NABOR ANDRÉ SABINO CANILHAS

INFLUÊNCIA DO VIÉS DE INTERPRETAÇÃO SOCIAL DOS PAIS NO VIÉS DE INTERPRETAÇÃO DAS CRIANÇAS EM IDADE PRÉ-ESCOLAR: O EFEITO DE VARIÁVEIS PESSOAIS E PARENTAIS

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Influência do viés de interpretação social dos pais no viés de interpretação das crianças em idade pré-escolar: o efeito de variáveis pessoais e parentais

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À minha mulher Anabela

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Resumo

Alguns modelos teóricos cognitivos reconhecem que diferentes tipos de viés cognitivo, como o viés de interpretação, desempenham um papel significativo na origem e manutenção de perturbações psicológicas, nomeadamente das perturbações associadas à ansiedade. Até onde sabemos, a maior parte da literatura que tem explorado as origens e desenvolvimento do viés de interpretação, assim como a sua transmissão intergeracional (pais-filhos), tem-se focado principalmente em crianças em idade escolar. Neste sentido, ao considerarmos a primeira e segunda infância como os períodos onde o desenvolvimento global da criança é mais rápido, pareceu-nos fundamental alongar o estudo da transmissão parental do viés de interpretação à faixa etária da idade pré-escolar. Por outro lado, se a tendência para interpretar negativamente situações ambíguas for adotada pelas crianças através da modelação do comportamento dos seus pais, um estilo de interpretação benigna transmitido pelos pais poderá ser especialmente benéfico em programas de modificação do viés de interpretação (CBM-I). Assim, esperamos que, ao alargar a crianças mais novas (idade pré-escolar) o estudo da transmissão intergeracional do viés de interpretação, possamos contribuir para um maior entendimento acerca da origem desse viés e das possibilidades de interromper o seu ciclo de transmissão.

Num primeiro estudo (Capítulo I), tendo em conta que os instrumentos de avaliação do viés de interpretação em crianças em idade pré-escolar são insuficientes, desenvolvemos uma versão portuguesa do *Children's Interpretation Bias Measure – Ambiguous Story-Stems* (CIBM; Ooi, Dodd, & Walsh, 2015) e avaliámos as suas propriedades psicométricas. Comparativamente à versão original, introduzimos ilustrações para cada uma das oito histórias com o objetivo de auxiliar as crianças a visualizar os aspetos principais da narrativa. A análise de conteúdo das respostas às histórias do CIBM permite captar a tendência de as crianças em idade pré-escolar produzirem interpretações benignas ou malignas a partir de situações quotidianas ambíguas. A rejeição de um modelo estrutural unidimensional para estas respostas indica, no entanto, que a predisposição para produzir interpretações enviesadas não é necessariamente consistente nos diferentes domínios avaliados pelo CIBM. Desta forma, a pontuação total proporcionada por este instrumento (número de respostas que expressam interpretações negativas) deve ser encarada como um indicador cumulativo que agrega tendências para adoptar uma interpretação enviesada em diferentes domínios e não como uma medida de um traço psicológico latente unificado. As correlações positivas entre as pontuações do CIBM, uma medida alternativa de viés de interpretação e uma medida convergente de ansiedade para crianças pré-escolares (PAS) constituem um indicador satisfatório de validade do instrumento. Ao apontar para uma associação positiva entre o viés de interpretação e os sintomas de ansiedade, confirmam-se conclusões obtidas em estudos

anteriores com participantes com idades desde o pré-escolar (Dodd et al., 2012) até à adolescência (Blote et al., 2014). Em suma, a abordagem metodológica utilizada – interpretação expressa ao completar histórias que retratam situações quotidianas ambíguas – parece ser das poucas possíveis que permitem investigar o viés de interpretação em crianças de idade pré-escolar. Apesar dos resultados sugerirem que este tipo de abordagem proporciona uma potencial medida do viés de interpretação nesta faixa etária, o CIBM apresenta problemas ao nível da fiabilidade (nomeadamente, consistência interna) que requerem estudo mais aprofundados sobre o modelo métrico que lhe está subjacente. Assim, os nossos resultados devem ser considerados apenas como um primeiro passo para melhorar a qualidade do CIBM devido às limitações do próprio instrumento, sendo necessário trabalho adicional para continuar a desenvolver um instrumento psicometricamente confiável para a interpretação do viés em crianças em idade pré-escolar.

No segundo estudo (Capítulo II), tendo em conta a reduzida investigação conduzida com crianças mais novas, propusemo-nos a explorar de que forma a relação entre pais e filhos contribui para o desenvolvimento do viés de interpretação, e procuramos esclarecer o papel de algumas características da criança (temperamento) e dos pais (nomeadamente, estilos parentais) numa possível transmissão intergeracional deste viés. Assim, pretendemos (1) avaliar se existe associação entre a tendência dos pais interpretarem negativamente situações ambíguas e a tendência para a interpretação negativa apresentada pelos filhos em idade pré-escolar; (2) verificar se a associação entre este viés de interpretação manifestado por pais e filhos é mediada por comportamentos verbais dos progenitores que transmitam esse estilo de interpretação; (3) explorar o efeito de potenciais moderadores – nomeadamente, características da criança (temperamento, género e idade) e características dos pais (estilos parentais) – na associação entre o viés de interpretação dos pais e da criança. Relativamente ao primeiro objetivo, não encontrámos associação significativa entre o nível de viés expresso pelos progenitores (PIBM) e o nível de viés expresso pelos seus filhos (CIBM). Relativamente ao segundo objetivo, observou-se que, embora os progenitores – e sobretudo as mães – expressem parcialmente o seu viés de interpretação na situação empírica por nós utilizada para avaliar comportamentos de transmissão (concluir histórias ambíguas tal como as contariam aos seus filhos em contexto real), esse comportamento não parece traduzir-se de forma significativa no nível de viés de interpretação manifestado pelos filhos. Assim, podemos concluir que a transmissão intergeracional não se manifestou nesta amostra de crianças em idade pré-escolar. No entanto, o grau de associação entre o viés dos progenitores e dos filhos parece ser moderado pela idade da criança (crianças mais velhas partilham mais viés de interpretação com os pais) e pelo nível educacional dos pais (maior escolaridade atenua a associação entre o viés de interpretação do pai e da criança). Além

disso, as características da mãe (sobretudo, o seu estilo parental) parecem também moderar a associação entre o viés de interpretação do pai e do filho, indicando que todas estas variáveis interagem de forma complexa dentro da família. Assim, apesar de grande parte dos moderadores considerados ter efeito nulo (sobretudo na associação entre viés da mãe e viés da criança), o grau transmissão intergeracional do viés (sobretudo de pais para filhos) parece ser condicionado pelas caraterísticas da criança e do seu ambiente familiar.

Para além da questão da transmissão do viés de pais para filhos, neste estudo também explorámos o efeito das características da criança e dos pais nos níveis de viés. Apesar da escassez de resultados significativos, alguns deles parecem ser merecedores de atenção futura. Em primeiro lugar, identificámos efeitos da idade no nível de viés de interpretação, que sugerem ser as crianças mais velhas mais suscetíveis a este tipo de enviesamento. Este resultado, quando combinado com evidências reportadas na literatura, torna-se relevante para perceber a tendência de desenvolvimento desse viés desde a infância. Em segundo lugar, surpreendentemente, algumas das dimensões do temperamento da criança teoricamente mais relevantes para este tema (tais como a timidez, o medo, a aproximação/antecipação positiva, ou o controlo inibitório) parecem não afetar o nível de viés de interpretação expresso pelas crianças pré-escolares: embora sejam consideradas facetas do temperamento associadas à ansiedade, a inibição comportamental e a timidez poderão não estar especificamente relacionadas às bases cognitivas da ansiedade (ou seja, vieses de processamento de informação) até que as crianças sejam mais velhas e cognitivamente mais maduras. É também possível que, em crianças mais novas, tais facetas do temperamento estejam associadas a outros processos cognitivos envolvidos na ansiedade (por exemplo, atenção) e não ao viés de interpretação.

No entanto, o temperamento das crianças parece influenciar a forma como pais e mães terminam as histórias ambíguas, o que reforça a possibilidade de os progenitores ajustarem aos filhos o seu comportamento verbal face à ambiguidade, talvez como estratégia preventiva de proteção de vivências negativas em situações ambíguas. Em terceiro lugar, embora não tivesse sido registado um efeito significativo, os estilos parentais permissivos e autoritários parecem influenciar o modo como os pais transmitem verbalmente aos seus filhos a forma de lidar com situações ambíguas.

Por último, no terceiro estudo (Capítulo III), realizámos a primeira tentativa de adaptação do programa de intervenção *Cognitive Bias Modification Training Intervention* (CBMT-I; Lau, Pettit, & Creswell, 2013) a crianças em idade pré-escolar. O CBMT-I tem como objetivo reduzir o viés de interpretação em crianças através da manipulação da natureza da interação pais-filhos em situações sociais ambíguas. Emparelhámos dois grupos de vinte crianças pré-escolares com elevado viés de interpretação, sendo o seu viés de interpretação avaliado em

dois momentos, antes e após a aplicação do programa de intervenção (CBMT-I). Não encontrámos diferenças entre os grupos relativamente ao nível de viés de interpretação das crianças no primeiro momento de avaliação. Enquanto um dos grupos seguiu o programa de intervenção estipulado (os progenitores treinavam com os filhos a interpretação benigna de 24 histórias ambíguas que eram lidas ao longo de quatro noites), o outro grupo era apenas exposto às mesmas histórias, sem que houvesse esforço numa interpretação benigna. Quando avaliados no segundo momento, após a intervenção do CBMT-I, observámos uma clara redução do viés de interpretação no grupo de intervenção, por comparação com o grupo de controlo, tanto na escala total do CIBM como nas duas subescalas (ameaça física e, em menor grau, ansiedade de separação). Este resultado é a extensão para uma faixa etária mais jovem dos resultados reportados em estudos anteriores com crianças em idade escolar (Beard & Amir, 2008; Cristea et al., 2015; Krebs et al., 2018; Lau et al., 2013; Vassilopoulos et al., 2009). O CBMT-I aplicado pelos pais parece assim ser um programa de intervenção eficaz na redução do viés de interpretação em crianças pré-escolares. Importa sublinhar que este resultado também apoia a hipótese da existência de uma modelação de pais para filhos do viés de interpretação. De resto, mais do que garantir um "tratamento", o CBMT-I fortalece o conceito de que é possível mudar a perspetiva do outro (negativa ou positivamente) através da transmissão do comportamento verbal e não verbal. Neste sentido, como o viés de interpretação está significativamente associado à ansiedade em crianças e adolescentes, parece-nos que crianças em idade pré-escolar que beneficiem da redução do viés de interpretação através desta intervenção poderão beneficiar em idades posteriores de uma diminuição dos sintomas de ansiedade.

Concluindo, os resultados do presente trabalho contribuíram para aumentar o conhecimento sobre a transmissão e modificação do viés de interpretação em crianças de idade pré-escolar, evidenciando o papel que a influência dos pais pode ter na redução desse viés através da explicitação de interpretações benignas em situações de ambiguidade. O programa de modificação do viés com aplicação parental (CBMT-I) parece reduzir o enviesamento da interpretação nas crianças em idade pré-escolar, sendo previsivelmente um instrumento válido para prevenir o aparecimento de sintomas de ansiedade em fases posteriores do desenvolvimento. Globalmente, este trabalho vem reforçar a importância de intervenções precoces no viés de interpretação das crianças mais novas (pré-escolares).

Palavras-chave: viés de interpretação de crianças pré-escolares; viés de interpretação dos pais; transmissão de viés parental; modificação do viés de interpretação; temperamento infantil; estilo parental.

Abstract

Various theoretical models recognize that cognitive biases, specifically interpretation biases, play a significant role in the origin and maintenance of some psychological disturbances, especially depression and anxiety disorders. As far as we know, the development of interpretation biases has been mostly explored in school-age children. Expanding the study of interpretation bias to younger children (preschoolers) and exploring the role parents might have in this process may help us understand the origins of such biases and how to attenuate the transmission cycle of cognitive biases between parents and children.

In Chapter I, due to the lack of instruments specifically designed to assess interpretation bias in preschoolers, we developed a Portuguese Version of the Children's Interpretation Bias Measure – Ambiguous Story-Stems (CIBM; Ooi, Dodd, & Walsh, 2015) and assessed for the first time its psychometric properties. Our results indicated that this ambiguous story stems methodology could provide an interpretation bias measure in young children. However, these results should be taken as a first step toward improving CIBM quality due to methodological limitations and the instrument itself. Additional work must be done to develop a consistent psychometrically reliable and viable instrument for interpreting bias in preschool children.

Given the lack of conclusive studies addressing the transmission of interpretation bias between parents and their preschool-aged children, Chapter II explores the extent of this intergenerational transmission. The effects of children's (age, gender, temperament) and parents' characteristics (age, education level, parenting styles bias) on intergenerational transmission of interpretation bias were also explored. Results suggest that although parents' own interpretation bias might be transmitted to their children through verbal expressions (namely in a storytelling context), this behavior does not globally influence preschool children's interpretation bias level. However, some child's and parents' attributes seem to moderate how interpretation bias might be transmitted across generations.

