solving and how dissociation impacts these features, as well as considering the outcomes for individuals with dissociative disorders.

To understand the proposed association between dissociation and social problem solving, it is necessary to understand the core processes of dissociation. Dissociative experiences are often characterised by two processes: compartmentalisation and detachment. Compartmentalisation occurs when mental events that are ordinarily processed together (e.g., memories, cognitions, emotions, sensations, and attitudes) are isolated from one another and become inaccessible to consciousness (Cavicchioli et al., 2023; Collins & French, 1998). Detachment refers to an altered state of being, characterised by separation from aspects of everyday experiences (e.g., emotional experience, sense of self, and out-of-body phenomena; Brown, 2006). The brain may use compartmentalisation, detachment, or both to manage overwhelming situations. This is confirmed by brain studies, which have shown a lack of communication between areas of the brain during dissociation (Scalabrini et al., 2020). The processes of compartmentalisation and detachment are believed to be responsible for the negative correlation between dissociative symptoms and cognitive processes (Ranjan et al.,

2016), memory retrieval (Sutherland & Bryant, 2007), and emotion regulation (Vancappel & El-Hage, 2023).

Social problem solving requires the use and application of cognitive processes. Impaired or decreased cognitive functions are associated with deficits in social problem solving (Bell & D'Zurilla, 2009). Similarly, studies have found that thought suppression, cognitive avoidance (Ahmadi Forooshani et al., 2021), and poor autobiographical memory retrieval (Sutherland & Bryant, 2007) correlate with poor social problem-solving abilities. These limitations are common for individuals with higher levels of dissociation (Kozak et al., 2008). Brand et al. (2009) proposes that the process of compartmentalisation blocks access to memories, emotions, and patterns of thinking, which are necessary for key cognitive processes. Without complete access to cognitions, memories, and emotions, the brain fills in the gaps with plausible but incorrect pieces of information, which can hinder problem-solving processes because they block the retrieval of target information (Kozak et al., 2008). This is known as the blocking hypothesis, which is associated with dissociation and poorer performance across a range of cognitive tasks, including social problem solving (Kozak et al., 2008).

Emotion regulation is also essential for good social problem solving. Bell and D'Zurilla (2009) claim that social problem solving requires effective emotion regulation, as individuals must be able to manage emotional responses to avoid impulsive problem-solving approaches and evaluate situations to make reasoned judgements. This has been confirmed by an adolescent study that found a significant correlation between emotion regulation and subscale of the social problem-solving framework (r = .16 - .32; Kuzucu, 2016). Individuals with pathological dissociation typically experience impairments in emotion regulation (Caviccioli et al., 2021). In a meta-analysis of 57 studies, Caviccioli et al. (2021) found a moderate association between dissociation and impaired emotion regulation (r = .32). The

association between dissociation and impaired emotion regulation, suggests an association with poorer social problem-solving abilities.

Individuals with dissociative disorders typically experience long-term difficulties in self-concept, memory, problem-solving abilities, and interpersonal relationships (Kamen et al., 2012). In a study of children and adolescents with dissociative disorders, Alvarez et al. (2022) found that most participants had poor adjustment, characterised by emotional, social, and family difficulties. The researchers attributed this to the high levels of stress and interpersonal disturbances experienced by participants (Alvarez et al., 2022). Similarly, Mishra et al. (2024) found that adolescents with dissociative disorders demonstrated poorer social adjustment, with notable deficits in the social and emotional domains. Mueller-Preiffer et al. (2012) found that individuals with dissociative disorders had lower global functioning, with specific deficits in interpersonal skills and participation in society. Individuals in this study were more likely to express difficulties in coping in social situations than population norms (Mueller-Preiffer et al., 2012). A limitation of each of these studies is the small sample size as they were working with clinically diagnosed individuals, therefore generalisations should be considered carefully. While social problem solving has not been examined in individuals with dissociative disorders, the association between dissociative disorders and maladaptive coping strategies, poor social adjustment, and interpersonal problems suggests a probable relationship.

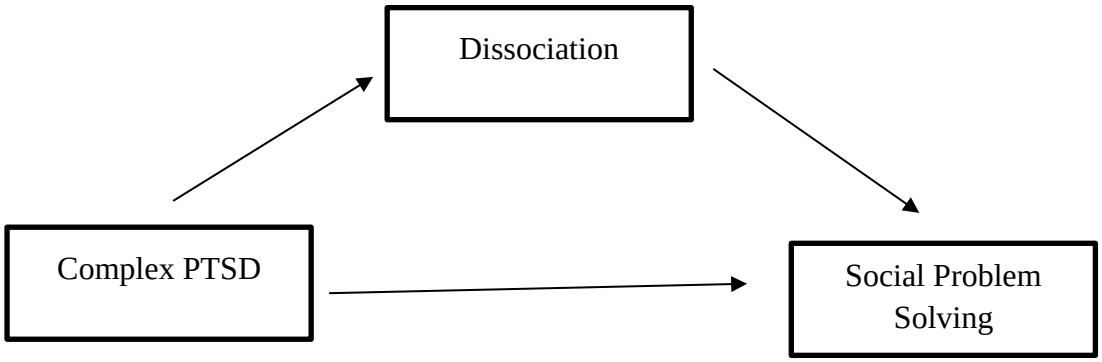
The Present Study

The current study investigates the relationship between complex PTSD and social problem solving, and if dissociation mediates this relationship (See figure 1). Previously, Ahmadi Forooshani et al. (2021) examined autobiographical memory and thought suppression as possible mediating factors between trauma and social problem solving. The results indicated a partial mediation, indicating that both factors were significant in predicting

social problem-solving ability, but did not explain the entire association (Ahmadi Forooshani et al., 2021). In our research, we are suggesting that when working with complex PTSD and social problem solving, dissociation should be considered as possible mediator. Dissociation is proposed as a possible mediator because it is strongly correlated with complex PTSD in adolescents (Hyland et al., 2020a). The association between dissociation and social problem solving has not yet been established in the literature. However, dissociation is associated with cognitive deficits and poorer emotion regulation in adolescents, which are both associated with poorer social problem solving. Based on this research, it is proposed that dissociation mediates the relationship between complex PTSD and social problem solving.

Figure 1

Proposed Mediation Model



Confirmation of this model will have significant implications on future interventions targeting social problem solving. Ahmadi Forooshani et al. (2016) suggested that trauma symptoms and mediators need to be considered to be able to have successful social problem-solving interventions. The present model would suggest that complex PTSD symptoms and dissociative symptoms should be considered for effective therapeutic interventions. Another implication of these findings is that effective interventions targeting dissociation and social problem solving in adolescents with complex PTSD may prevent potentially long-lasting impairments. This research will also contribute to the developing understanding of the

interrelationships between complex PTSD, social problem solving, and dissociation in adolescents.

Based on the literature, the following hypotheses have been proposed:

Hypothesis 1: It is hypothesised that complex PTSD is negatively associated with social problem-solving ability.

Hypothesis 2: It is hypothesised that complex PTSD is positively associated with dissociation.

Hypothesis 3: It is hypothesised that dissociation is negatively associated with social problem-solving ability.

Hypothesis 4: It is hypothesised that when the effect of dissociation on social problem-solving is controlled that the relationship between complex PTSD and social problem-solving will become non-significant.

Chapter 2: Method

Survey Design

The primary purpose of this study was to determine if, and to what extent, dissociation mediates the relationship between complex PTSD and social problem solving in adolescents. In line with previous studies on these variables in adolescent populations (Ahmadi Forooshani et al., 2021; Kazlauskas et al., 2022), a survey design was selected, which allows access to a greater sample size and rapid turnaround. The data was collected via online survey. The cross-sectional design of this study allows for data collection from a single point in time.

Participants

The participants were adolescents aged 14-18 years, from Australia, recruited from researchers' networks. The sample included in the analysis was 332 adolescents with a mean age of 16.25 years (*SD* = 1.34). The sample consisted of more males (58.1%, *n* = 193) than females (36.4%, *n* = 118). Three quarters identified as aboriginal and/or Torres Straits Islander background (75.6%, *n* = 251), and 72% (*n* = 239) self-identified as neurodiverse. All demographic characteristics are presented in Table 1.