In Chapter III, we conducted the first attempt to adapt the Cognitive Bias Modification Training Intervention (CBMT-I; Lau, Pettit, & Creswell, 2013) to reduce interpretation bias in preschool children by manipulating the nature of parent-child interaction in ambiguous situations. Results showed that parent-administrated CBMT-I proved a useful intervention program to reduce interpretation bias in preschoolers. Moreover, CBMT-I seems to support the concept that it is possible to change the other's perspective (negatively or positively) through the transmission of verbal and non-verbal behavior.

The results of the present study contributed to a better understanding of the transmission and modification of interpretation bias in preschool-age children, highlighting the role that parents may play in reducing this bias. Also, the information transmitted from parents to children may

have a significant, relevant role here since preschool children apparently showed weak responsiveness to parents' negative interpretation bias but reacted favorably to an intervention based on parents' deliverance of positive interpretations when facing ambiguity. Overall, this work reinforces the importance of early interventions in younger children (preschoolers) interpretation bias.

Keywords: preschoolers interpretation bias; parental interpretation bias; parental bias transmission; interpretation bias modification; child temperament; parenting style.

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General Introduction

Information Processing Bias and Emotional Disorders

The concept of information processing bias represents the individual tendency to process information in a way consistent with our biased ideas and representations (Crick & Dodge, 1994). Attention, memory, reasoning and interpretation are different components of the information processing architecture which are particularly susceptible to bias. Such biases may become a persistent, self-reinforced processing style, affecting the individual's daily functioning.

It is well established that specific clinical populations selectively attend to, remembers, and interpret events in ways that are congruent with their disorder (Wray, Freund & Dougher, 2009, Williams, Macleod, Watts & Mathews, 1997). For instance, depressed individuals tend to focus on negative stimuli and thoughts more than healthy individuals. This selective bias to negative information may be a central mechanism in maintaining depressive symptomatology (Gotlib & Joormann, 2010). Considering the early steps of information processing, fearful individuals are more likely to detect and adjust toward potentially threatening stimuli (Bar-Haim et al., 2007; Dudeney, Sharpe & Hunt, 2015), with a high probability of processing such ambiguous stimuli as threatening (Aktar, 2022). This attentional bias may develop into a persistent negative interpretation style that characterizes anxiety disorders (Daleiden & Vasey, 1997).

Researchers have been suggesting that biased information processing is present in several emotional problems, such as social phobia (Amir, Foa, & Coles, 1998; Stopa & Clark, 2000), anxiety (Barrett et al., 1996; Creswell, Schniering & Rapee, 2005; Mathews & Mackintosh, 2000; Mathews & MacLeod, 2005), depression (Dineen & Hadwin, 2004; Hertel & Mathews, 2011; Hertel, Mor, Ferrari, et al., 2014; Hirsch, Meeten, Krahé, & Reeder, 2016; Mathews & MacLeod, 2005), substance abuse (e.g., Franken, Rosso, & Honk, 2003) and bulimia nervosa (Meyer et al., 2005). Additionally, biased information processing is present in several chronic illnesses, such as cancer (Chan et al., 2011; Lichtenthal et al., 2017) and chronic pain (Karimi et al., 2016). Dysfunctional cognitions may act as a cause (Beck & Haigh, 2014; MacLeod, Rutherford, Campbell, et al., 2002) or a maintenance factor (Disner et al., 2011; Mogg, Bradbury, & Bradley, 2006) of some of these psychological disorders. Specifically, empirical studies suggest that people with (sub) clinical depression are more likely to favor negative explanations for ambiguous situations (Everaert, Podina, & Koster, 2017). These information processing biases, in turn, would reinforce their existing negative or illness-related schemas and increase distress, thereby worsening negative thinking and symptoms (Yoon, Shaffer & Benedict, 2020).

The literature points to two main types of processing biases towards threat information in the specific case of anxiety disorders. Hadwin and Field (2010) suggested that anxious people tend to selectively pay attention to threats in their environment (attentional bias) and interpret ambiguous stimuli in an overly threatening way (interpretation bias). Similarly to anxious adults, children and adolescents with anxiety also appear to display attentional (Field & Lester, 2010; Heim-Dregeret al., 2006; Nightingale, Field, & Kindt, 2010) and interpretational biases (Field & Lester, 2010; Muris & Field, 2008).

Apparently, information processing biases can be considered one of the causes of anxiety since increasing biases lead to higher anxiety symptoms in anxious but non-clinical populations (Mathews & Mackintosh, 2000; Salemink, van den Hout, & Kindt, 2010; Wilson et al., 2006; Yiend, Mackintosh, & Mathews, 2005). The causal role processing bias might have in anxiety onset and maintenance encouraged extensive research into the origins and development of such biases during the last decades.

Cognitive anxiety models describe biases at different stages of information processing, including encoding, interpretation, and response selection. First, the threat detection system evaluates external stimuli for threat relevance; then, attention is allocated to relevant stimuli. Thus, such models suggest that the cognitive system of anxious individuals is hypersensitive to detecting threats and allocating attention to threats. Memory and interpretation bias occurs during the following interpretation stage when enhanced memory for threatening information and anxiety-related schema are activated, attaching threatening meaning to stimuli. These attention processes and biased interpretations increase anxiety and lead to behavioral self-protection strategies to prevent adverse outcomes (Clark, 2001; Clark & Wells, 1995; Rapee & Heimberg, 1997). Thus, interpretation bias is one of the biased cognitive processes central to cognitive behavioral models of anxiety (Beck & Clark, 1997; Klein et al., 2018).

Yoon, Shaffer and Benedict (2020) underline the lack of specific theories or models that address negative interpretation biases. According to the authors, such biases are considered an essential component of many cognitive models for specific psychological disorders, and their role of negative in the etiology and maintenance of the specific disorder is relatively similar. However, there are distinct varying specificities, such as the type of information negatively interpreted and in what manner negative interpretation biases. Therefore, in the next section, we focus on negative interpretation biases and explore their influence on the etiology of disorders.

Negative Interpretation Biases

Cognitive models of anxiety (Beck et al., 1985; Mathews & MacLeod, 2005, Muris & Field, 2008) suggest that anxiety is associated with the predisposition to interpret ambiguous

situations as threatening. Negative interpretation bias is the tendency to misinterpret neutral or ambiguous information as being more negative or harmful than it actually is (Beck et al., 1985; Klein et al., 2018; Mathews & MacLeod, 2005; Muris & Field, 2008); such negative information (related to threat, illness, separation, loss or other threatening domain) become overrepresented in the individual's mind, increasing the subjective sense of threat in the environment and maintaining or worsening symptomatology (Yoon, Shaffer & Benedict, 2020).

Nevertheless, these models do not imply that an individual's emotional disorders will interpret every ambiguous information negatively. Instead, how people interpret ambiguous information and what they interpret is determined by the themes of their schemas (the content specificity assumption; Beck & Clark, 1997). Individuals with depression and panic disorders may interpret differently the same ambiguous information: someone with panic disorder may interpret ambiguous bodily sensations as signs of a heart attack, although not necessarily interpret a colleague's ambiguous observation as rejection, while a depressed person may interpret the same observation as rejection but not perceive ambiguous physical sensations negatively (Yoon, Shaffer & Benedict, 2020).

In youngsters, the literature shows that anxious children and adolescents also tend to have a negative interpretation bias or interpret information threateningly (Blanchette & Richards, 2009; Castillo & Leandro, 2010; Creswell, Schniering, & Rapee, 2005; Hadwin et al., 1997; Hadwin, Garner & Perez-Olivas, 2006; Muris & Field, 2008; Taghavi et al., 2000).

Muris and Field's (2008) model of information processing takes Kendall's (1985) cognitive theory of childhood anxiety and Crick and Dodge's (1994) model of information processing into account. Kendall (1985) suggested that the link between negative cognitive biases and childhood anxiety resulted from a persistent overactivity of threat schema, leading to negative biases in processing information related to the threat. These biased cognitive processes are believed to contribute to the dysfunctional and maladaptive thoughts and behaviors of anxiety disorders. Crick and Dodge's (1994) information processing model allows for identifying biased information processing at any stage (encoding, interpretation, response selection and performance).

According to Muris and Field's (2008) model, anxious children selectively pay attention to threatening stimuli during the encoding phase. In addition, anxious children show enhanced memory for threatening information during the interpretation phase and perceive ambiguous stimuli as dangerous, leading to memory bias and interpretation bias. Consequently, it is theorized that anxiety and fear are generated by these information processing biases, thereby enhancing the occurrence of the biases and reinforcing maladaptive schemas about danger.

To address the importance of development in the information processing models of anxiety, Field and Lester (2010) identified three ways in which children's cognitive development may contribute to the emergence of information processing biases: (a) first, it does not influence - the integral bias model; (b) second, it moderates an existing bias - the moderation model; (c) third, it contributes to acquiring the non-existent bias - the acquisition model.

The first model, the integral bias model, assumes that cognitive biases are innate emotional components. They are present in early childhood and are constant throughout development (see Martin, Horder, & Jones, 1992). The second model, the moderation model, proposes the existence of a moderation effect on existing bias. The model suggests that information processing biases related to threats are present in all children from early childhood. However, these biases may develop according to individual factors (e.g., anxiety and temperament). Therefore, children may experience different trajectories of information processing bias based on the interaction between individual differences and cognitive, emotional, and social development. Finally, the acquisition model focuses on the influence of child development on learning and interpretation bias that did not previously exist. According to this model, it is necessary to develop cognitive, emotional, and social components so that information processing bias can arise (see Alfano, Beidel, & Turner, 2002; Muris & Broeren, 2009). The acquisition model considers two alternative hypotheses related to the origin of anxiety-associated interpretation bias. Children with trait anxiety might have a predisposition to acquire a threat-related bias during their development. On the other hand, non-anxious children may develop anxiety due to acquiring threat-related biases. This latter hypothesis is supported by investigations that establish bias acquisition via verbal information (Muris & Field, 2010) as well as by cognitive bias modification programs, which shows that threat-related biases can be trained, with direct impact on anxiety (Mathews & Mackintosh, 2000; Muris et al., 2008; Muris et al., 2009).

Indeed, as an example of training intervention, the cognitive bias modification of interpretation explores the manipulation of interpretation bias in ambiguous situations. Several studies have shown that bias modification interventions can reduce anxiety (e.g., Beard, 2011; Hallion & Ruscio, 2011), supporting the causal role of interpretation bias in anxiety. Up to this point, this paradigm has shown that interpretation biases can be effectively manipulated in children: negative training promotes negative interpretative biases, while positive training modifies and decreases this kind of information processing bias (Lester et al., 2009; Muris et al., 2008; Muris, Huijding et al., 2009; Vassilopoulos, Banerjee & Prantzalou, 2009).

Field and Lester's (2010) acquisition model enframes the learning potential of interpretation bias during development. Although the role of interpretation bias in anxiety has been largely studied with children and adolescents, the literature is scarce regarding earlier development

stages, especially for ages under seven (Stuijfzand et al., 2017). Thus, it is challenging to explore how interpretation bias develops during preschool years.

In summary, negative interpretation biases play a critical role in developing and maintaining anxiety disorders, especially in children. However, there is much to know about the development of interpretive bias. Therefore, the next section will explore the effects of children's characteristics and parental factors that might influence the development of interpretation bias.

Development of Interpretation Bias

Etiological models of anxiety have increasingly focused on information processing biases in children. According to research, approximately 60%-70% of information processing biases can be explained by environmental factors (Eley & Zavos, 2010). Although research has explored information processing biases in children, few models describe cognitive biases from a childhood-appropriate perspective (e.g., Field, Cartwright-Hatton, Reynolds, & Creswell, 2008). Research into childhood anxiety tends to use adult models and theoretical frameworks, which may not reflect children's cognitive, emotional, and social development (Field & Lester, 2010).

To expand the etiological knowledge related to interpretation bias, some authors suggest that the tendency to interpret ambiguous situations as threatening seems to be associated with family as well as children-specific characteristics (Creswell, Schniering, & Rapee, 2005; Taghavi et al., 2000). It seems consensual in the literature that one of such children's characteristics is temperament, namely behavioral inhibition, in which warning signs begin in early childhood. For example, Hudson, Dodd, and Bovopoulos (2011) suggested that children whose behavior is shy, avoidant, and withdrawn facing unknown situations or contexts appear to be at higher risk of developing anxiety (Chronis-Tuscano et al., 2009; Degnan, Almas, & Fox, 2010; Schwartz, Snidman, & Kagan, 1999).

Behaviorally inhibited children tend to take longer to approach and communicate with strangers, keeping their attachment figures close, showing anguish and withdrawal in the face of new situations, and consequently showing inhibited and reduced social behavior (Pérez-Edgar et al., 2011). Furthermore, inhibited temperament, shyness, and social withdrawal seem stable from preschool through early adulthood (Caspi et al., 2003, Degnan et al., 2008, Denissen et al., 2008; Fox & Reeb-Sutherland, 2010). However, not all behaviorally inhibited preschoolers grow into introverted and socially anxious children (Degnan & Fox 2007).

The literature also indicates the existence of a gender factor in behavioral inhibition, showing that inhibited temperament may assume a more problematic behavior in boys than girls. In

early childhood, behavioral withdrawal is more strongly associated with adjustment difficulties in boys, who are more likely to be excluded and rejected by peers than girls (e.g., Coplan et al., 2001; Coplan et al., 2004). Rubin, Coplan, and Bowker (2009) suggest that this behavior is more frequently correlated with socio-emotion for boys through development. So, inhibited boys tend to define themselves as lonelier, with minor social skills, and lower self-esteem than their peers (Nelson, Rubin & Fox, 2005).