Table 1

Demographic Characteristics of Participants

Demographic	Frequency	Percentage
Age		
14	23	6.9%
15	101	30.4%
16	74	22.3%
17	39	11.7%
18	95	28.6%

Gender		
Male	193	58.1%
Female	118	35.5%
Non-binary	5	1.5%
Gender-fluid	7	2.1%
Not disclosed	9	2.7%
Culturally and Linguistically Diverse status		
Yes	68	20.5%
No	235	70.8%
Not disclosed	39	8.7%
Aboriginal and Torres Straits Islander status		
Yes, Aboriginal background	144	43.4%
Yes, Torres Straits Islander background	80	24.1%
Yes, Aboriginal and Torres Straits Islander background	27	8.1%
No	64	19.3%
Not disclosed	17	5.1%
Neurodivergent		
Yes, ADHD	94	28.3%
Yes, ASD	105	31.6%
Yes, ADHD and ASD	40	12%
No	78	23.5%
Not disclosed	15	4.5%

Measures

International Trauma Questionnaire – Child and Adolescent Version (ITQ-CA)

The ITQ-CA was developed by Cloitre et al. (2018) as a self-report measure for the assessment of PTSD and complex PTSD, in line with the ICD-11 diagnostic criteria (See Appendix A). The questionnaire consists of 12 items that examine posttraumatic symptoms. There are two items for each of the three PTSD symptom clusters (re-experiencing of the trauma, avoidance of trauma reminders, and heightened sense of threat) and two items for each of the disturbances of self-organisation symptoms present in complex PTSD (emotional dysregulation, interpersonal difficulties, and negative self-concept). The items are answered on a 5-point Likert scale ranging from 0 (never) to 4 (almost always) considering how "the following things have bothered you in the past month". An example item is: "bad dreams reminding me of what happened". A score of 2 or more suggests the presence of a symptom. There are a further 5 items determining the functional impairment for PTSD and 5 items determining the functional impairment for disturbances of self-organisation. Items are answered on a binary scale (yes/no) addressing impairments in areas of friends, family, schoolwork, anything else important, and general happiness. A diagnosis of PTSD is assigned with fulfilment of one symptom from each PTSD cluster and the presence of functional impairment. A diagnosis of complex PTSD is assigned with fulfilment of one symptom from each disturbance of self-organisation symptom in addition to PTSD and functional impairment. A sum score of responses to the 12 symptom items is used to determine overall symptom severity, with higher scores indicating more severe symptoms.

The ITQ-CA is widely used in research and clinical practice (Bruckmann et al., 2020; Redican et al., 2022). Haselgruber et al. (2020) examined concurrent validity by analysing bivariate correlations between the ITQ-CA and the Child and Adolescent Trauma Screen, a common PTSD measure (Sachser et al., 2017). Moderate to strong correlations were found

between each symptom cluster (r = 0.65 – 0.84). High convergent validity and discriminant validity have also been demonstrated in previous studies (Haselgruber et al., 2020; Hyland et al., 2020b). The ITQ-CA has previously demonstrated good internal reliability (α = .88; Lokkegaard et al., 2023). The current study also demonstrates good internal reliability (α = .83).

Adolescent Dissociative Experiences Scale – II (A-DES)

This scale was developed by Armstrong et al. (1997) as a screening tool to detect pathological dissociation in adolescents (See Appendix B). The A-DES consists of 30 self-report items that reflect four subscales widely considered to reflect basic aspects of dissociation (Armstrong et al., 1997). Dissociative amnesia items (2, 5, 8, 12, 15, 22, and 27) measure lapses in memory that reflect dissociative breaches in memory. Absorption items (1, 7, 10, 18, 24, and 28) focus on the ability to become so wrapped up in fantasy that confusion between fantasy and reality can occur if such behaviours become chronic. Passive influence items (4, 14, 16, 19, and 23) describe a person's experiences of losing control over one's body and sensations. Depersonalisation and derealisation items (3, 6, 9, 11, 13, 17, 20, 21, 25, 26, 29, and 30) reflect feelings of being disconnected from oneself or the world. Subscale scores can be used to better understand a person's unique profile; however, the total score is the most common measure used (Armstrong et al., 1997). All items are worded to reflect experiences rather than specific symptoms or disabilities. Participants respond to each statement on an 11-point scale ranging from 'never' (0) to 'always' (10). Participants are asked to choose the number that best describes how often a given experience happens. Example items are 'I have thoughts that don't really seem to belong to me' and 'I feel like I'm in a fog or spaced out and things around me seem unreal.' The total A-DES score is equal to the mean of all item scores. Higher scores indicate more pathological dissociative symptoms.

The psychometric features of the A-DES have been confirmed in several studies, including strong internal consistency, convergent validity, and construct validity (Armstrong et al., 1997; Schimmenti 2016). Correia-Santos et al. (2023) found the A-DES had high test-retest stability with no statistically significant differences in responses over a nine-month period. Schimmenti (2016) also found the A-DES has high split-half reliability. The current study demonstrated high internal reliability (α = .97), which is in line with previous studies; α = .93 (Armstrong et al., 1997) and α = .94 (Sho et al., 2009). High internal reliability was also demonstrated in each of the subscales; dissociative amnesia (α = .90), absorption (α = .86), passive influence (α = .87), and depersonalisation and derealisation (α = .94).

Social Problem-Solving Inventory for Adolescents (SPSI-A) Short Version

Frauenknecht and Black (1995) developed the SPSI-A to measure an adolescent's perceived social problem-solving abilities (See Appendix C). The survey consists of 25 items which require a person to reflect on their response to a significant, recent problem they faced. The SPSI-A contains five subscales measuring positive problem orientation (items 4, 5, 9, 13, and 15), negative problem orientation (items 1, 3, 7, 8, and 11), rational problem-solving style (items 12, 16, 19, 21, and 23), impulsive problem-solving style (2, 14, 20, 24, and 25), and avoidance problem-solving style (items 6, 10, 17, 18, and 22). Subscale scores can be used to identify specific deficiencies; however, a total score is more commonly used to identify overall social problem-solving skills (Frauenknecht & Black, 1995).

Items are rated on a 5-point Likert scale, ranging from 'not at all true of me' (0) to 'extremely true of me (4). The items reflect positive and negative attitudes about the problem-solving process. An example of a positive item is 'to solve a problem, I do what has worked for me in the past'. An example of a negative item is 'when I can't solve a problem quickly and easily, I think that I am stupid'. When scoring, the negative items are reversed, which include all items measuring negative problem orientation, impulsive problem-solving

style, and avoidance problem-solving style. The responses are added to give a total score, which is then divided by the number of items. Higher scores indicate greater self-perceived problem-solving ability.

The SPSI-A has a high construct validity and concurrent validity (Frauenknecht & Black, 1995) and has been used widely to determine adolescent problem-solving abilities (Holbein et al., 2018; Skowron, 2004). Frauenknecht and Black (1995) found the SPSI-A to be relatively stable with a high correlation (r = .83) between first and second administration over a 2-week period. The current study found good internal reliability (α = .83). This is less than previous studies that found α = .93 (Holbein et al., 2018), and α = .95 (Frauenknecht & Black, 1995) but is still within the appropriate range. Suitable reliability was also shown in each of the subscales; positive problem orientation (α = .81), negative problem orientation (α = .74), rational problem-solving style (α = .73), impulsive problem-solving style (α = .82), and avoidance problem-solving style (α = .82).

Procedures

Ethics approval was granted by the USQ Human Research Ethics Committee (Human Research Ethics Committee Approval number: H21REA309). Data were collected from archival data collected between June and October 2023 as part of a PhD project. One PhD student and three honours students collected data for this survey using social media, including Facebook and Instagram, as well as Survey Circle (a platform to help find survey participants). The eligibility criteria were being aged 14-18 and providing a valid email address. A valid email address was required as participants with elevated trauma responses were contacted within seven days of survey completion. Participants were entered into a draw to win one of three $150 gift vouchers. As the chance of winning was low, participants were also informed about the benefits in completing the survey, both for themselves and their contribution to research.

The first page of the online survey provided a detailed description of the study, as well as key information for participants. This included expected benefits of participation, specifically, an opportunity for self-reflection on coping strategies, as well as the possible financial reward. Possible risks were identified, particularly the possibility of discomfort or distress while completing the surveys. Participants were informed that a researcher would get in touch within seven days of completion if they scored highly on certain questionnaires. Support contacts were also provided, including Lifeline and Kid's Helpline. Information was provided about the collection and storage of data and its possible use in future projects. Specifically, data would be stored on a secure, password protected computer. A brief description of the types of questions in the surveys was given as well as an estimation of time to complete the survey (15-30 minutes). Participants were informed that they could withdraw consent at any time during the survey, without any negative consequence. Contact details for each of the researchers were provided, as well as contacts for the USQ Human Research Ethics Committee. At the bottom of the page, participants ticked a box to provide their consent to participate in this research project. The next page asked participants to enter their age, gender, if they are from a culturally and linguistically diverse background, if they are from an Aboriginal and/or Torres Strait Island background, if they are neurodivergent, and a contact email address. Participants then responded to each of the questionnaires mentioned as well as the Child and Adolescent Trauma Screen (Sachser et al., 2017), the Toronto Alexithymia Scale (Bagby et al., 2014), and the Child Complex PTSD Checklist (Hiller et al., 2021). These other questionnaires were used as part of a larger PhD study. Upon completion, participants were again provided with contact information for support agencies and the research team.

Power Analysis

To determine the sample size needed for this study, an a priori analysis was conducted using G*Power 3.1.9.7 (Faul et al., 2009). The G*Power output indicated a sample of 84 participants would be necessary for a medium effect size (two-tailed, $\alpha = .05$, Power =.80). A medium effect size was proposed based on the medium effect size shown between complex PTSD and dissociation (Hamer et al., 2024) and the medium effect size shown between complex PTSD and social problem solving in adolescent samples (Kuzucu, 2016). To determine the number of participants required for adequate power in a mediation analysis, the standards outlined by Fritz and Mackinnon (2007) were considered. To achieve a .80 statistical power, based on an estimation of a small-medium effect size, 148 participants were required. The current study has 332 participants, which meets the sample size requirements.

Data Analysis Plan

Data collected from the survey were cleaned and checked for missing information. Since providing a valid email address was a requirement for ethics approval, then responses with an invalid email address were removed. Survey responses were checked for repeated answering patterns, improbable responses, and short completion times. Total scores for dissociation, social problem solving, and complex PTSD symptoms were calculated. Two univariate and two multivariate outliers were identified and removed. Descriptive statistics were calculated, and assumptions tested. An alpha level was set at .05 for all probability testing.

Data were analysed using IBM SPSS Software (Version 29) and PROCESS v4.1 (Hayes, 2022). A Pearson's correlation was conducted between each measure (ITQ-CA, A-DES, and SPSI-A), to address hypotheses one, two, and three. A mediation analysis was conducted using PROCESS v4.1 (Hayes, 2022), to address hypothesis four. After determining the direct effect of complex PTSD (independent variable) on social problem

solving (dependent variable), the indirect effect through dissociation (mediator) was calculated. Bootstrapping estimates based on 5000 samples was used and confidence intervals at 95% were determined.

Chapter 3: Results

Data Screening

Data were collected between June and October 2023. Data were transferred to IBM SPSS version 29 for inspection, coding, and analysis. Internet Protocol (IP) detection and time stamp checking was used to check for bots' responses, which were removed. Cases that did not provide a valid email address or entered multiple times using the same email address were removed, as this did not meet inclusion criteria (56 cases). Repeated answering patterns were identified in each survey. Improbable responses, evidenced by reverse scoring items in the SPSI-A, were also identified. The survey was completed in an average time of 20 to 35 minutes. Participants with very short completion times that also demonstrated repeated answering patterns or improbable responses were removed from the sample (42 cases). This inclusion protocol is in line with Shipp et al. (2024) for managing adolescent self-report survey data.

The survey design prevented participants from moving on without answering each item, so there was no missing survey data. However, participants could choose not to respond to demographic information; specifically, Aboriginal and Torres Strait Islander status and neurodivergence. These cases were assigned 'not disclosed' but were still included in the study.

To identify univariate outliers, sum scores for complex PTSD, dissociation and social problem solving were converted to z-scores. Two z-scores (z = 4.02, and 4.39) were outside the acceptable range of +/- 3.3 in the social problem-solving scale (Allen et al., 2019). This was confirmed by a visual inspection of the boxplot. These outliers were removed.

To identify multivariate outliers, Mahalinobis' Distance was calculated with a critical value of 13.82 with df = 2 at p = .001. Two multivariate outliers were identified (16.82, and

25.28). These reflected unlikely combinations of responses so were removed. This left a total of 332 cases included in the sample.

Assumption Testing

To test for univariate normality, a visual inspection was conducted on the frequency histogram and skewness and kurtosis scores were calculated for each scale score. Visual inspection of histograms showed each variable was approximately normal. This was confirmed by skewness and kurtosis values within the acceptable range of +/- 2. Shapiro-Wilk and Kolmogorov-Smirnov values indicated a deviation from normal distribution. However, given the large sample size and high power, the use of parametric tests was warranted and therefore Pearson's correlation coefficients were calculated (Allen et al., 2019).

The assumptions for mediation analysis were met. There were linear relationships between each variable, which were independent of each other, as determined by Durbin-Watson statistics. There was no multicollinearity, shown by tolerance values, and residuals were normally distributed. Observations of the scatter plots showed that the assumption of homoscedasticity has not been violated. Statistical significance was set at $\alpha = .05$ (two-tailed).

Data analysis

Descriptive statistics, including mean, standard deviation, and range were calculated for complex PTSD, dissociation, and social problem solving. These are shown in Table 2.

Table 2

Descriptive Statistics and Reliability

	M	*SD*	Possible range (Max/Min)	Observed range (Min/Max)	Reliability (α)
Social Problem Solving	9.69	1.12	0 – 20	5 – 13.6	.93
Dissociation	6.37	1.54	0 - 10	0 – 9.5	.97
Complex PTSD	29.48	6.04	0 – 48	16 - 46	.83

A correlation analysis was completed for each of the variables. A moderate, negative correlation was found between social problem solving and dissociation, $r(330) = -.33$, $p < .001$. A moderate, negative correlation was found between social problem solving and complex PTSD, $r(330) = -.35$, $p < .001$. A strong, positive correlation was found between dissociation and complex PTSD, $r(330) = .56$, $p < .001$. Correlations are shown in Table 3.

Table 3

Correlation Between Variables

	Social Problem Solving	Dissociation	Complex PTSD
Social Problem Solving	-		
Dissociation	-.33***	-	
Complex PTSD	-.35***	.56***	-

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

Mediation Analysis

A mediation analysis was run, with complex PTSD symptoms as the predictor, social problem solving as the dependent, and dissociation as a mediator; see Table 4. The mediation model is shown in Figure 2.