We found studies that concluded that anxiety symptoms and inhibited temperament are associated with cognitive biases (e.g., Dodd et al., 2012). If so, temperamental inhibition is expected to positively correlate with threat interpretation in ambiguous situations. However, the specific relationship between the child's inhibited temperament and the manifestation of interpretive bias in ambiguous situations needs further investigation in young ages (only one study, with inconclusive results; Dodd et al., 2012). Most studies addressed inhibited temperament and interpretive bias conducted with school-aged children. Therefore, exploring the influence of personal factors, such as inhibited temperament, in children of preschool age facing interpretation bias is essential.

According to the acquisition model, children may develop cognitive biases through the learning process, reinforcing that such learning may occur mainly in the family context, namely through parents (Drake & Ginsburg, 2012; Hadwin et al., 2006). Evidence from the literature suggests that family factors may play an essential role in the parental transmission of interpretation bias. For example, parenting styles (e.g., criticism or less affective; over-protective, intrusive, controlling) are predictors of childhood anxiety (Blossom et al., 2013; Hudson, Dodd & Bovopoulos, 2011; Rapee & Heimberg, 1997), a result that suggests that parenting styles may influence interpretation bias in children.

Lindhout and colleagues (2006) suggest that overprotective parenting inhibits children's exploration capacities, decreasing independent learning in the child's environmental context. This parenting style may result in the delimitation of the child's abilities and confidence to interact with the environment. Furthermore, rejection and lack of parental affectivity can result in an insecure attachment and, consequently, anxiety disorders (Lindhout et al., 2006). Parental behavior based on criticism or less affection or, on the opposite extreme, overprotective, intrusive, or controlling, seems to be also a predictor of child anxiety. That might increase the child's perception of danger and reduce their perceived control over the threat (Rapee & Heimberg, 1997). However, the relationship between parenting styles and children’s interpretive biases in ambiguous situations has received little attention from researchers. Blossom and colleagues (2013) explored the relationship between family dynamics and children's cognitive bias. They concluded that family functioning significantly influences the way children interpret ambiguous situations. In other words, children who experience a family

environment characterized by poor communication and interpersonal patterns, with unfounded punishments and high behavioral firmness, tend to interpret ambiguous situations in harmful and threatening ways.

In an investigation with sixty children (clinical and non-clinical) aged between 7 to 15 years old and their mothers, Creswell, Schniering and Rapee (2005) explored the relationship between anxiety and threat interpretation of mothers and their children. The findings suggest that mothers of clinically anxious children tend to present a higher level of threat interpretation when facing ambiguous scenarios. Also, mothers and children's threat interpretations correlated higher than self-report measures of anxiety.

Based on the parents' transmission hypothesis, Lester and colleagues (2009) investigated the association between parents' interpretation bias in a threatening way involving themselves and their children, developing a study including forty parents of children between ages 4 and 10. The results suggest that parents' anxiety patterns predicted the amount of interpretation bias (threatening way) involving their children's situations. Therefore, parents' anxiety may lead them to interpret threats in ambiguous scenarios involving themselves and generalize about their children's situations.

Another research conducted by Lester and colleagues (2010), involving ninety-two children aged between 6 and 11 years and their mothers, aimed to investigate the potential mechanisms through which biased cognitions and behaviors might transmit across the mother-child relationship. The results suggested a positive correlation between children's harmful interpretation bias in self-referent ambiguous situations and the belief that their mothers would also solve the ambiguity for them threateningly. Therefore, children's interpretation bias may be a process of how their mothers resolved situations for them earlier (Field & Lester, 2010).

Creswell, Shildrick and Field (2011) investigated 110 children between 5 and 9 years old and their parents (103 mothers and four fathers) to evaluate relationships between parental and child anxiety, threat interpretations, and expectations. The findings suggest that children's biased cognitions are initially influenced by parents' expectations of their child's coping skills (i.e., children learn from their parents that they cannot cope). Therefore, the authors concluded that parents' (mainly mothers') threat interpretation might directly impact (e.g., via modeling or oral transmission) their child's threat interpretation.

In another study, Remmerswaal and colleagues (2016) explored the parents' role in cognitive bias and following fear levels in children when confronted with animal narratives. The participants were forty-nine children (non-clinical), aged between 9 and 12 years, and their mothers. Results demonstrated that mothers' verbal feedback (whether instructed or spontaneously) based on their cognitive bias substantially influenced children's cognitive bias.

Therefore, the transmission occurs when mothers verbally reassure their children to seek threat-related information about the animal. As a result, children demonstrated a higher verification bias, consequently developing an increased fear of the unknown animal.

In the investigation conducted by Ooi and colleagues (2015), one of the goals was to study the relationship between parents' interpretation bias toward their children. Findings suggest that children's interpretation bias is associated with the amount of threat in their parents' written stories. That supports the idea that parental verbal information can influence the bias of preschool children. Furthermore, supposedly children's interpretation bias decreases after parents tell them stories in a non-threatening way. In that case, it can be concluded that parental verbal information influences children's interpretation bias.

One of the limitations observed in studies involving intergenerational transmission of anxiety and interpretation bias is that the majority (approximately 90%) of parent participants are mothers (Creswell, Schniering & Rapee, 2005; Creswell, Shildrick & Field, 2011; Lester et al., 2010; Ooi, Dodd & Walsh, 2015; Remmerswaal, Muris & Huijding, 2016). Therefore, considering that both parents play a role in influencing their child's cognitive biases, we presume that involving fathers in the studies may give us more information about the entire process of parental transmission of anxiety and bias.

Overall, a more detailed study of parents' interpretation bias in ambiguous situations may help to explain the bases underlying the children's interpretation bias and its consequent negative self-evaluation. Furthermore, a better understanding of this procedure may also contribute to interventions interrupting the transmission cycle of cognitive biases between parents and children.

Most of the literature concerning biased parental transmission has been directed toward school-age children. Furthermore, knowing that it is during this period that children learn more quickly (Fox et al., 2005), it seems possible for parents transmission via verbal information. Consequently, we expect that expanding the study of intergenerational bias transmission to younger children (preschoolers) may help us understand the initial development of biases.

Research Methods on Interpretation Bias in Children

Interpretation bias has been studied using a variety of paradigms. Yoon, Shaffer and Benedict (2020) noted that it is possible to categorize them based on the stimuli used (e.g., words, scenarios, and facial pictures) and on the interpretation bias component assessed (e.g., generation vs. selection of interpretations). They can also be assessed indirectly (e.g., response times) or directly (e.g., interpretations of a stimulus). Also, whether online (i.e., initial, immediate interpretations of stimuli) or offline (i.e., later, more reflective interpretations influenced by elaborative processes) are assessed. A participant in all these tasks is presented

with ambiguous stimuli; tasks then assess whether they consistently resolve the ambiguity positively, neutrally, or negatively. It is commonly used in paradigms that directly assess interpretation biases to ask individuals to answer questions about their interpretations of ambiguous information. Participants are asked to complete a task based on different stimuli in each paradigm.

Generally, studies use one of two materials to assess interpretation bias in children. First, the Ambiguous scenario tasks (ASC; Barrett et al., 1996) are more frequently applied; second, a task based on lexical knowledge, e.g., homophones or homographs (Gifford et al., 2008). However, both were addressed to children above six years old. Nevertheless, more recent research has started to explore a story-stem methodology accurately to assess preschoolers' interpretation of ambiguous situations (Dodd et al., 2012; Micco et al., 2014; Ooi, Dodd & Walsh, 2015).

The most used task, the Ambiguous Situations Questionnaire (Barrett et al., 1996), presented to each child twelve ambiguous situations (half physical and half social) to be interpreted in a threatening or non-threatening way. For example, ask children to imagine having a party at 4 o'clock, and it was half past four, and no one had arrived. After, it was shown to the child two pictures demonstrating a threatening and non-threatening justification (e.g., "the children are running late" or "the children do not want to come"). Then ask the children to reveal which would be more probable of the two options.

Dodd and colleagues (2012) conducted a study that applied a story-stem method to adjust interpretation bias assessment to preschoolers. Bretherton and Oppenheim (2003) previously described the method, with three ambiguous story stems presented to children to assess interpretation bias. The stories represented a physical threat, social threat, and separation anxiety, modified from Barrett and colleagues (1996) previous investigation assessing interpretation bias in children and adolescents. The procedure task explained to the participants that they would tell some stories using the dolls and start each story, and the child would finish them.

In another research conducted by Micco and colleagues (2014), the interpretation bias in younger children was assessed with a storytelling game. They added three more ambiguous scenarios (a total of six) to the story stem previously used by Dodd and colleagues (2012). Also, the procedure was like previous versions of the "storytelling game." The experimenter acted out each of the six ambiguous scenarios with dolls and then asked the child to use the dolls to "show me what happens next." The child then asked what they think is happening in the scenario (free response) and asked the child to select one of two interpretations (forced choice).

Recently, in an investigation with preschoolers, Ooi and colleagues (2015) modified the story-stem methodology used in previous research (Dodd et al., 2012; Micco et al., 2014). The authors presented the children with eight ambiguous story stems (four physical, two socials, and two separation themes). Then, they asked them to finish the stories verbally (with the dolls and extra props), allowing either threatening or non-threatening interpretation. The authors created 50%, 25% adapted from Dodd and colleagues (2012) research, and 25% adapted from Barrett and colleagues (1996) research with children and adolescents from a total of eight stories. In this research, independent raters ensured story-stem ambiguity through a 7-point Likert scale (range between -3, no threat, and +3, threat; 0 suggests ambiguity in the story stems). That reflected ambiguity for all the story stems, with an overall mean of .08 (*S.D.* = .65).

Subsequently, the improvement of interpretation bias assessment measures and other factors, such as the effectiveness of existing psychological treatments, long-term medication treatment, and the challenging access to treatments for anxiety disorders, triggered the need to develop a different intervention methodology. Primarily reduce anxiety symptoms by modifying negative interpretations of ambiguous situations (Lau, Pettit, & Creswell, 2013).

In the adult population, intervention programs for cognitive modification of interpretation bias (CBM-I) have shown encouraging results in reducing anxiety symptoms (Beard, 2011; Hallion & Ruscio, 2011). CBM-I modifies negative interpretation through training on a methodological level, including continually presenting to participants unfinished ambiguous scenarios, which can only be finalized well by endorsing a favorable evaluation of the situation. Therefore, the main goal was to, over time, these favorable resolutions become automatic and ignore any negative interpretational tendencies, consequently reducing anxiety vulnerability.

More recently, an investigation developed by Lau, Pettit and Creswell (2013) used a program of cognitive modification of interpretation bias (CBM-I) to reduce children's social anxiety. The authors intended to assess the effects of the application of CBM-I by the children's parents through the training of benign interpretations of ambiguous scenarios. Therefore, parents were asked to tell a group of stories with ambiguous content at the procedural level over three nights a week. Each time, the parents would have to reinforce the benign interpretation of the situation portrayed. The results indicated that the positive verbal information transmitted by the parents through storytelling tends to reduce the interpretation bias and the symptoms of social anxiety in children (7-11 years).

Orchard and colleagues (2017) investigated whether the cognitive modification of interpretation bias (CBM-I) is associated with a more benign and less harmful interpretation of ambiguous social scenarios. Reduction and severity of social anxiety symptoms, and even if

the change in social anxiety patterns would mediate by the difference in the type of interpretation. The results pointed out the absence of a significant association between modifying the kind of interpretation and social anxiety in children. Therefore, they conclude the possibility that the interpretation bias does not have an independent causal role in children's social anxiety, consistent with the conclusions by Creswell, Murray, and Cooper (2013).

In a current systematic review of the literature, Stuijfzand and colleagues (2017) identified that positive results through the manipulation of interpretation bias (CBM-I) are associated with changes in anxiety and fear (Lau, Belli, & Chopra, 2012; Lau, Pettit, & Creswell, 2013; Vassilopoulos, Banerjee & Prantzalou, 2009). Furthermore, the authors highlighted a causal pathway and a meaningful relationship between negative interpretation bias and anxiety in children.

Considering the lack of studies exploring preschoolers, it seems crucial to understand at what age we can observe the manifestation of parental transmission of interpretation bias. Consequently, verify if manipulating interpretation bias (CBM-I) can reduce information bias in preschool-age children.

In this way, with the interpretation bias manipulation program (CBM-I), we can benefit from the ability of children to acquire cognitive styles through social learning mechanisms (Field, 2006). Involving parents in bias modification training reproduces the natural processes by which children learn certain types of interpretation. That might reflect a more effective strategy than learning through a digital interface (Lau, Pettit, & Creswell, 2013).

So, we intend to evaluate the hypothesized causality relationships between parental interpretation and children's interpretation bias with the present investigation. Also, we aimed to know if children's interpretation bias reduction occurs through modifying the parent-child interaction when assessing ambiguous situations. This intervention aims to contribute to the development of strategies to reduce bias in the systemic context.

Objectives

In this sense, we intend to (1) understand the direct relationship between parent's interpretation bias in ambiguous situations and their preschool-aged children's interpretation bias; (2) perceive the moderating effect that child’s individual variables - inhibited temperament, sex, and age of the children – as well as (3) parental variables (parental style) might have on the parental transmission of interpretation bias.

Therefore, we aimed to select measures to assess interpretation bias in preschool children and adults. We chose to develop a Portuguese Version of the Children's Interpretation Bias Measure – Ambiguous Story-Stems (CIBM; Ooi, Dodd, & Walsh, 2015) and appraised its

psychometric properties, since no alternative measures exist for such young children. If the Portuguese version of the CIBM proves to be psychometrically adequate, a valid and reliable instrument to assess the interpretation bias in the Portuguese preschool population will be available for research and clinical assessment purposes (Chapter I).

Subsequently, we aimed (1) to understand the association between parent's interpretation in ambiguous situations and the level of interpretation bias shown by their preschool-aged children; (2) to verify if the association between parents' and child's interpretation bias is mediated through the transmission of malign interpretations from parents to children; and (3) to explore the moderation effect that individual child variables – temperament, gender, and age – and parents' characteristics (parental styles) might have on the association between parents and child's interpretation bias (Chapter II).

Finally, we believe it is essential to understand if, at younger ages, manipulating interpretational patterns through parent-child interaction can reduce interpretation bias in early ages (preschoolers) and help prevent the development and onset of anxiety symptoms in later childhood stages. Therefore, we will implement a parent-administrated modification bias program and measure its impact on the degree of negative bias presented by the children (Chapter III).

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Chapter I. Study of the psychometric properties of the Portuguese version of the *Children's Interpretation Bias Measure – Ambiguous Story-Stems* (CIBM; Ooi, Dodd, & Walsh, 2015)

Introduction

Various theoretical models recognize that cognitive biases, specifically attentional and interpretation biases, play a significant role in the origin and maintenance of several psychological disturbances, like social anxiety disorder (Clark & Wells, 1995; Rapee & Heimberg, 1997; Spence & Rapee, 2016) and depression (Beck, 1976; Beevers, 2005; Gotlib & Joormann, 2010; Mathews & MacLeod, 1985). In this specific context, attentional bias is the tendency to assign attentional resources to potentially threatening stimuli (MacLeod, Mathews & Tata, 1986; Mathews & MacLeod, 1985), while interpretation bias is the tendency to interpret ambiguous situations as negatively, threatening, and catastrophizing (Chen, Short, & Kemps, 2020; Vassilopoulos, Banerjee, & Prantzalou, 2009). Both biases have been considered to significantly promote the development and persistence of anxiety disorders in children and adolescents (Dodd et al., 2012; Klein et al., 2018). Another type of bias has also been mentioned, although less explored: a preferential memory for threat-related information, also known as memory bias (Amir et al., 2003).

Muris and Field (2008) proposed an information processing model for childhood anxiety, suggesting that the attentional bias may influence the encoding phase, when the anxious child selectively directs his attention to threatening stimuli, while interpretation and memory biases appear during the interpretation stage when the anxious child shows improved memory for threatening information and evaluates situations as dangerous by assigning threatening meaning to ambiguous stimuli. Field and Lester (2010) suggest that those cognitive biases may emerge early (preschool stage).

Studying interpretation bias, Dodd and colleagues (2012) observed that clinically anxious (social anxiety disorder, separation anxiety disorder, and specific phobia) preschool-aged children were more prone to make threatening interpretations of the ambiguous story stems than non-anxious children. In another study, Ooi (2012) found a more specific association between threat interpretation biases and social anxiety and peer problems in young children (aged 4 to 6). Other studies suggest that children and adolescents with social anxiety (SA) are more likely to interpret social situations negatively (Blote et al., 2014; Miers, et al., 2008).

Like anxious adults, anxious children tend to represent threatening situations into two major domains, namely physical threat (e.g., getting hurt, drowning, getting blind) and social threat (e.g., being abandoned, having negative evaluations, being mocked) (Campbell & Rapee, 1994; Klein et al., 2018). Muris (2010) underlined the importance of content-specific situations

in interpretation bias processes, suggesting that anxious children will interpret ambiguous situations as a threat only if such situations explicitly refer to the content of their fear. A few recent studies report this hypothesized content-specificity of interpretation processes in childhood fears (Klein et al., 2019; Mobach et al.,2019; Stuijfzand et al., 2017). In a meta-analysis, Stuijfzand and colleagues (2017) found a more significant association between anxiety and interpretation bias when ambiguous situations correspond to the type of anxiety examined. Furthermore, Klein and colleagues proposed the content-specific hypothesis that clinically anxious children (ages 6 to 12 years) exhibit interpretation biases specific to fear-related stimuli. Finally, Mobach and colleagues (2019) observed that children (ages 7 to 12) with higher levels of anxiety (social, separation, or spider anxiety) exhibited negative interpretation biases only for their specific fear or anxiety-threatening situations.

Most studies exploring interpretation bias in school-aged children have used one of two methodologies. One is based on lexical knowledge tasks involving ambiguous words (Gifford et al., 2008; Hadwin et al., 1997; Taghavi et al., 2000), and the other is based on story-stem completion methodology (Barrett et al., 1996; Chorpita, Albano & Barlow, 1996; Creswell, Schniering & Rapee 2005; Dineen & Hadwin, 2004), which is the more frequently applied.

In the lexical knowledge paradigm, Hadwin and colleagues (1997) used pictures representing homophones (words that have the same sound but different meanings) that correspond both to a neutral and to a threatening word (e.g., “dye vs. die” or “bury vs. berry”). Forty children (aged 7 to 9) were presented with the spoken homophone word with two potential interpretations and then with the corresponding pair of pictures; children had to select the picture best matching a spoken word. The results showed that children with higher anxiety levels chose, preferably, the picture corresponding to the threat interpretation of the ambiguous word.

Nevertheless, this methodology requires a certain level of development skills (namely, vocabulary knowledge) and may be too challenging for preschool children. Indeed, previous research has shown that, when faced with tasks that require assigning different, unrelated meanings to familiar word forms, preschoolers have difficulty completing the task correctly (Casenhiser, 2005; Doherty, 2004).

In the context of the story-stem methodology, the ambiguous story task was previously developed for adults by Butler and Mathews (1983) and later modified by Barret and colleagues (1996) for use with children. Barrett and colleagues adapted the Ambiguous Scenarios Questionnaire (ASQ) to assess the interpretation bias in clinically anxious (separation, generalized, simple, and social phobia) school-aged children (aged 7 to 14); the control groups were divided into non-clinical and oppositional defiant disorder samples. The procedure

consists of presenting verbally to each child a set of twelve ambiguous situations (half physical and half social) that could be interpreted in a threatening or non-threatening way (e.g., “You see a group of students from another class playing a great game. As you walk over and want to join in, you notice that they are laughing.”). Children were asked three questions about the situation: “What do you think is happening?” (Free-choice interpretation); “Which of the following explanations do you think is most likely?” (Forced-choice interpretation; two threat and two neutral interpretations were read to the child in random order, e.g., (a) “They are telling secrets about you”, (b) “They will soon ask you to join in”, (c) “One of them is likely to rush up and push you away”, or (d) “One of them is likely to notice you and smile”); “What would you do about it? (To assess the children’s coping mechanisms with the possible threat). The results suggest that anxious and oppositional children tend to be more predisposed to interpret ambiguous situations as threatening than non-clinical children. Curiously, both clinical groups (oppositional and anxious) showed separate ways to solve ambiguous situations: oppositional children tend to adopt a more aggressive approach. In contrast, anxious children use a more avoidant strategy.

More recently, Stuijfzand and colleagues (2017) argued that, although the ASQ methodology is appropriate for school-aged children, investigating the early origin of interpretation bias requires the development of reliable instruments adequate for younger children (preschoolers). Only four studies have been published addressing interpretation bias in younger children (preschoolers).

First, Ooi (2012) conducted a study involving shyness, threat interpretation biases, negative peer experiences, and social anxiety in preschoolers (aged between 4 and 6 years). The investigator used a modified version of the ASQ. Many items were removed and replaced with versions appropriate for the child's age and language. Also, the inclusion of visual aids was the main difference between the original ASQ and the preschoolers' version. In preschool-aged children, story-telling heavily depends on visual aids since they cannot yet read. Each item in the study was accompanied by pictures representing the ambiguous situation and the alternative interpretations, following procedures defined by Creswell and colleagues (2011). The authors suggested that the study provided preliminary steps toward developing an appropriate method of assessing threat perception in early childhood. However, more work was still needed to develop a psychometrically good measure.

Another study, conducted by Dodd and colleagues (2012), aimed to assess interpretation bias in children aged between 38 and 53 months. The investigators used three-story stems referring to ambiguous situations: physical threat, social threat, and separation anxiety. These stories were adapted from Barrett and colleagues (1996) study with children and adolescents. In this procedure, the experimenter would orally start a story, and the child should finish it using dolls

to represent the story's characters. The results suggest that children with clinical anxiety tend to interpret the story more threateningly than those non-clinical anxious children. However, this difference was small and not statistically significant (Cohen's *d* = 0.29). Differences were more robust between children with and without specific phobia, with phobic children providing more threatening interpretations (Cohen's *d* = 0.57).

Micco and collaborators (2014) conducted a study involving twenty-seven children (aged between 4 and 7 years) using a similar story-stem methodology. The researchers added three more ambiguous scenarios to Dodd and colleagues' previous ones (2012). The procedure was presented as a "story-telling game", in which the experimenter acted out with dolls each of the six ambiguous scenarios and then asked the child to use the dolls to "show me what happens next" (free response) and to select one of two possible interpretations (forced-choice). Inter-rater reliability for the categorization of free response data was high (*r* = 0.95), but results indicated no significant differences between children with and without full or onset anxiety disorders. So, according to the authors, young children at risk for anxiety disorders (or who already had anxiety disorders) did not exhibit interpretation bias in this study.

In another investigation assessing interpretation bias in fifty preschoolers (aged between 31 and 68 months) and their parents, Ooi, Dodd and Walsh (2015) adapted again the story-stem methodology used in previous studies, taking two stories from Dodd and colleagues (2012), two from Barrett and colleague's (1996) and including four new stories. Thus, children were presented with eight ambiguous story stems (four physical, two social, and two separation themes) and were asked to finish them verbally (with the dolls and extra props). Inter-rater reliability for children's threat interpretations was high (the ICC for the total score was .99). The results showed a null association between preschoolers' interpretation bias and anxiety symptoms (*r* = -.03). However, the authors underlined various study limitations, particularly the underpowered sample (only *n* = 38 children, due to the presence of missing data in 24% of the sample) that prevented detecting even moderate-sized effects and the possible existence of sample biases due to selective data missingness (apparently, children included in final analyses were more anxious, but with less biased interpretations, than those that do not complete the study).

In previous studies addressing interpretation bias in preschoolers, researchers have been forced to adapt, modify or create instruments to ensure their suitability for the age group under study. Several procedures were considered: oral story-stem presentation, content specificity (stories addressing the physical, social, and separation contexts), and graphic illustrations to boost participant engagement and understanding.

As outlined, the instruments designed to assess interpretation bias in preschoolers are insufficient worldwide and inexistent in Portugal. The purpose of this study is to present a Portuguese Version of the Children's Interpretation Bias Measure – Ambiguous Story-Stems (CIBM; Ooi, Dodd, & Walsh, 2015) and appraise its psychometric properties, namely its factor structure, its validity considering alternative measures of interpretation bias predisposition and theoretically related concepts (social anxiety) and the reliability of the measures provided. If the Portuguese version of the CIBM proves to be psychometrically adequate, a valid and reliable instrument to assess the interpretation bias in the Portuguese preschool population will be available for research and clinical assessment purposes.

Method

Participants

Two hundred and seventy-two non-clinical Portuguese children (154 boys and 118 girls), aged between 45 and 71 months (mean age = 58.89 months, *sd* = 6.49 months), participated in this study. We enrolled the participants through eleven preschool establishments (public and private) in the Alentejo region (Portugal).

All the children had Portuguese nationality, and most lived with both parents (87%). Parents (age: mothers mean = 36.1 years, *sd* = 5.30; fathers mean = 39.1 years, *sd* = 5.89) mainly were married or unmarried partners (above 80%), completed at least high school (fathers: 55%; mothers: 71%), and were employed (above 87%). Most children were only-child (40.1%) or had only one sibling (49.5%). Children having neurodevelopmental disorders or severe organic diseases were excluded from the sample.

Measures

Children Interpretation Bias

The Children's Interpretation Bias Measure – Ambiguous Story-Stems (CIBM; Ooi, Dodd & Walsh, 2015) was used to assess the interpretation bias in preschool children. The CIBM comprehends eight narratives: four involving possible physical threat (e.g., "This is the park. Here is the family walking in the park. Look, there is a high rock. Maria wants to climb the rock. What is going to happen if she climbs the rock?"); two involving possible social threat (e.g., "This is the park. Maria is playing alone. A group of kids walks towards Maria. Why does this happen?"); and two related to separation anxiety (e.g., "Joana is having a fun party at her house. Maria wants to go to the party. Mom is busy, so she drops Maria at the party. Mom is about to drive away. What does Maria do? How does Maria feel?").