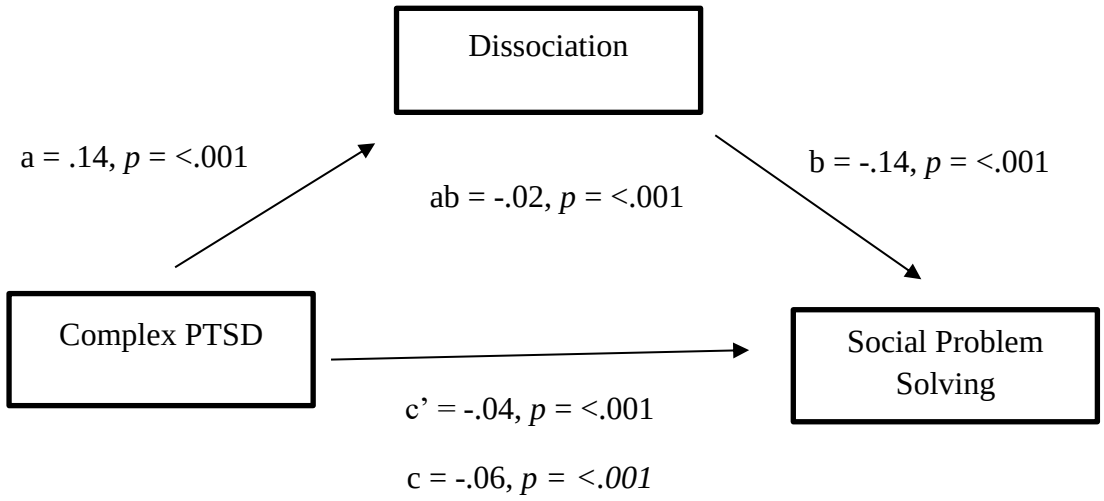
Table 4

Results of Mediation Analysis

			95% Confidence Interval			
Effect	β	SE	Lower	Upper	*z*	*p*
Total Effect	-.06	.01	-.08	-.05	-6.68	<.001
Indirect Effect	-.02	.01	-.04	-.00	-3.2	<.001
Direct Effect	-.04	.01	-.07	-.02	-3.84	<.001

Figure 2

Observed Mediation Model



The model revealed that complex PTSD negatively predicts social problem solving, β = -.06, *z* = -6.68, 95% CI [-.08, -.05], *p* <.001. Furthermore, dissociation significantly mediates this relationship, β = -.02, *z* = -3.2, 95% CI [-.04, -.00], *p* <.001. It is estimated that dissociation accounts for 31.7% of complex PTSD's effect on social problem solving. Nevertheless, complex PTSD still has a significant direct effect, β = -.04, *z* = -3.84, 95% CI [-.08, -.03], *p* <.001. As the direct effect remains significant, this suggests a partial mediation. Interestingly, in the field of psychology the majority of mediation analyses are found to be

partial mediation. This can explain the contribution of different factors explaining one construct.

Chapter 4: Discussion

Throughout the literature, trauma has consistently been associated with impaired social problem solving in adolescents. The relationship between complex PTSD and dissociation has also been explored with the significance of this association highlighted in psychopathology and treatment protocols. The current research has examined the mediating role of dissociation, measured by the Adolescent Dissociative Experiences Scale (Armstrong et al., 1997), between complex PTSD, measured by the International Trauma Questionnaire – Child and Adolescent Version (Cloitre et al., 2018), and social problem solving, measured by the Social Problem-Solving Inventory for Adolescents (Frauenknecht & Black, 1995), in adolescents. The findings help to deepen the understanding of social problem solving and provide insight towards developing effective therapeutic interventions.

The present study investigated four hypotheses. Hypotheses one, two, and three proposed a negative correlation between complex PTSD and social problem solving, a positive correlation between complex PTSD and dissociation, and a negative correlation between dissociation and social problem solving. These hypotheses were all confirmed. The fourth hypothesis examined if dissociation mediated the relationship between complex PTSD and social problem solving. This was supported with the results showing a partial mediation. Each of these will be discussed in detail after consideration of the participants in the study, which represented a surprisingly high proportion of individuals from Aboriginal and/or Torres Strait Islander backgrounds and a high representation of neurodiversity. Following this, theoretical and practical implications, strengths and limitations, and future directions for research will be discussed.

In the design of our research, we sought information from adolescents that had experienced trauma. It was somewhat unexpected to receive a high response from individuals with Aboriginal and/or Torres Strait Islander heritage (75.6%). This is an important

consideration. Indigenous Australians have increased rates of mental health disorders (Nasir et al., 2021). In a large clinical interview study of Indigenous Australian adults (*n* = 544), the current prevalence of anxiety, mood, and substance disorders were 3.8 times, 6.7 times, and 6.9 times higher, respectively, than the Australian general population (Nasir et al., 2021). Nasir et al. (2021) found the current prevalence of PTSD was 12% with a lifetime prevalence of 19.9%, which is 3 times higher than the general Australian population. While no studies have identified the prevalence of complex PTSD in Australian Indigenous populations, the high prevalence of childhood abuse (3-4 times higher than non-Indigenous Australians), as well as cumulative traumas, notably systemic racism and ongoing threats to safety, suggest higher occurrence of complex trauma (Dudgeon et al., 2017). Furthermore, the historical and intergenerational trauma experienced is believed to contribute to poorer mental health, poorer physical health, and overall inequalities (Chamberlain et al., 2020). A scoping review identified trauma as a key influencer of poorer social outcomes for Indigenous Australian adolescents, measured by education, employment, social and emotional wellbeing, and life skills (Macniven et al., 2019). Dissociation is also believed to be more prevalent in Indigenous populations. Dupuis-Rossi et al. (2019) identified dissociation as a common response to colonisation, specifically, as a result of trauma induced from loss of land, community, and identity. Based on these findings, it could be expected that both complex PTSD symptoms and dissociative symptoms would be elevated in Australian Indigenous populations.

In this research we look at the mediating effect of dissociation on the association between complex PTSD and impaired social problem solving. It is unexpected to have such a high response from participants from Aboriginal and Torres Strait Islander heritage, however, we do not believe that this will influence our findings. In a previous study, Ahmadi Forooshani et al. (2021) examined the association between trauma and social problem solving

in refugees and individuals born in Australia. The association between trauma and social problem solving was not significantly different between people groups (Ahmadi Forooshani et al., 2021). Similarly, Coker et al. (2014) found that the association between complex trauma and social problem solving did not differ between African American and White American teenagers.

Another consideration in the sample population is the representation of individuals that self-identified as neurodiverse (72%). Complex PTSD is highly comorbid with ADHD and Autism Spectrum Disorder in adolescents (Carpita et al., 2024). Neurodiverse children are two to three times more likely to experience interpersonal trauma compared to their typically developing peers (Kalisch et al., 2023). Furthermore, they are three times more likely to demonstrate post-traumatic sequelae, including intrusive thoughts, distressing memories, and sleep disturbances (Kalisch et al., 2023).

Dissociation is also highly comorbid with neurodiversity, with one study of abused children and teenagers finding 71% of ADHD participants met the criteria for a comorbid dissociative disorder (Bozkurt et al., 2015). In a study of autistic adolescents (n = 687), 94% reported clinically significant levels of dissociation (Dincel & Karajagmurlu, 2024). Dissociation is believed to act as a maladaptive coping mechanism in neurodiverse individuals with a history of trauma, but also as a response to difficulties coping with everyday life (Mbu et al., 2024). Neurodiverse adolescents consistently report more daily challenges, poorer cognitive capacity, emotion regulation difficulties, and social deficits (Palmer & Dvir, 2024). This overactive dissociation then also acts to reduce the resources available for social problem solving. This aligns with the body of research, showing associations between complex PTSD, dissociation, and poorer social problem-solving abilities.

When designing the mediation hypothesis, we did not expect such a high response from neurodiverse individuals, however the findings are in line with the literature. The findings will be explained in light of the general findings of the literature as well as acknowledging this specific population. It should be noted that previous studies have established that the relationship between complex PTSD and social problem solving is consistent across people groups (Ahmadi Forooshani et al., 2021; Coker et al., 2014)

Complex PTSD and Social Problem Solving

The first hypothesis that complex PTSD would be negatively associated with social problem solving was supported. The results revealed that complex PTSD significantly negatively correlates with social problem solving, with an observed effect size of r = -.35. This effect size implies that approximately 12% of variance in social problem solving can be attributed to complex PTSD. This is a medium effect size according to Cohen's conventions (Cohen, 1988). These results aligned with the findings in the literature. Ahmadi Forooshani et al. (2021) found a moderate correlation (r = -.26 to -.32) between trauma and social problem solving. Coker et al. (2014) also found a moderate correlation (r = -.33) between complex trauma and social problem solving.

Currently, no studies have investigated the association between complex PTSD and social problem solving; however, an association has been established between social problem solving and PTSD. Sutherland and Bryant (2007) found that veterans with PTSD exhibited impaired social problem solving compared to their non-traumatised peers. Similarly, Beck et al. (2024) found that female victims of domestic violence that developed PTSD demonstrated poorer social problem solving than victims without PTSD. These studies showed that increased posttraumatic symptoms is associated with poorer social problem solving. Reich et al. (2015) proposed that individuals with PTSD were more likely to use avoidant coping behaviours and maladaptive problem-solving strategies (e.g., disengagement or avoidance),

which are both consistent with poorer social problem solving. Beck et al. (2024) extends on this, proposing that posttraumatic symptoms increase the likelihood of developing maladaptive cognitions (specifically negative self-belief), which can impair social problem solving.

The findings of the current study suggest that more severe complex PTSD symptoms are associated with greater impairments to social problem-solving abilities. This suggests that a person with complex PTSD is more likely to experience difficulties responding to and generating solutions to challenges in everyday life. Shallcross et al. (2016) originally proposed this association by conceptualising the social erosion model, which proposes that complex trauma leads to poorer problem solving and social outcomes. This directional explanation proposed that trauma led to the development of maladaptive cognitions and coping mechanisms which increased social dysfunction (Cox et al., 2019; Shallcross et al., 2016). This was supported by the findings of Freedman et al. (2015) that found strong associations between trauma and maladaptive coping mechanisms and cognitions, which led to poorer social outcomes. It was proposed that the maladaptive coping mechanisms that developed after a trauma negatively influenced psychosocial outcomes. In the study, traumatised individuals were more likely to demonstrate increased depressive symptoms, maintain negative self-beliefs, and distance themselves socially, which impacted social functioning outcomes (Freedman et al., 2015). Repeated traumatic exposure was proposed to reduce a person's ability to cope and increase the probability of developing maladaptive coping strategies (Browne & Winkelman, 2007; Hughesdon et al., 2021). However, in this study, maladaptive coping only partially mediated the association between trauma and social functioning, which suggests other factors need to be considered. This supports the position that trauma is associated with poorer social outcomes.

It is evident from the present study and in the literature that more traumatised adolescents typically demonstrate poorer social problem-solving abilities. This highlights the vulnerability of traumatised individuals, as impaired social problem solving is associated with poorer mental health, poorer occupational outcomes, and interpersonal problems (Bachem et al, 2021; Bell & D'Zurilla, 2009). These findings give important insight into theoretical understandings of both complex PTSD and social problem solving.

Complex PTSD and Dissociation

The second hypothesis that complex PTSD is positively associated with dissociation was supported. The results revealed that complex PTSD significantly positively correlates with dissociation, with an observed effect size of $r = .56$. This effect size suggests that approximately 31% of variance in dissociation can be attributed to complex PTSD. This is a large effect size according to Cohen's conventions (Cohen, 1988). This implies that more severe complex PTSD symptoms are associated with greater severity of dissociation. The literature suggests that these more severe dissociative symptoms may present as feeling disconnected from a person's body or surroundings, incomplete memories of events, or in more extreme cases fractures in identity (Hamer et al., 2024). This can be highly distressing and can significantly impact social and occupational functioning, as well as psychopathology (Dorahy et al., 2014).

The results of the current study align with the findings in the literature. In a study of children and adolescents in foster care ($n = 122$), Haselgruber et al. (2021) found a strong correlation between complex PTSD and dissociation ($r = .73$). Similarly, van Dijke et al. (2015) found a strong correlation between complex PTSD and dissociation ($r = .65$) in an adult sample. In a sweeping study, Hamer et al. (2024) found moderate-to-strong positive correlations between complex PTSD and dissociation in children and adolescents ($r = .42$-$.73$). Moderate-to-strong positive correlations ($r = .40$-$.80$) were also found in studies of adult

populations (Hamer et al., 2024). Interestingly, this association is consistent while using different measures of complex PTSD and dissociation, and in both clinical and community samples (Hyland et al., 2020b).

One notable study (Rodewald et al., 2011) did not find a significant correlation between complex PTSD and dissociation, however, this study used a very small clinical sample (n = 30). It is possible that other variables in that particular study limited any association found between complex PTSD and dissociation. Nevertheless, the majority of the literature support the findings of the current study.

While the literature is consistent about the association between complex PTSD and dissociation, less is understood about the nature of this relationship. Kira et al. (2023) proposed that complex PTSD symptoms (most significantly flashbacks and emotion dysregulation) can prompt dissociative responses. This model suggests that more extreme posttraumatic symptoms lead to more severe dissociation (Kira et al., 2023). While dissociation may begin as a defence mechanism, if unresolved, it can increase in frequency and severity (Dorahy et al., 2014). Similarly, Guzman Torres et al. (2023) explained this relationship by considering dissociation as an avoidance mechanism. In response to trauma and posttraumatic symptoms, dissociation acts to avoid the painful memories and emotions, and disrupts information processing (Guzman Torres et al., 2023). This prevents information from being integrated into memory networks (Taft et al., 2009). Theoretically, greater posttraumatic symptoms would require a greater dissociative response to prevent exposure to painful stimuli (Guzman Torres et al., 2023). However, further research would be needed to confirm this model.

Dissociation and Social Problem Solving

The third hypothesis that dissociation is negatively associated with social problem solving was supported. The results revealed that dissociation significantly negatively

correlates with social problem solving, with an observed effect size of r = -.33. This effect size implies that approximately 11% of variance in social problem solving can be attributed to complex PTSD. This is a medium effect size according to Cohen's conventions (Cohen, 1988). This suggests that individuals with more severe dissociation were more likely to demonstrate poorer social problem-solving abilities.

While this association had not previously been examined in the literature, impaired cognitive processes and impaired emotion regulation have both have both been identified as key features of dissociation, which are also associated with impaired social problem solving. Ahmadi Forooshani et al. (2021) found a small negative correlation (r = -.27) between impaired cognitive processes and social problem solving. A similar association has been found between emotion regulation and social problem solving. In an adolescent study, Kuzucu (2016) found a small-to-moderate association between emotion regulation and each subscale of the social problem-solving framework (r = .16 - .32). These studies suggest that stronger emotion regulation and cognitive processes are associated with greater social problem-solving abilities.

As social problem solving is predominately a cognitive process (Bell & D'Zurilla, 2009), it is expected that the cognitive impairments associated with dissociation contribute to poorer social problem solving. These results align with research conducted on individuals with dissociative disorders. In particular, findings have shown that individuals with greater dissociative symptoms typically demonstrate poorer cognitive functions than the general population (Dixit et al., 2019). As such, Dixit et al. (2019) found that adolescents with dissociative disorders demonstrated deficits in executive function (i.e. working memory, planning, and problem solving) in intelligence testing. Similarly, Mueller-Preiffer et al. (2012) found that individuals with dissociative disorders demonstrated impairments in memory retrieval.

Individuals with dissociative disorders often demonstrate impaired emotion regulation (Roberts & Reuber, 2014). Dissociation is proposed to prevent emotion processing, particularly highly emotive stimuli, which may relate to previous trauma (Roberts & Reuber, 2014). In a meta-analysis, Cavicchioli et al. (2021) found that individuals with dissociative disorders consistently demonstrated poorer emotion regulation than the general population. Furthermore, individuals with higher dissociative symptoms were more likely to exhibit maladaptive emotion regulation strategies, including impulsivity, feeling overwhelmed, and the use of rigid, context-insensitive emotion regulation strategies (Caviccioli et al., 2021). Emotion regulation is key to effective social problem solving, as individuals must control their emotions to make rational, reasoned evaluations and judgements (Bell & D'Zurilla, 2009). Bell and D'Zurilla (2009) previously identified emotion dysregulation as a possible indicator of impaired social problem solving. This provides a possible explanation for the association between dissociation and impaired social problem solving.

Dissociation as a Mediator between Complex PTSD and Social Problem Solving

The fourth hypothesis that when the effect of dissociation on social problem solving is controlled, the relationship between complex PTSD and social problem solving would become non-significant was partly supported. The model showed that complex PTSD significantly predicted variation in social problem solving. Dissociation was shown to significantly mediate this relationship. However, after accounting for dissociation, there was still a significant association between complex PTSD and social problem solving, but the association was weaker. This shows a partial mediation, which is common in psychology research. A partial mediation suggests that dissociation is a significant mediator, but other factors may also mediate this relationship. In our research, it is estimated that dissociation accounts for 31.7% of complex PTSD's effect on social problem solving. This extends on the literature, which had previously identified an association between complex PTSD and

dissociation (Hyland et al., 2020a), and complex trauma and impaired social problem solving (Coker et al., 2014).