The CIBM adaptation process followed Hill and Hill's translate-back method (2000) to obtain a version that corresponded as precisely as possible to the original text while respecting the

Portuguese language and cultural specificities. First, two independent psychologists translated the questionnaire into Portuguese; both versions were discussed, and a consensual preliminary translated version was obtained. In a second step, the Portuguese consensual version was back-translated by an independent researcher with in-depth knowledge of the English language. Then, the original, the Portuguese version, and the retroversion were compared, the found discrepancies were discussed, and the necessary adjustments were made until no relevant inconsistencies subsisted.

In the original study, the investigators asked children to complete the narratives with the help of dolls and additional props. In the present study, children were asked to answer orally. Here, to help explain the narrative to the participants, we used a graphic illustration for each story stem, which was developed by a preschool educator.

Previously to data collection, the provisional Portuguese version of the CIBM (see appendix 1) was evaluated with a small group of preschool children to ensure participants understood the instructions and the stories and tolerated the illustrations used (see appendix 2).

Ambiguous Situations Questionnaire

Interpretation bias in preschoolers was also assessed with the Ambiguous Situations Questionnaire (ASQ; Barrett, Rappe, Dadds, and Ryan, 1996), adapted by Ooi (2012) to preschool children (ASQ–PS). The ASQ-PS includes twelve ambiguous scenarios, six addressing physically ambiguous situations (e.g., "On the way to school, you start to feel sick in the tummy. Do you think: a) you did not have enough breakfast and are just feeling hungry; or b) you ate some bad food and are going to be really sick at school") and six socially ambiguous situations (e.g., "You are having a birthday party, and no one has arrived at your house yet. Do you think: a) no one wants to come to the party; or b) they are running a little late.").

Similarly to CIBM, the adaptation of the ASQ-PS version (Ooi, 2012) followed Hill and Hill's translate-back method (2000) to obtain a version that corresponded as accurately as possible to the original version while respecting the Portuguese language characteristics. As in the original version, each scenario of the ASQ_PS Portuguese version (see appendix 3) was complemented by the original graphic illustration to improve the scenario's comprehension.

Each alternative interpretation was also visually supported by two images, one corresponding to the threatening alternative and the other to the non-threatening alternative (see appendix 4).

Child Anxiety Symptoms

The Preschool Anxiety Scale – PAS (Spence et al., 2001; Portuguese version: Almeida & Viana, 2013) was used to evaluate anxiety symptoms in young children. The instrument consists of twenty-two items describing symptoms associated with five dimensions of anxiety: generalized anxiety (four items); social anxiety (five items); obsessive-compulsive disorder (five items); physical injury fears (two items); separation anxiety (six items). Here, we used the PAS Teacher version. Class educators must rate each item on a 5-point scale (from "not true at all" to "very often true") to show how frequently the symptom occurs to the child. In the Portuguese version (Almeida & Viana, 2013), internal consistency for the PAS global score was adequate (*Cronbach's alpha*: .88).

Procedure

Data collection

Since the population under study included schools in the public education network, we requested and obtained authorization from the Committee for Monitoring Surveys in School Environment (MIME, Portuguese Directorate-General for Education; approval code: 0652900002) before data collection.

All the school boards (public and private) administrations approved the data collection procedures. Subsequently, the children's families were contacted and informed about the goals and procedures of the study. Parents supplied voluntary written informed consent for their children. Each child provided verbal assent to the study procedure and completed the story-stem protocol in a quiet and noise-free environment in their preschool contexts.

The experimenter executed the protocol with the collaboration of the Class Educators. A procedure script was defined to be followed during the assessment session to ensure a standardized methodology across data collectors and participants. The data collector told each participant that they would begin a story and show an illustration and that the child should finish it freely. Children's responses to all the story-stems were written for posterior analysis. The CIBM assessment session lasted around 20 minutes for each child.

For part of the sample (50 children), an extended evaluation protocol was followed to include the Portuguese versions of the ASQ – Preschoolers as a CIBM convergent validity measure. For this subsample, the CIBM was first applied, followed by the ASQ, telling children that they would be shown different stories with some illustrations and that they had to finish choosing the illustration that would best match the end of the story.

One month after the first data collection (retest interval: mean = 32 days, *sd* = 6), a subset of the sample (50 participants) was re-evaluated through the CIBM. The Class Educators of these

50 children were asked to complete the Preschool Anxiety Scale (Almeida & Viana, 2013) for each of their pupils.

Coding Scheme

Children's responses to story stems were transcribed and evaluated using a three-category coding scheme: threatening vs. non-threatening vs. missing. For applying this coding scheme, three independent judges read the responses to each story and assigned a score of 1 if the end of the story reflects a threat interpretation and a score of 0 if the end of the story does not reflect a threat interpretation. If the story-stem responses were vague, doubtful, or unrelated, or if there was a non-answer, the score was considered "missing" (Ooi, Dodd & Walsh, 2015). A fraction of the responses (n = 104 participants, 46.8%) was also coded by a fourth judge.

Data Analysis

The data were processed with the IBM SPSS and R software. The psychometric analysis comprised item analysis, interrater agreement (Fleiss's *kappa* was used since there were more than two judges), confirmatory factor analysis, reliability (internal consistency and test-retest), and validity analysis (Pearson correlation).

Since CIBM items are dichotomous, factor analyses were based on the tetrachoric correlations, assuming a latent continuous normal variable (namely, dispositional interpretation bias) underlying the binary responses to each CIBM item. Tetrachoric correlation matrices were computed with the *psych* R-package (Revelle, 2021).

The *lavaan* R-package (Rosseel, 2012) was used to estimate the measurement model in this study. The categorical diagonally weighted least squares (DWLS) estimation procedure was applied since the items were dichotomic (Bandalos, 2014; Savalei, 2014). Model goodness of fit was evaluated using several robust indices, namely the model's robust X^2 statistic, and the robust versions of the normed chi-square (X^2 / df), the Bentler Comparative Fit Index (CFI), the Tucker–Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA) and the Standardized Root Mean Square Residual (SRMR). The magnitude of these indices was evaluated following the Hu and Bentler (1999) recommendations. Thus, the cut-off criterion for good fit were CFI ≥ 0.9, TFI ≥ 0.9, RMSEA < .05; X^2 / df < 2, SRMR < .1. Internal consistency indicators for CIBM scores were computed using the *semTools* R package.

Results

Response coding

In the four stories involving physical threats, responses were coded as conveying a threatening interpretation whenever the character was physically injured. Examples of threatening

responses were “He fell over and hurt himself” (in story S01, “Climbing the rock”), “The cars run over them” (S04, “Crossing a busy street”), “She will drown” (S07, “Child in the swimming pool”) or “Dog wants to bite the girl” (S08, “Dog run toward children”).

Sometimes, the story's endings do not explicitly convey physical threats but express the presence of potential danger. For example, answers such as “Mom gets angry” (S04) or “Mother ordered him to come down” (S01) are suggestive that the parent’s reaction possibly stems from the fear that the child may be hurt. Consequently, a biased interpretation of the threat was assumed. Some responses to these stories were coded as expressing bias to threat, even if not necessarily the risk of physical harm (for instance, “The child gets lost” in S01). On the contrary, non-threatening codes were given to answers like “The boy will have a nice view from the top of the rock” (S01), “They should wait until seeing the green light to cross” (S04), “She can swim alone” (S07) and “The dog wants to play with the boy” (S08).

For the two stories involving social threats, responses were coded as threatening whenever the character faced social threats (e.g., is ignored, is negatively evaluated by others, is mocked). For example, “They are laughing at the boy because he was dirty” (S02, “Children laughing”) or “They want to make fun of Maria” (S03, “Children approaching”).

Occasionally, the story endings do not convey the expected social threat but express the idea of another kind of potential danger. For example, answers like “To hurt him” (S03) or “To smack him'' (S03) are suggestive that children detect a potentially physically risky situation in which the other children will hurt them. Examples of non-threatening answers were “Children are laughing because they are playing a funny game” (S02) or “They want to play with Maria” (S03).

The stories involving separation anxiety were more complex to code. Answers were coded as threatening if the child in the story is described as afraid of separation from their parents and refuses to leave them. For example, “João threw a tantrum because he wants to go home with his mother” (S05, “Mom drops child at a party”) or “Maria cries and wants to go out with her parents” (S06, “Mom and Dad going out”). Non-threatening codes were given to answers such as “She stays at the party and plays with her friends” (S05) or “She played with the babysitter and had fun” (S06), which reveal that the child in the story did not suffer from the separation from parents.

Frequently the story ending describes the child feeling sad because the parents are leaving but overcoming the separation situation. For example, “Maria feels sad because her mom does not stay, but then she goes to play with friends at the party” (S05), or “Maria goes to play with the babysitter but feels sad because she wanted to go out with her parents” (S06). In these situations, responses were coded as non-threatening; although feeling unhappy, the child in

the story can cope with the separation from parents and accept staying without them at the party (S05) or home (S06).

Table 1.1 shows the agreement level obtained among judges for the codes attributed to the responses of the eight CIBM stories.

Table 1.1 Percentage of agreement among judges (mean, standard-deviation, and extremes) and Fleiss's kappa (n = 272)

Story	**Min.**	**Max.**	**Mean**	**SD**	***Kappa***
S01: Climbing the rock	67% (2)	100% (269)	99.7%	3.20%	.967
S02: Children laughing	67% (1)	100% (268)	99.6%	3.28%	.981
S03: Children approaching	67% (1)	100% (271)	99.9%	2.00%	.986
S04: Crossing a busy street	67% (5)	100% (266)	99.3%	4.68%	.968
S05: Mom drops the child at a party	67% (15)	100% (235)	96.2%	9.81%	.766
S06: Mom and Dad going out	50% (1)	100% (211)	93.8%	11.81%	.653
S07: Child in the swimming pool	67% (1)	100% (270)	99.8%	2.51%	.983
S08: Dog runs toward children	67% (1)	100% (271)	99.9%	2.00%	.995

Note: Minimum percentage (and its frequency); maximum percentage (and its frequency); missing values occurred once in Stories 3, 7, and 8 and three times in Story 2.

The percentage of agreement among judges was nearly 100% for all the stories, except for the two separation anxiety stories: "Mom and Dad going out" story (mean agreement level: 93.8%, due to the judges were not in total agreement in 61 responses) and "Mom drops the child at a party" story (mean agreement level: 96.2%, due to the judges' partial disagreement in 37 responses). Fleiss' *kappa*, a measure of interrater agreement, was excellent (*kappa* > .9), except for the two separation anxiety stories, where agreement may be described as moderate (S06, *kappa* ~ .65) or substantial (S05, kappa ~.77).

The coding of the responses obtained in the retest phase (n = 50) returned similar agreement levels between judges: agreement among judges reached 100% for all stories, except again for the two separation anxiety stories (98.0% for both S05 and S06) and one story about the physical threat (S02, 99.3%).

Item analysis

Table 1.2 shows the percentage of children whose responses to the stories were coded as expressing a threat or non-threat interpretation.

Table 1.2 *Interpretation bias for CIBM stories: frequency and percentage for response codes (n = 272)*

Story	**Threat interpretation**	**Non-threat interpretation**	**Missing**	**Non-response**
S01: Climbing the rock	251 (92.3%)	20 (7.4%)	1 (0.4%)	0 (0.0%)
S02: Children laughing	128 (47.1%)	139 (51.1%)	2 (0.7%)	3 (1.1%)
S03: Children approaching	27 (9.9%)	244 (89.7%)	0 (0.0%)	1 (0.4%)
S04: Crossing a busy street	95 (34.9%)	177 (65.1%)	0 (0.0%)	0 (0.0%)
S05: Mom drops the child at a party	43 (15.8%)	229 (84.2%)	0 (0.0%)	0 (0.0%)
S06: Mom and Dad going out	53 (19.5%)	219 (80.5%)	0 (0.0%)	0 (0.0%)
S07: Child in the swimming pool	224 (82.4%)	47 (17.3%)	0 (0.0%)	1 (0.4%)
S08: Dog runs toward children	93 (34.2%)	177 (65.1%)	1 (0.4%)	1 (0.4%)

Two of the physical threat stem stories, “Climbing the rock” (S01) and “Child in the swimming pool” (S07), led the participants to provide a high percentage of responses expressing threatening interpretations (92.3% and 82.4%, respectively). On the other hand, the “Children approaching” story (S03) produced an extremely low rate of threatening interpretations (9.9%). Between these extremes, the remaining stories showed dispersed levels of threatening interpretations (between 16% and 47%). The percentage of “missing” scores and non-responses was residual. Overall, these results suggest that the different stories target preferentially distinct levels of interpretation bias tendencies among the young respondents.

As previously stated, the kind of risk conveyed by the response did not always correspond to the type of story stem. However, this mismatch rarely occurred: only in responses to S03 (seven endings referring to physical threat in this social menace story-stem) and in two responses to S01 (referring to non-physical threat in this risky physical story).

CIBM structure

Responses to CIBM stories were coded as dichotomic variables, so the analysis of the CIBM internal structure should be based on tetrachoric correlations (Table 1.3).