While this mediation has not been investigated previously, the findings sit within the body of the existing literature. For example, in line with our findings, Evren et al. (2011) had previously identified dissociation as a mediator between posttraumatic symptom severity and quality of life. This showed a full mediation, which prompted researchers to propose that dissociation was an essential consideration in diagnosis and treatment of posttraumatic stress disorders (Evren et al., 2011). However, Evren et al. (2011) used a small sample of clinical patients, which limited generalisability. In a similar clinical study, Boyd et al. (2018) found that dissociation mediated the relationship between posttraumatic symptoms and psychosocial functioning. According to Boyd et al. (2018), dissociation is associated with reduced cognitive capacities such as attention, executive function, and verbal memory performance. In their sample of traumatised adults, the most evident impairments were present in the social and occupational domains. These studies highlight the significant role of dissociation, mediating the relationship between posttraumatic symptoms and both quality of life and psychosocial functioning, which align with the current study's findings. This can explain the results of our study in which dissociation mediated the relationship between complex PTSD and social problem solving.

The results of the present study could also be considered in the light of the present understanding of borderline personality disorder. Borderline personality disorder is typically associated with childhood trauma, often of a complex nature (Schmitz et al., 2021) and is highly comorbid with dissociation with up to 80% reporting elevated dissociative symptoms (Krause-Utz, 2021). In a clinical study of individuals with borderline personality disorder, dissociation was found to predict interpersonal problems (Webermann & Murphy, 2019). It was proposed that dissociation interfered with intimacy, trust, and processing both positive

and negative experiences in close relationships (Krause-Utz, 2021). Similarly, dissociation was found to mediate the relationship between trauma and impaired emotion regulation in individuals with borderline personality disorder (Schmitz et al., 2021). Schmitz et al. (2021) found that dissociation contributed to emotion dysregulation, affective instability, and the use of maladaptive emotion regulation strategies (including non-suicidal self-injury). These studies were conducted on small clinical samples of individuals with borderline personality disorder, may limit generalisability, but provide useful insight into the effects of dissociation. Hence, these findings can explain the mediating role of dissociation in the relationship between posttraumatic symptoms and both interpersonal problems and emotion regulation difficulties.

Similar findings have also been found in studies investigating dissociative disorders. Dissociative disorders are consistently linked to childhood complex trauma (Dorahy et al., 2014). Dorahy et al. (2014) proposed that dissociation develops initially as a defence mechanism, which then becomes overresponsive to avoid painful memories, emotions, and cognitions. The result of increased dissociative symptoms is often impaired cognitive processes and impaired emotion processing (Boyer et al., 2022). In a longitudinal study of children and adolescents through to early adulthood, Jans et al. (2008) found that individuals with a dissociative disorder demonstrated poorer cognitive functioning and social adjustment, which was consistent across multiple time points. This was confirmed by the findings of Fung et al. (2023) that individuals with dissociative disorders consistently reported reduced cognitive functioning and social functioning both of which are important for strong social problem solving.

The five factor structures of the social problem-solving framework could be used to consider the effects of dissociation, specifically poorer cognitive functioning and emotion regulation. It is proposed that the reduced cognitive capacities associated with dissociation

can inhibit rational problem solving, as a person has less resources to draw on to make informed choices (Boyd et al., 2018). Similarly, reduced cognitive capacities and poorer autobiographical memory limits a person's ability to generalise and use experiences to develop their positive problem orientation (Sutherland & Bryant, 2007). Instead, these limitations alongside difficulties in emotion regulation can increase negative problem orientation (Kuzucu, 2016). Poorer emotion regulation is strongly associated with impulsive problem-solving style, as individuals can struggle to take the necessary time to plan before acting (Bell & D'Zurilla, 2009). Negative past experiences can also contribute towards developing an avoidant problem-solving style (Bell & D'Zurilla, 2009). Each of these factors contribute towards poorer social problem-solving abilities. This suggests that individuals with problematic dissociation are more likely to experience difficulties responding to life stressors and social challenges.

It is important to consider this partial mediation from a cognitive perspective. Individuals with complex PTSD are often sensitive to certain stimuli. When exposed to a trigger, an individual may dissociate to prevent the integration of overwhelming emotions, memories, or cognitions (van der Hart et al., 2008). However, when left untreated or unresolved, dissociation can increase in frequency, duration, or intensity leading to more pathological forms of dissociation (van der Hart et al., 2008). Increased dissociative symptoms are associated with impaired cognitive functions, including memory recall, executive functioning, and attention (Boyd et al., 2018). Consequently, an individual is likely to demonstrate poorer social problem solving, as they do not have access to all of their resources. Incomplete or inaccurate memory recall may limit a person's ability to solve problems based on past experiences (Sutherland & Bryant, 2007). Similarly, poorer executive function may prohibit the integration of multiple sources of information to generate new solutions (Kira et al., 2023). Finally, poor attention may prohibit individuals from drawing

from all available information before generating a solution (Kira et al., 2023). In a similar way, increased dissociation is associated with temporary and enduring emotion dysregulation (Boon et al., 2011). Social problem solving is heavily reliant on both emotion regulation and cognitive processes. With impairments to these areas of functioning, poorer social problem-solving could be expected.

Furthermore, this partial mediation could be considered in light of the effects of complex PTSD and dissociation on an individual's sense of self. After exposure to complex trauma, an individual can experience significant alterations to their sense of identity and sense of self (van der Hart, 2021). This can lead to difficulties integrating experiences and can prevent developing a coherent self-narrative (van der Hart, 2021). This is exacerbated by dissociation, as dissociation represents a parallel of both owning and disowning of experience (Boon et al., 2011). People with pathological dissociation do not feel integrated, but rather feel fragmented as they often have memories, thoughts, feelings, or behaviours that feel uncharacteristic or foreign (Boon et al., 2011). Consequently, without a fully integrated sense of self, they are not able to seamlessly adapt to new situations or face new challenges (van der Hart, 2021). This lack of integration can prevent individuals from transferring existing problem responses to novel situations and limits their ability to adopt new ways of coping (Boon et al., 2011). In considering the effects on self and identity, this provides a possible explanation for the mediating effect of dissociation between complex PTSD and social problem solving.

These findings highlight the significant role of dissociation in social problem solving. While previously the significance of dissociation may have been overlooked, this research shows the importance of identifying and targeting dissociation in traumatised individuals. Ignoring dissociative symptoms may lead to poorer social problem-solving abilities in adolescents, which then places them at greater risk of poorer social functioning, poorer

mental health, and difficulties coping with everyday stressors. Furthermore, individuals with a history of complex trauma and a dissociative disorder have increased likelihood of revictimization, particularly sexual assault and intimate partner violence (Boyer et al., 2022). These can have negative short- and long-term outcomes for individuals.

Theoretical and Practical Implications

This study contributes to the developing understanding of the association between complex PTSD, dissociation, and social problem solving. These findings build on the existing literature, which has shown a strong association between complex PTSD and dissociation, and a moderate association between complex PTSD and impaired social problem solving. This study is the first to demonstrate an association between dissociation and impaired social problem solving and identify dissociation as a partial mediator between complex PTSD and social problem solving. This significantly contributes to the theoretical understanding of factors that influence social problem-solving abilities in adolescents. Furthermore, it emphasises the significance of dissociation and highlights the importance of identifying and treating dissociative symptoms.

These findings will contribute towards improving psychological interventions targeting social problem solving in adolescents. Our research supports the recommendations made by Ahmadi Forooshani et al. (2022) that trauma symptoms may need to be addressed to see improved social problem-solving abilities. Furthermore, our research suggests that addressing dissociation would help adolescents with poorer social problem-solving abilities. By addressing dissociation and complex PTSD, interventions targeting social problem-solving skills in adolescents may then see improved results. An understanding of the interaction between these variables is therefore important when developing personalised treatment protocols to meet individual therapeutic needs. Furthermore, developing effective psychological interventions may minimise the risk of potentially long-term impairments.