Table 1.3 *Correlation matrix (tetrachoric correlations; n = 272)*

	S01	S02	S03	S04	S05	S06	S07	S08
S01	1.000							
S02	.236	1.000						
S03	-.136	.436	1.000					
S04	.318	.245	-.025	1.000				
S05	.141	.326	.210	.272	1.000			
S06	-.010	.162	.189	-.092	.582	1.000		
S07	.227	.265	.406	.601	.311	-.093	1.000	
S08	.061	-.028	.407	.173	.094	.137	.165	1.000
tau	-1.450	0.065	1.286	0.387	1.002	0.860	-0.943	0.407

The *tau* value (bottom line in Table 1.3) is determined during tetrachoric correlation estimation and indicates the level in the hypothetical latent trait (dispositional interpretation bias) the child must have to give a threatening end to each story; thus, *tau* reflects the percentage of threatening responses already presented in Table 1.2, but now expressed in *z*-scores.

Correlations between stories are mostly weak: only eight out of 28 coefficients were above .30. The strongest correlations (above .4) are between two separation anxiety stories (S05 and S06) and between two physical threat stories (S07 and S04). S03 is the story that correlated more strongly with the other ones, establishing an association with the other social threat story (S02, r = .44) and with two physical stories (S07, r = .41; S08, r = .41).

The one-factor model was tested using confirmatory factor analysis to assess whether CIBM stories truly measure a unique latent dimension (the dispositional interpretation bias). The fit of the unidimensional model (M1) was not acceptable (robust *CFI* and *TLI* clearly below .9 and *RMSEA* close to .1; see Table 1.4). Loadings were positive, but only three were above the desirable 0.5 (S04, S06, and S07); all loadings were non-significant ($p \geq .096$).

Table 1.4 *Testing models for CIBM latent structure (tetrachoric correlations; n = 272)*

Models	X^2 *rob*	*df*	*p*	X^2*/df*	*rob CFI*	*rob TLI*	*rob RMSEA (90% CI)*	*SRMSR*
M1 – one factor	64.03	20	< .001	3.2	.628	.479	.090 [.060, .115]	.148
M1a – one factor + 1 cov	35.92	19	.011	1.9	.857	.789	.057 [.027, .086]	.117
M1b – one factor + 2 cov	28.02	18	.062	1.6	.915	.868	.045 [.000, .076]	.104
M2 – 3 factors *	33.15	18	.016	1.8	.872	.801	.056 [.024, .085]	.114
M2a – 3 factors + 1 cov *	23.32	17	.139	1.4	.947	.912	.037 [.000, .071]	.099

* Due to the presence of a Heywood case, an equality constraint was imposed on the S05 and S06 indicators.

Modification indices suggest a correlation between the residuals associated with S05 and S06 (both separation anxiety stories; r = .582). Including such a correlation between residuals improved the model (robust ΔX^2 = 20.24, Δdf = 1, p < .001), indicating that responses to separation anxiety stories may have a uniqueness not shared with the remaining stories. However, this modified model M1a does not fit the data (robust *CFI* < .9; *TLI* <. 9; *RMSEA* > .05; *SRMSR* > .1; see Table 1.4). Different covariances between residuals were included (between S03 and S08, a social and a physical threat stories; r = .407), again significantly improving the model (robust ΔX^2 = 6.4, Δdf = 1, p = .012) and leading to an acceptable fit (M1b: non-significant robust X^2, robust *CFI* > .9; *TLI* ~ .9; *RMSEA* < .05; *SRMR* ~ .1; see Table 1.4).

However, adding *ad-hoc* covariances between residuals suggests that the hypothesis for CIBM's one-dimensionality is debatable. The alternative theoretical structural hypothesis (multidimensionality of the responses to CIBM) was tested, considering three latent dimensions related to the three threat domains contemplated by CIBM scenarios: physical, social, and separation risks (model M2; Table 1.4). This model shows a near satisfactory fit (significant robust X^2, robust *CFI* ~ .9; *TLI* ~ .8; *RMSEA* ~ .06; *SRMR* ~ .1; see Table 1.4). Modification indices suggest adding a covariance between the residuals associated with S03 and S08, and its inclusion improved the model significantly (robust ΔX^2 = 8.22, Δdf = 1, p = .004). This modified model shows a good fit for the data. Parameter standardized estimates for model M2a are displayed in Figure 1.1. Almost all loadings were significant, yet below .5

for two physical stories (S01 and S08); correlations between latent dimensions were moderate (~.4) or negligible (~.2).

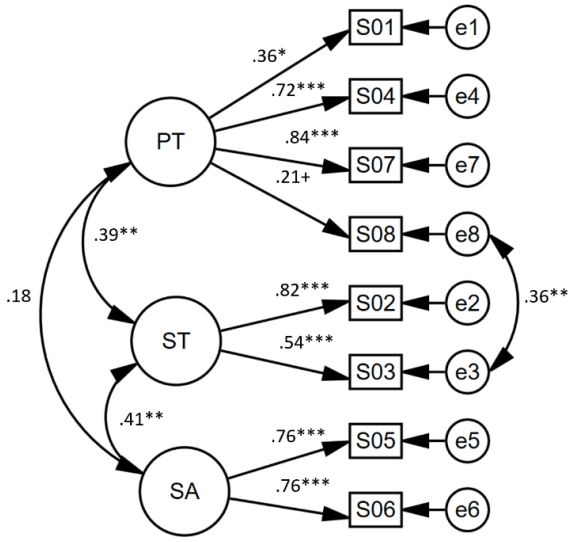

Figure 1.1 *CIBM latent structure: diagram for the three-factor model (standardized loadings and covariances);*
*+ p < .1; * p < .05; ** p < .01; *** p < .001*

CIBM reliability

The internal consistency of the scores provided by CIBM was assessed through different procedures. It is known that Cronbach's *alpha* underestimates true reliability for congeneric measures, which seems to be the case of CIBM, considering the observed differences in item difficulty. Furthermore, underestimation of Cronbach's *alpha* becomes more serious when the items are dichotomic because correlations among binary items (*phi* coefficients) tend to attenuate true correlations (namely, the maximum value for the phi coefficient is not necessarily the unity and is determined by the joint distribution of the two dichotomic variables).

This theme has been the subject of a recent debate (Chalmers, 2018; Flora, 2020; Sun et al., 2007; Zumbo, Gadermann & Zeisser, 2007; Zumbo & Kroc, 2019), and a satisfactory consensus has not yet been reached. So, we opted to present three measures of reliability based on internal consistency: 1) the Kuder-Richardson coefficient (KR20), which corresponds to the traditional Cronbach's *alpha* for binary items and is based on observed correlations; 2) McDonald's *omega* coefficient, which takes in consideration the differential saturation of each item to the latent dimension being measured (congeneric measurement model), but based on observed correlations; 3) *omega* coefficient, an ordinal version of the McDonald's *omega* based on implicit tetrachoric correlations and that takes in consideration the differential

saturation of each item to the latent dimension being measured[1]. Reliability indicators for internal consistency are reported in Table 1.5.

Table 1.5 *Internal consistency indicators for CIBM scores (n = 272)*

Score	KR20	McDonald's ω	*Omega*
CIBM physical	0.344	0.437	0.633
CIBM social	0.302	0.400	0.635
CIBM separation	0.513	0.516	0.736
CIBM total	0.455	0.550	0.666

KR20: Kuder-Richardson coefficient (based on observed correlations); McDonald's ω: Mc Donald's *omega* coefficient (based on observed correlations); *Omega*: ordinal Mc Donald's *omega* coefficient (based on tetrachoric correlations).

Internal consistencies were not satisfactory when computed directly from observed binary data. For instance, the internal consistency for the total score was KR20 = .455 (95% confidence interval based on 1000 bootstrap samples: [.36, .53]), being far from the recommended level (above .7). Considering CIBM multidimensionality, the scores associated with the three latent dimensions were evaluated for internal consistency. Again, the KR20 coefficients were unsatisfactory (apparently, the most reliable score corresponds to the separation anxiety dimension, KR20 = .513).

Computing McDonald's *omega* from binary data, which considers each item's differential saturation, reveals only slightly better reliability indicators: physical threat, ω = .437; social threat, ω = .400; separation anxiety, ω = .516.

However, if we assume that the dichotomous response to each item reflected the discretization of a latent continuous variable (the predisposition for interpretation bias) and used the implicit tetrachoric correlations to estimate the correlation between latent variables, internal consistency for CIBM scores gets near the recommended level (.7).

[1] As Napolitano, Callina and Mueller (2013) said, "a WLS-based approach using tetrachoric correlations is the most appropriate method for estimating reliability for dichotomous data that represent normally distributed true scores. Computing ω from tetrachoric correlations therefore provides a reliability estimate that is sensitive to heterogeneous item quality and uses values consistent with the categorical nature of the data." (p. 149).

Table 1.6 *Temporal stability for CIBM scores: test and retest descriptive statistics (mean, standard deviation, paired-sample t-test, Cohen's d) and Pearson correlation r (n = 50)*

	Test (mean ± sd)	Retest (mean ± sd)	*t* (*df* = 49)	Cohen's *d*	*r*
CIBM physical	63.5% ± 27.7	61.5% ± 20.3	0.68 (*p* = .498)	0.09	.541 (*p* < .001)
CIBM social	27.0% ± 30.7	27.0% ± 28.9	0.01 (*p* = .999)	0.00	.599 (*p* < .001)
CIBM separation	11.0% ± 29.1	11.0% ± 25.3	-0.00 (*p* = .999)	0.00	.594 (*p* < .001)
CIBM total	41.2% ± 16.0	40.2% ± 13.9	0.54 (*p* = .591)	0.07	.626 (*p* < .001)

The test-retest analysis provided fair indicators of temporal stability for the CIBM total score: CIBM measures obtained 30 days apart were positively correlated (*r* = .626), and a negligible difference was observed between the two moments (Table 1.6).

Somewhat lower correlations were observed for the three partial scores computed from CIBM (between *r* = .541 and *r* = .599, respectively, for the physical and social threat scores).

Validity

The correlation between CIBM scores and a concurrent measure of anxiety symptomatology (PAS) revealed satisfactory indicators of convergent validity in this sample (Table 1.7). Overall, correlations between CIBM total score and PAS scales were positive and had a moderate magnitude (except for PAS physical injury fears scale).

The CBIM physical threat and CBIM separation anxiety scores showed a similar, although weaker, correlation pattern. CBIM social threat score only correlated significantly with PAS social anxiety scale (*r* ~.3). Only scores related to physical harm (both in CIBM and PAS) did not significantly correlate with other measures.

The Ambiguous Situations Questionnaire is an alternative measure to assess bias interpretation in preschool children. Correlations with CBIM scores are moderate (between. 4 and .5), except for separation anxiety (*r* ~ .2).

Table 1.7 *Correlation between the CIBM scores, Preschool Anxiety Scale (PAS), and Ambiguous Situations Questionnaire (ASQ) (Pearson correlation r; n = 50)*

	CIBM total	CIBM physical	CIBM social	CIBM separation
PAS subscales				
GA	.481***	.367**	.111	.370**
SA	.527***	.293*	.286*	.402**
OCD	.322*	.268º	.020	.270º
PIF	.014	-.008	-.200	.255º
SEP	.650***	.343*	.209	.677***
Total	.577***	.354*	.175	.534***
ASQ – Total	.524***	.446***	.409**	.155

Preschool Anxiety Scale (PAS): GA - generalized anxiety; SA - social anxiety; OCD - obsessive-compulsive disorder; PIF - physical injury fears; SEP - separation anxiety; Total - PAS total score. ASQ – Ambiguous Situations Questionnaire total score.

º $p < .1$; * $p < .05$; ** $p < .01$; *** $p < .001$

Score distribution

The distribution characteristics of the scores provided by CIBM are reported in Table 1.8.

Table 1.8 *CIBM scores distribution: descriptive statistics (n = 272)*

	Mean	SD	Min – Max	Sk	Kt
CIBM physical	61.1%	23.68%	0% – 100%	-0.181	-0.506
CIBM social	28.7%	31.64%	0% – 100%	0.645	-0.551
CIBM separation	17.7%	31.29%	0% – 100%	1.573	1.250
CIBM total	42.1%	18.34%	0% – 88%	0.206	-0.471

SD – standard deviation; Min-Max – minimum and maximum; Sk – skewness; Kt – kurtosis.

Considering the small number of items for the CIBM partial scores, it does not make sense to inspect the normality of their distribution. However, it is worth noting that while the CIBM physical threat score shows a negative asymmetry, the social threat and the separation anxiety scores distributions are positively skewed with a floor effect (50% of the sample or more obtained a score of 0%).

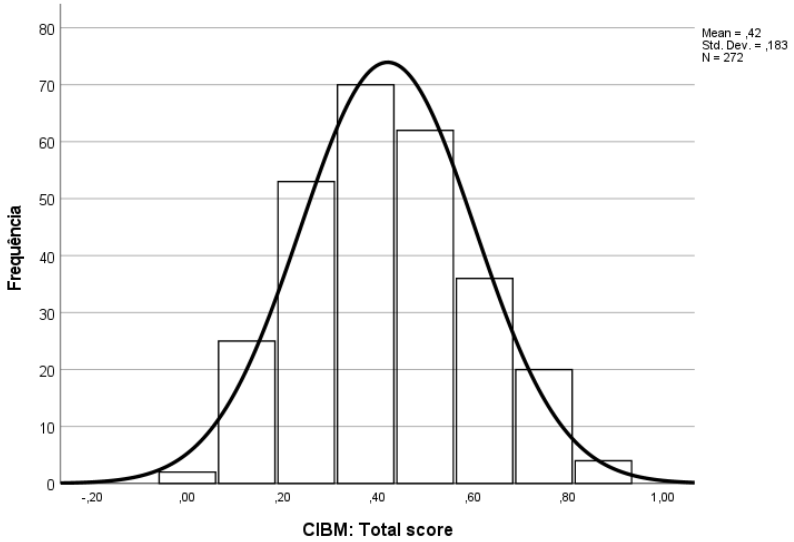

Figure 1.2 *CIBM total score distribution*

Individual differences

Gender differences were negligible (Cohen's *d* < 0.2) and non-significant for all the CIBM scores (Table 1.9).

Table 1.9 *Gender differences in CIBM scores (mean, standard deviation, independent samples t-test, Cohen's d)*

	Boys (n = 154) (mean ± sd)	Girls (n = 118) (mean ± sd)	*t* (*df* = 270)	Cohen's *d*
CIBM physical	59.4% ± 25.1	63.4% ± 21.6	1.36 (*p* = .175)	0.17
CIBM social	30.8% ± 33.4	25.8% ± 29.0	-1.29 (*p* = .197)	-0.16
CIBM separation	18.5% ± 31.8	16.5% ± 30.7	-0.52 (*p* = .606)	-0.06
CIBM total	42.1% ± 18.8	42.3% ± 17.8	0.10 (*p* = .922)	0.01

Discussion

The present study aimed to develop a Portuguese Version of the Children's Interpretation Bias Measure – Ambiguous Story-Stems (CIBM; Ooi, Dodd, & Walsh, 2015) and to assess its psychometric properties in a sample of preschool children aged between 45 and 71 months. CIBM comprises eight ambiguous stories about possible physical, social, and separation anxiety threats (Ooi, Dodd & Walsh, 2015). To date, this is the first attempt to evaluate the factor structure of the CIBM and its psychometric properties.

The eight stories were translated into Portuguese, and illustrative pictures (made in collaboration with preschool educators and based on similar illustrations used by Ooi (2012)) were presented to provide visual support to the story stems, helping children visualize the narrative line. This is a change concerning the original materials used by Ooi, Dodd and Walsh (2015).

Since the CIBM involves open responses from children, content analysis was required to verify if the response reflects what the instrument was supposed to measure (interpretation bias for threat). Using Ooi and colleagues (2015) coding procedure, it was possible to classify almost all responses as "threat" or "non-threat" (with "missing" code being attributed to less than 1% of the responses). Our residual percentage of missing codes contrasts with Dodd and colleagues (2012)'s and Ooi, Dodd and Walsh's (2015) much higher missingness (18% and 12%, respectively). One possible explanation for this difference is that graphic illustrations for each story may have helped the child interpret the situation adequately and induced less ambiguous endings, leading to a lower percentage of "missing" codes than in previous studies. Another probable reason is the involvement of several class educators in the data collection procedure. Although an application protocol was elaborated to standardize the procedure among the various data collectors (including class educators), it is possible that some did not meticulously follow the protocol and tried to help some children finish the story stems.

The code allocation was almost consensual among the three/four judges, as expressed by the excellent level of interrater agreement index attained (between 93% and 100%; Fleiss's kappa above .9 for all except two stories). In short, this means that the coding procedures used allow to reliably categorize the presence of threat bias in the child's response to CIBM stories. However, this interrater agreement does not guarantee the validity of the coding procedures. Some responses were particularly difficult to code, and objective coding criteria had to be negotiated. This difficulty occurred mainly in the separation stories, as reflected by the observed lower agreement between judges. For instance, in the "Mom and Dad going out" story (S06), answers like "being sad when parents leave" were assumed not to reflect separation anxiety because this putative signal of anxiety may reflect a normative behavior in

such situations. Also, in the “Mom drops child at a party” (S05), answers like “being sad because mom will not stay, but then goes play with his friends” were, again, assumed not to reflect separation anxiety since they may describe an expected behavior in this situation. Some answers were also tricky to code in physical story stems, requiring the definition of objective criteria. For example, answers like “Mom said to be careful” (in the “Climb the rock” story, S01) or “wait for the cars to stop so they can pass” (in the “Cross busy street”, S04) although may reflect (implicitly) the presence of threat, were coded as “non-threat” since they express just a normative behavior of parents towards younger children in these situations. In future applications, we recommend that the CIBM application procedure should include additional questioning of the child whenever the meaning of the response is not totally clear, even including a direct questioning about the presence of a threat in the response. Alternatively, graded codes can be used to ensure that they accurately match the level of interpretation bias expressed by the child in each story.

Some stories have induced interpretations that do not match the intended specific content (e.g., a physical harm threat interpretation in a social threat story). Although rare, these situations are relevant if partial scores (reflecting bias to specific threat domains) are intended.

Despite the drawbacks mentioned above, the content analysis of the answers to the CIBM stories suggests that this instrument seems to capture what it intends to measure – the interpretation bias of preschool children in ambiguous situations.

Item analysis showed that some stories evoked biased interpretations more easily than others. We found that two of the physical threat stories (“Climbing the rock”, S01; “Child in the swimming pool”, S07) induced a high percentage of interpretation bias in the sample (above 80%). This result may corroborate the idea that physical situations are one of the main domains that small children tend to represent and interpret as threatening (Campbell & Rapee, 1994; Klein et al., 2018). Nevertheless, not all the physical threat stories induced high rates of interpretations bias: “Crossing a busy street” (S04) and “Dog runs toward children” (S08) reached only 35% and 34%. Perhaps this heterogeneity may result from the specificities of each story: the rock (S01) and the swimming pool (S07) scenarios may have more physical harm connotations since children could not have their parent’s help in the situation (climb the rock alone and let go of mom's hand in the pool). The variation is also high among social domain stories, where S02 (“Children laughing”) generated 47% of threat biased responses, while S03 (“Children approaching”) had the lowest rate of interpretation bias (10%). Again, this heterogeneity may be due to the specific situation described in the story: in S02, children's laughter (interpreted as mocking) is more socially threatening than children approaching in S03 (interpretable as an invitation to play with). So, we believe these variations in threat levels between stories are due more to the stories' specific content than to the importance of one

domain for interpretation bias. Reducing the impact of specific story content in CIBM scores would require more story stems involving different scenarios for each threat domain.

The variation of the percentages of threat interpretation among stories (ranging from 10% to 92%, corresponding to *tau* values from -1.5 to 1.3) suggests that different stories target distinct levels of dispositional interpretation bias among preschoolers. For instance, when confronted with story S01, any child will likely produce a biased ending (the corresponding *tau* value -1.5 may be interpreted as a *z*-score, indicating that even a child with low interpretation bias will provide a risky ending to this story). Consequently, this story-stem does not enable discrimination to be moderate or high levels of dispositional interpretation bias. On the contrary, story S03 only induced 10% of biased responses, suggesting that it cannot discriminate medium or lower levels of dispositional interpretation bias. Therefore, we recommend again that more stories should be included in the instrument for a more systematic and sensitive "coverage" of the entire interpretation bias gradient that children may express.

The factor analysis (confirmatory factor analysis, CFA) showed that CIBM does not measure a unique dimension. The one-factor model did not attain a proper fit, and five out of the eight stories showed low loadings (below the recommended .5). That suggests that these eight story stems do not reliably reflect the putative underlying concept and that most of the variance in responses is attributable to other unspecified factors.

Rejected the hypothesis of one-dimensionality, a three-factor measurement model was tested based on the three threat domains addressed by the CIBM stories. This model showed a near-satisfactory fit that improved when a covariance between residuals (associated with S03 and S08) was added. Thus, this modified model suggests that CIBM assesses three dimensions associated with three threat domains in preschool children: an interpretation bias for physically risky situations, an interpretation bias for social situations, and an interpretation bias for separation situations. Since these three dimensions are not strongly related, the hypothesis for a generic predisposition for interpretation bias across situations is not supported in this population. The lower loading for the S08 story and the required covariance between S03 and S08 residuals, not expected *a priori*, suggested that the physical threat dimension is not particularly relevant for the S08 story ("Dog runs toward children"). Perhaps some children did not recognize the dog as a physical threat: many of them like dogs, have a dog, or frequently play with dogs, and the dog's presence (friendly or non-friendly) might have been interpreted as a kind of social rejection/acceptance situation.

Reliability for the CIBM scores was also estimated. As expected, due to the rejection of one-dimensionality, results indicated an unsatisfactory internal consistency for the CIBM total score. Even though all the stories induced threatening endings, these threatening endings

were not provided consistently across stories by the same participants. So, if a child makes a threatening interpretation of a specific story, they will not necessarily express a similar bias in other stories of the same domain. Consequently, internal consistency across the eight CIBM stories was not guaranteed.

When partial scores (corresponding to three threat domains) were analyzed for internal consistency, results were mixed and depended on the computational approach adopted. Indeed, a recent debate on the way internal consistency should be computed for composite scores based on dichotomous items has defined two main approaches: the “ordinal alpha” approach computes internal consistency of a score composed of dichotomous items based on the tetrachoric correlations (Zumbo, Gadermann & Zeisser, 2007; Zumbo & Kroc, 2019), assuming that this coefficient estimates reliability as if the responses obtained reflect truly continuous latent dimensions (and not their dichotomic manifestation effectively observed); the other approach considers that reliability should be based on the observed dichotomous items, regarded as a discretized version of the latent continuous process under study (Chalmers, 2018). Since both approaches seem acceptable from a statistical point of view, recommended practices will depend on the researcher’s goals and the theoretical and practical meaning assigned to each coefficient. For instance, Yang and Green (2015) asserted that applied researchers should be more interested in the observed total score's reliability than in the latent total score's reliability. That is mainly because observed scores, rather than latent ones, are most frequently used to differentiate among individuals in research and practice. In the present study, reliability based on the internal consistency of observed dichotomous variables was insufficient ($.40 \leq \omega \leq .55$). At the same time, it was almost satisfactory when based on the internal consistency of latent variables ($.63 \leq$ ordinal *omega* $\leq .74$). Considering the psychometric challenge involved in the estimation of internal consistency for composite scores based on dichotomic variables, which is aggravated by the reduced number of items (two scores are based only in two items), it is not possible to endorse satisfactory reliability for CIBM scores based on the internal consistency approach.

However, the test-retest approach to reliability revealed almost satisfactory temporal stability, i.e., scores obtained approximately one month apart seem to be consistent (test-retest $r \sim .6$), suggesting that participants’ responses were not produced at random.

The correlations between CIBM scores and a concurrent measure of interpretation bias (ASQ) were positive and moderate, especially for the CIBM total score ($r = .52$) and for the partial scores related to physical ($r = .45$) and social threat ($r = .41$). Since the separation anxiety dimension was absent in ASQ scenarios, it partly expectable the non-significant correlation with CIBM separation score. Although CIBM and ASQ share some features (story-stem methodology and even two situations were similar in the two tasks), stories in ASQ are more

heterogeneous. They have a different response format (forced-choice), so scoring does not depend on judge ratings. So, the consistent results obtained with CIBM and ASQ suggest convergent validity in the sample.

A concurrent measure of preschool children's anxiety (PAS) also provided satisfactory indicators of construct validity. Specifically, the CBIM total score correlated positively (r ~ .5 or above) with almost PAS dimensions (except with the Physical Injury Fear and the obsessive-compulsive dimensions). This finding converges with several previous studies, suggesting that the predisposition to interpretation bias is associated with anxiety symptoms (Blote et al., 2014; Dodd et al., 2012; Miers et al., 2008) and thus supporting the hypothesis that the CIBM total score reflects interpretation bias. The CIBM separation anxiety score was also highly correlated with the PAS separation anxiety subscale (r ~ .7), strengthening the validity of this partial score. Unexpectedly, the CIBM physical threat score did not correlate precisely with the PAS Physical Injury Fear subscale; indeed, this subscale did not correlate positively with any CIBM score, a result whose interpretation we leave open. The CIBM social threat score showed weak correlations with all PAS dimensions (r < .3). However, the strongest correlation was with the theoretically corresponding subscale (social anxiety). Perhaps this result may reflect that CIBM responses to social threat stories were not strongly determined by an interpretation bias driven by social fears and concerns associated with peers relationship. They might reflect other fears (as suggested in the story with the approaching dog, S08). Furthermore, it is known that clinically socially anxious preschool children make more threatening interpretations of ambiguous story stems than non-social anxious children (Dodd et al., 2012). So, the less evident bias for social threat may partly result from using a community, non-clinical sample for young children.