Strengths and Limitations

The current study comprises of several strengths. This was the first study to investigate the relationship between complex PTSD, dissociation, and social problem solving. Complex PTSD and dissociation are both emerging areas of research, and the present study contributes to the developing understanding of each of these constructs. This contributes to filling a key gap in the literature. The present study collected data on adolescents with complex PTSD, which previously had been a difficult group to collect data from. Furthermore, a survey design is advantageous in adolescent populations, as participants can self-report independently and responses are less likely to be influenced by others (Kazlauskas et al., 2022). There was a high survey response; a large sample size ensured that the study was suitably powered. Previous studies have experienced difficulty attaining a suitable sample size within this population. The design of the survey model prevented missing data and tracked timing, which allowed for easy identification of improbable responses to the survey. Finally, there was a high representation of individuals with Aboriginal and Torres Strait Islander heritage and neurodivergence in the sample population. Data on these groups has been difficult to attain. Unfortunately, this research was not designed to compare population groups, but future research may wish to consider this.

There are also several limitations that need to be considered. Using cross-sectional data limits causal influences and only shows the variable interaction at one point in time. The surveys used self-report measures, which relies on participants reporting accurately and honestly. This can be particularly challenging in adolescent populations, especially using constructs that require thoughtful self-reflection. There was no external checking or validation of symptoms, so all data was reliant on participant responses. Future investigations may consider balancing self-report with caregiver or clinicians' reports to examine the current findings. This data was collected as part of a larger study, which included eight

measures. The survey completion time was long (most took between 20 and 40 minutes to complete). As a result, it is possible that thoughtful consideration was not given to each question due to response fatigue as individuals progressed. Finally, the Adolescent Dissociative Experiences Scale was developed in 1997 and may need revision to match changing behavioural habits of adolescents. Although the Adolescent Dissociative Experiences Scale is still widely used and the reliability was high in this study, there is some criticism that an update is necessary to suit the modern generation of adolescents (Strand et al., 2005). There are some items that measure absorption, which likely have different implications to a generation raised with consistent access to technologies that promote absorption such as smartphones and computers.

Future Research Directions

This study found that dissociation partially explains the effects of complex trauma on social problem solving. As this is a new area of research, further research would help to validate these findings. Furthermore, longitudinal investigation would help to best understand any changes in this association over time and other possible variables that may influence this relationship. This study only considered dissociation as a mediator, where future studies could help to identify other possible mediators.

Further research into the application of these findings would also be advantageous. While the findings suggest that addressing both complex PTSD and dissociative symptoms in therapy would help social problem-solving skill development, this would need to be tested. By tracking therapeutic interventions, further information could be ascertained about the importance of considering both dissociation and complex PTSD in social problem-solving interventions.

The present study included a high representation of Aboriginal and/or Torres Strait Islander background and neurodiverse individuals. While complex PTSD is more prevalent in

both of these populations, there are no studies on social problem solving in this population. Unfortunately, the present study was not structured to compare the effects on different people groups, but future research may wish to examine these differences.

Conclusion

This study has contributed to the developing understanding of the relationship between complex PTSD, dissociation, and social problem solving. The main aim of this study was to determine if and to what extent dissociation mediated the relationship between complex PTSD and social problem solving. A correlation analysis showed significant correlations between complex PTSD, dissociation, and impaired social problem solving. More notably, a mediation analysis determined that dissociation partially mediates the association between complex PTSD and dissociation. These results indicate that complex PTSD has a direct effect on social problem-solving ability and also that dissociation partially explains the effect of complex PTSD on social problem solving.

These findings provide valuable insight into the potential importance of targeting complex PTSD and dissociation during interventions to improve social problem-solving abilities. As social problem solving is associated with good mental health and wellbeing, effective interventions can help to improve possible outcomes for individuals. Furthermore, this provides insight to potentially individualise treatment protocols to best suit individual needs.

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Appendix A

International Trauma Questionnaire – Child and Adolescent Version

*** Below are problems people can have after an upsetting or a stressful event. Thinking about an event, Mark 0, 1, 2, 3 or 4 for how much the following things have bothered you in the past month.**

	0 Never	1 A Little bit	2 Sometimes	3 A lot	4 Almost Always
Bad dreams reminding me of what happened.	○	○	○	○	○
Pictures in my head of what happened. Feels like it is happening right now.	○	○	○	○	○
Trying not to think about what happened. Or to not have feelings about it.	○	○	○	○	○
Staying away from anything that reminds me of what happened (people, places, things, situations, talks).	○	○	○	○	○
Being overly careful (checking to see who is around me).	○	○	○	○	○
Being jumpy.	○	○	○	○	○

*** Please mark yes or no whether the above problems interfered with:**

	Yes	No
Getting along with friends	○	○
Getting along with family	○	○
Your schoolwork	○	○
Anything else that is important to you (hobbies, other relationships)	○	○
Your general happiness	○	○

*** Below are problems people report after traumatic or stressful events. They are about how you feel, what you believe about yourself and others.**
Mark 0, 1, 2, 3 or 4 for how much the following things have bothered you in the past month.

	0 Never	1 A little bit	2 Sometimes	3 A lot	4 Almost Always
Having trouble calming down when I am upset (angry, scared or sad).	○	○	○	○	○
Not being able to have any feelings or feeling empty inside.	○	○	○	○	○
Feeling like a failure.	○	○	○	○	○
Thinking I am not a good person.	○	○	○	○	○
Not feeling close to other people.	○	○	○	○	○
Having a hard time staying close to other people.	○	○	○	○	○

*** Please mark yes or no whether the above problems interfered with:**

	Yes	No
Getting along with friends	○	○
Getting along with family	○	○
Your schoolwork	○	○
Anything else that is important to you (hobbies, other relationships)	○	○
Your general happiness	○	○

Appendix B

Adolescent Dissociative Experiences Scale – II (ADES)

* These questions ask about different kinds of experiences that happen to people. For each question, circle the number that tells how much that experience happens to you. Circle a "0" if it never happens to you, circle a "10" if it is always happening to you. If it happens sometimes but not all of the time, circle a number below 1 and 9 that best describes how often it happens to you. When you answer, only tell how much these things happen when you HAVE NOT had any alcohol or drugs.

	0 Never	1	2	3	4	5	6	7	8	9	10 Always
I get so wrapped up in watching TV, reading, or playing a video game that I don't have any idea what's going on around me.	○	○	○	○	○	○	○	○	○	○	○
I get back tests or homework that I don't remember doing.	○	○	○	○	○	○	○	○	○	○	○
I have strong feelings that don't seem like they are mine.	○	○	○	○	○	○	○	○	○	○	○
I can do something really well one time and then I can't do it at all another time.	○	○	○	○	○	○	○	○	○	○	○
People tell me I do or say things I don't remember doing or saying.	○	○	○	○	○	○	○	○	○	○	○
I feel like I am in a fog or spaced out and things around me seem unreal.	○	○	○	○	○	○	○	○	○	○	○
I get confused about whether I have done something or only thought about doing it.	○	○	○	○	○	○	○	○	○	○	○
I look at the clock and realize that time has gone by and I can't remember what has happened.	○	○	○	○	○	○	○	○	○	○	○
I hear voices in my head that are not mine.	○	○	○	○	○	○	○	○	○	○	○
When I am somewhere that I don't want to be, I can go away in my mind.	○	○	○	○	○	○	○	○	○	○	○

	0 Never	1	2	3	4	5	6	7	8	9	10 Always
I am so good at lying and acting that I believe it myself.	○	○	○	○	○	○	○	○	○	○	○
I catch myself "waking up" in the middle of doing something.	○	○	○	○	○	○	○	○	○	○	○
I don't recognise myself in the mirror.	○	○	○	○	○	○	○	○	○	○	○
I find myself going somewhere or doing something and I don't know why.	○	○	○	○	○	○	○	○	○	○	○
I find myself someplace and I don't remember how I got there.	○	○	○	○	○	○	○	○	○	○	○
I have thoughts that don't really seem to belong to me.	○	○	○	○	○	○	○	○	○	○	○
I find that I can make physical pain go away.	○	○	○	○	○	○	○	○	○	○	○
I can't figure out if things really happen or if I only dreamed or thought about them.	○	○	○	○	○	○	○	○	○	○	○
I find myself doing something that I know is wrong, even when I really don't want to do it.	○	○	○	○	○	○	○	○	○	○	○
People tell me that I sometimes act so differently that I seem like a different person.	○	○	○	○	○	○	○	○	○	○	○

	0 Never	1	2	3	4	5	6	7	8	9	10 Always
It feels like there are walls inside of my mind.	○	○	○	○	○	○	○	○	○	○	○
I find writings, drawings or letters that I must have done but I can't remember doing.	○	○	○	○	○	○	○	○	○	○	○
Something inside of me seems to make me do things that I don't want to do.	○	○	○	○	○	○	○	○	○	○	○
I find that I can't tell whether I am just remembering something or if it is actually happening to me.	○	○	○	○	○	○	○	○	○	○	○
I find myself standing outside of my body, watching myself as if I was another person.	○	○	○	○	○	○	○	○	○	○	○
My relationships with my family and friends change suddenly and I don't know why.	○	○	○	○	○	○	○	○	○	○	○
I feel like my past is a puzzle and some of the pieces are missing.	○	○	○	○	○	○	○	○	○	○	○
I get so wrapped up in my toys and stuffed animals that they seem alive.	○	○	○	○	○	○	○	○	○	○	○
I feel like there are different people inside of me.	○	○	○	○	○	○	○	○	○	○	○
My body feels as if it doesn't belong to me.	○	○	○	○	○	○	○	○	○	○	○

Appendix C

Social Problem-Solving Inventory for Adolescents (SPSI-A) Short Version

* Below are some ways that you might think, feel and act when faced with problems in everyday living. We are not talking about the ordinary hassles and pressures that you handle successfully every day. In this questionnaire, a problem is something important in your life that bothers you a lot, but you don't immediately know how to make it better or stop it from bothering you so much. The problem could be something about yourself (such as your thoughts, feelings, behaviour, health, or appearance), your relationships with other people (such as your family, friends, teachers, or boss), or your environment and the things you own (such as your house, car, property, or money).

Please read each statement carefully and choose one of the numbers below that best shows how much the statement is true of you. See yourself as you usually think, feel, and act when you are faced with important problems in your life these days. Circle the number that is the most true of you.

	Not at All True of me	Slightly True of me	Moderately True of me	Very True of me	Extremely True of me
I feel threatened and afraid when I have an important problem to solve.	○	○	○	○	○
When making decisions, I do not evaluate all my options carefully.	○	○	○	○	○
I feel nervous and unsure of myself when I have an important decision to make.	○	○	○	○	○
When my first efforts to solve a problem fail, I know if I persist and do not give up too easily, I will be able to eventually find a good solution.	○	○	○	○	○
When I have a problem, I try to see it as a challenge, or opportunity to benefit in some positive way from having the problem.	○	○	○	○	○
I wait to see if a problem will resolve itself first, before trying to solve it myself.	○	○	○	○	○
When my first efforts to solve a problem fail, I get very frustrated.	○	○	○	○	○
When I am faced with a difficult problem, I doubt that I will be able to solve it on my own no matter how hard I try.	○	○	○	○	○
Whenever I have a problem, I believe that it can be solved.	○	○	○	○	○
I go out of my way to avoid having to deal with problems in my life.	○	○	○	○	○

	Not at All True of me	Slightly True of me	Moderately True of me	Very True of me	Extremely True of me
Difficult problems make me very upset.	○	○	○	○	○
When I have a decision to make, I try to predict the positive and negative consequences of each option.	○	○	○	○	○
When problems occur in my life, I like to deal with them as soon as possible.	○	○	○	○	○
When I am trying to solve a problem, I go with the first good idea that comes to mind.	○	○	○	○	○
When I am faced with a difficult problem, I believe that I will be able to solve it on my own if I try hard enough.	○	○	○	○	○
When I have a problem to solve, one of the first things I do is get as many facts about the problem as possible.	○	○	○	○	○
When a problem occurs in my life, I put off trying to solve it for as long as possible.	○	○	○	○	○
I spend more time avoiding my problems than solving them.	○	○	○	○	○
Before I try to solve a problem, I set a specific goal so that I know exactly what I want to accomplish.	○	○	○	○	○
When I have a decision to make, I do not take the time to consider the pros and cons of each option.	○	○	○	○	○

	Not at All True of me	Slightly True of me	Moderately True of me	Very True of me	Extremely True of me
After carrying out a solution to a problem, I try to evaluate as carefully as possible how much the situation has changed for the better.	○	○	○	○	○
I put off solving problems until it is too late to do anything about them.	○	○	○	○	○
When I am trying to solve a problem, I think of as many options as possible until I cannot come up with any more ideas.	○	○	○	○	○
When making decisions, I go with my "gut feeling" without thinking too much about the consequences of each option.	○	○	○	○	○
I am too impulsive when it comes to making decisions.	○	○	○	○	○

Appendix D

Mediation Output

Matrix

Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 4.1 *****************

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2022). www.guilford.com/p/hayes3

****
Model : 4
Y : SPS_Tota
X : ITQ_Tot
M : ADES_Tot

Sample
Size: 332

****
OUTCOME VARIABLE:
ADES_Tot

Model Summary

R	R-sq	MSE	F	df1	df2	p
.5567	.3099	1.6422	148.2050	1.0000	330.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	2.1760	.3507	6.2050	.0000	1.4861	2.8658
ITQ_Tot	.1419	.0117	12.1739	.0000	.1190	.1648

Standardized coefficients

	coeff
ITQ_Tot	.5567

Covariance matrix of regression parameter estimates:

	constant	ITQ_Tot
constant	.1230	-.0040
ITQ_Tot	-.0040	.0001

****

****
OUTCOME VARIABLE:
SPS_Tota

Model Summary

R	R-sq	MSE	F	df1	df2	p
.3816	.1456	1.0835	28.0356	2.0000	329.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	11.8945	.3010	39.5155	.0000	11.3023	12.4866
ITQ_Tot	-.0438	.0114	-3.8402	.0001	-.0662	-.0213
ADES_Tot	-.1432	.0447	-3.2022	.0015	-.2311	-.0552

Standardized coefficients

	coeff
ITQ_Tot	-.2356
ADES_Tot	-.1964

Covariance matrix of regression parameter estimates:

	constant	ITQ_Tot	ADES_Tot
constant	.0906	-.0020	-.0044
ITQ_Tot	-.0020	.0001	-.0003
ADES_Tot	-.0044	-.0003	.0020

```
************************** TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 SPS_Tota

Model Summary
       R     R-sq      MSE        F      df1      df2        p
    .3449    .1190   1.1139   44.5670   1.0000  330.0000    .0000

Model
           coeff       se        t        p     LLCI     ULCI
constant  11.5829    .2888   40.1049    .0000  11.0147  12.1510
ITQ_Tot    -.0641    .0096   -6.6759    .0000   -.0830   -.0452

Standardized coefficients
          coeff
ITQ_Tot    -.3449

Covariance matrix of regression parameter estimates:
          constant   ITQ_Tot
constant     .0834    -.0027
ITQ_Tot      -.0027     .0001

************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
    Effect       se        t        p     LLCI     ULCI      c_cs
    -.0641    .0096   -6.6759    .0000   -.0830   -.0452   -.3449

Direct effect of X on Y
    Effect       se        t        p     LLCI     ULCI      c'_cs
    -.0438    .0114   -3.8402    .0001   -.0662   -.0213   -.2356

Indirect effect(s) of X on Y:
          Effect    BootSE  BootLLCI  BootULCI
ADES_Tot   -.0203     .0098    -.0402    -.0011

Completely standardized indirect effect(s) of X on Y:
          Effect    BootSE  BootLLCI  BootULCI
ADES_Tot   -.1094     .0524    -.2136    -.0059

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
 95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
 5000

WARNING: Variables names longer than eight characters can produce incorrect output
when some variables in the data file have the same first eight characters. Shorter
variable names are recommended. By using this output, you are accepting all risk
and consequences of interpreting or reporting results that may be incorrect.

------ END MATRIX -----
```