The psychometric analysis of CIBM responses indicates that this instrument is not unidimensional and that interpretation bias may be markedly dependent on the specific fear domains being assessed. Although the CIBM total score lacks internal consistency, it showed temporal stability and correlated with an alternative interpretation bias measure as well as with a theoretically relevant construct (measured by PAS). This pattern of results suggests that the construct measured by CIBM – interpretation bias – may have several facets not necessarily associated. This means that a child that shows physical threat interpretation bias will not necessarily show social or separation interpretation bias (or vice-versa). Furthermore, stories associated with one domain may not be totally equivalent: a child that shows threat interpretation bias in one physical story (“Climbing the rock”, for instance) may not necessarily express the same bias in another story from the same physical domain (“Child in the swimming pool”). The interpretation bias may not require that children be consistently biased across stories and domains. This possibility finds support in studies that argue for content-specific

negative interpretation biases in children (Mobach et al., 2019; Stuijfzand et al., 2017): children are more sensitive to threat-related scenarios that match the content of their specific anxiety or fears, and consequently, will not produce biased interpretations in other domains or situations. If this hypothesis is correct, the psychometric measurement model appropriate for CIBM would not be the traditional reflective model (Diamantopoulos & Winklhofer, 2001), which assumes that stories are indicators that reflect coherently (in the sense that they are an effect of) the same latent construct (a generic dispositional interpretation bias). The total CIBM score may be viewed alternatively as integrating components from different domains (physical, social, separation anxiety) not necessarily correlated, forming a summative score that indexes the latent construct being measured (idiosyncratic dispositional interpretation bias). In such case, psychometric analysis of CIBM could be more appropriately accommodated in the formative measurement perspective (Bollen & Diamantopoulos, 2017), where observed indicators (stories) form – in the sense that they cause – the latent dimension and are not required to be intercorrelated. This topic needs additional investigation to clarify whether the lack of internal reliability is intrinsic to the construct being measured (and so, the psychometric analysis for CIBM should follow the formative measurement approach instead of the traditional reflective one) or, instead, it is just a consequence of a small number of excessively heterogeneous stories in each dimension.

The distribution of the CIBM total score is approximately normal, with a mean of 42% and a standard deviation of 18%, which shows the sensitivity of the CIBM to individual differences. This global level of interpretation bias in our sample is clearly higher than that obtained in the Ooi study (only 29 % of the responses were coded as biased interpretations). The sensitivity of the CIBM partial scores is low. These scores are based on a small number of items (which necessarily imposes a reduced number of measuring levels); the social threat and the separation anxiety scores revealed a floor effect (insensitivity to differences in the low range of the interpretation bias variable). In contrast, the physical threat score showed signs of a ceiling effect (relative insensitivity to differences in the high range of the interpretation bias variable).

Results indicated non-significant gender differences in CIBM scores, corroborating findings from other studies (Ooi, Dodd & Walsh, 2015; Spence et al., 2001). This result contrasts with much of the literature on older children that suggest that girls manifest higher anxiety levels and more fears, such as minor injury, animals, and danger (Craske & Glover, 2000; Ollendick, Yule & Ollier, 1991). Indeed, we observed that girls conveyed more biased interpretations of potential physical risk stories than boys, although the difference was non-significant. Other studies suggest that adolescent girls tend to make more threat interpretations than boys, but only in social threat situations (Gluck et al., 2014; Miers et al., 2008).

Results also showed a null correlation between children's age and the incidence of interpretation bias. These results do not corroborate Blossom and colleagues (2013) and Waite, Codd and Creswell's (2015) findings in studies with children aged 7 to 17, in which older children have higher negative interpretation bias. Even so, a small but marginally positive correlation was observed with CIBM social threat score, suggesting that older children were more susceptible to negative interpretation in social contexts. Thus, one possible explanation for these results might be the narrow age interval (between 48 to 72 months), which may have attenuated correlations because the development differences are not marked enough to be significantly reflected in interpretation bias differences.

This study has several limitations, and its results should be interpreted cautiously. One of the main limitations involves the data collection procedure. Although an assessment protocol was followed, the collaboration of the Class Educators in data collection did not guarantee that they rigorously followed the instructions. Consequently, two possible complications may have occurred: they encouraged/forced the child to answer or did not fully register their answers. In this sense, a possible solution for this problem in future applications could be to ask parents' permission for the entire recording (audio or video) of children's assessments. Other important limitations are related to the CIBM itself: an insufficient number of stories for each threat domain (although physical threats involved four story-stems, separation anxiety, and social threats stories had only two story-stems each); the stories do not cover the entire interpretation bias gradient that children may show; some stories (live “Crossing a busy street”) induced very conventional and normative responses, perhaps preventing the expression of possible interpretation bias by the children; finally, the response dichotomic coding entails considerable analytic difficulties.

Conclusion

As we mentioned earlier, the present study was the first attempt to develop the Portuguese Version of the Children’s Interpretation Bias Measure – Ambiguous Story-Stems (CIBM; Ooi, Dodd, & Walsh, 2015) and to evaluate its factor structure. Overall, our results produced positive indicators that this ambiguous story stems methodology could provide interpretation bias measure in young children. However, due to methodological limitations and the instrument itself, our results should be interpreted just as a step in improving CIBM quality. More work must be done to develop a solid psychometrically reliable and viable instrument for interpreting bias in preschool children.

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Chapter II. Effect of Parental Interpretation Bias on Preschool Children Interpretation Bias

Introduction

Information-processing biases have been increasingly recognized as etiological factors of anxiety and other psychological disorders. Various investigations point to an association between the predisposition to threat interpretations and anxiety (Barrett et al., 1996; Creswell, Schniering & Rapee, 2005; Dineen & Hadwin, 2004), being this negative (threatening) interpretation bias considered one of the central aspects of cognitive behavioral models of anxiety (Beck & Clark, 1997; Klein et al., 2018).

Although researchers have given much attention to biases in children's information processing, few models were specifically developed to describe the role of cognitive biases in the unique context of childhood (e.g., Field, Cartwright-Hatton, Reynolds, & Creswell, 2008). In fact, although it has been recognized that theoretical models delineated for adults may not reflect the accurate cognitive and emotional responses that children display during development, the role of bias in childhood anxiety is mainly looked at through those adult models (Field & Lester, 2010). Given the role cognitive bias seems to have in the onset and maintenance of psychological disorders, investigating the origin of such biases during a child's development is a timely and relevant topic.

Researchers estimate that 60-70% of biases in cognitive processes are due to environmental factors (Eley & Zavos, 2010). According to Field and Lester's (2010) acquisition model, biases can be acquired and learned (Muris & Field, 2010). Children can develop cognitive biases through learning and reinforce them through interaction with parents (Drake & Ginsburg, 2012; Hadwin, Garner & Perez-Olivas, 2006). In addition, several studies (Lau, Pettit, & Creswell, 2013; Mathews & Mackintosh, 2000; Wilson et al., 2006; Muris et al., 2008; Muris et al., 2009) suggest that the predisposition to interpretation bias can be trained to cope with threatening situations.

Considering that biases can be learned, the literature indicates that family factors may play a significant role in the manifestation of interpretation bias during development. Lester and colleagues (2009) suggested that parents' biases (interpreting threateningly ambiguous scenarios involving themselves) may generalize to situations involving their children. Creswell and colleagues (2011) suggest that parents' (especially mothers') biased interpretation may directly influence their child's threat interpretation through modeling or verbal transmission; this conclusion was later corroborated by Micco and colleagues (2014) study. Podina, Mogoase, and Dobrean (2013) suggested that mothers' information processing bias affects children's ability to interpret ambiguous situations. Remmerswaal, Muris and Huijding (2016) also

observed that mothers who verbally convey threat-related information about an animal story to their children lead them to develop an intensified fear of the unfamiliar animal. Ooi, Dodd and Walsh (2015) observed that children's interpretation bias correlated with the amount of bias their parents expressed in completing their children's ambiguous stories (how parents communicated and told each of the ambiguous stories to their children), suggesting that parental verbal information influences children's interpretation bias. Overall, these studies suggest the possibility of intergenerational transmission of interpretation bias from parents to children by passing biased thinking styles from generation to generation.

As described in the previous chapter, Ooi, Dodd and Walsh (2015) studied the relationship between parents' interpretation bias toward their infants and preschoolers (between 2 and 5 years old). Exploring the early origin of interpretation bias requires reliable, age-appropriate instruments. One of the most commonly used approaches to asses young children's interpretation bias is confronting them with ambiguous situations (scenarios). Ooi and colleagues (2015) presented children with a story-stem instrument (eight ambiguous scenarios), asked them to complete the narrative, and analyzed the answers looking for threat biased interpretations. The authors also asked the parents (45 mothers and five fathers) to write down the end of the same narratives as they would tell them to their children. The results suggest a relationship between children's interpretive bias and the threat conveyed by their parents' written narratives. However, this effect was observed only for infants (2-3 years old), especially in girls, but not for preschool children (4-5 years old). Furthermore, the relationship between parental narrative and children's anxiety symptoms was not demonstrated. These results support the hypothesis that verbal information transmitted by parents can influence their children's biases, at least for infants.

The tendency to interpret ambiguous situations threateningly appears to be associated with child-specific individual and family characteristics (Creswell, Schniering, & Rapee, 2005; Taghavi et al., 2000). Some authors suggest that genetic inheritance may also play an essential role in the development of cognitive biases in children (Eley & Gregory, 2004; Eley & Zavos, 2010). In this context, several authors suggested that temperamental factors (*e.g.*, behavioral inhibition) can be related to the development of cognitive biases in children (Claus & Blackford, 2012; Chronis-Tuscano et al., 2009; Hudson, Dodd & Bovopoulos, 2011; Rapee & Coplan, 2010; White et al., 2016), particularly to the predisposition to threat interpretation in ambiguous situations.

Behaviorally inhibited temperament (also known as shy, reticent, fearful, inhibition to novelty or behavioral inhibition) is characterized primarily by anxiety, hypervigilance, and withdrawal when confronted with unfamiliar or novel situations and by concomitant avoidance of such situations (Kagan 2001). This temperament facet manifests itself very early and can be

measured within one year of birth (Fox et al. 2005). According to various studies, behavioral inhibition is associated with anxiety (Fox & Pine, 2012; Kagan, 2001; Muris et al., 2001). Perez-Edgar and Fox (2005) report that children experiencing highly negative affect in response to novelty showed more behavioral constriction toward objects threatening them. Faced with unfamiliar stimuli, events, or challenges, they may become biased toward negative affect (Fox & Pine, 2012; Lonigan & Vasey, 2009; Lonigan et al., 2004). In addition, more recently, it has been suggested by Niditch and Varela (2018) that diminished effortful control (i.e., temperamental self-regulation) might explain the association between behavioral inhibition and anxiety symptoms in early childhood. However, we note that the relationship between inhibited temperament and the manifestation of interpretive biases in preschoolers has been poorly studied (only one study, with inconclusive results; Dodd et al., 2012), leaving room to explore the direct impact of behavioral inhibition on interpretation bias or its moderating effect on the putative transmission of bias between parents and preschool children.

Parental variables can also contribute to the transmission of interpretation bias between parents and children. Several authors suggest that parenting styles are relevant predictors of the development of cognitive biases during childhood (Blossom et al., 2013; Edwards, Rapee & Kennedy, 2010; Hudson et al., 2011; Lindhout et al., 2006; Rapee & Heimberg, 1997; Van der Bruggen, Stams & Bögels, 2008).

Rappe and Heimberg (1997) suggested that excessive parental control may reinforce children's belief that they cannot help themselves. The message that parents do not think they are competent negatively affects their mental representation of others' opinions of their performance. Lindhout and colleagues (2006) also suggest that overprotective parenting reduces children's discovery behaviors and exploration ability, diminishing autonomous learning and development in the child's environment.

Creswell and colleagues (2011) highlighted specific parental factors (parental control and rejection) as one of several potential risks for child information processing biases. The authors found less convincing evidence for the role of rejection than parental control in explaining child biases in processing information. Accordingly, parental criticism/rejection contributes less (4% of the variance) to child biases than parental overcontrol, which accounts for about 6% of this variance (McLeod et al., 2007). These parental behaviors are related to the parent's belief that the child is vulnerable in the face of a potentially dangerous world. Therefore, these parenting styles also play a role in maintaining the child's inhibitions and fears by reinforcing the child's emerging perceptions that the world is threatening and that they are unable to cope with this threat.

Similarly, Blossom and colleagues (2013) found that children's threat bias was related to their age, parent's expectations of the child's bias, and children's reported family dysfunction. They also suggested that child-reported family dysfunction and parent expectations of child bias were significant positive predictors of self-reported child threatening bias. Children who perceived their families as inconsistent in expectations, poor communication, and interpersonal relationships were more prone to perceive threats in ambiguous situations. Children who experience inconsistent punishment at home or perceive punishment as unfair, harsh, or arbitrary might perceive other situations (e.g., a meeting with the school principal) as similarly ambiguous, potentially threatening, or dangerous. In addition, of all predominant parenting styles, the authoritative style has been associated with stronger modeling behavior and more constructive developmental outcomes in children (Kuppens & Ceulemans, 2019).

Through the process of modeling, parental biased behaviors may constitute another way through which parents influence their children's information processing. Although Fisak and Grills-Taqueche (2007) consider observational learning of parent's biased behaviors insufficient to explain anxiety development, it could increase the risk of acquiring fears or interact with other factors to raise children's risk and vulnerability to developed cognitive biases (Rapee, 2002). For example, De Rosnay and colleagues (2006) found that children tend to copy their mother's behavior when she previously exhibited fearful behavior toward the stranger (rather than neutral or positive behavior); children that experienced such situations show more fear and avoidance patterns in the presence of strangers (Gerull & Rapee, 2002).

One of the noted limitations in studies addressing the intergenerational transmission of interpretative bias is that approximately 90% of the adults involved are mothers (Creswell, Schniering & Rapee, 2005; Creswell et al., 2011; Lester et al., 2010; Muris et al., 2009; Ooi, Dodd & Walsh, 2015; Pasarelu et al., 2017; Podina et al., 2013), leaving the father's role unexplored. According to Bögels and Phares (2008), same-sex factors may also be important in infants and preschoolers, accentuating gender identification. Thus, if both parents play a role in influencing their child's cognitive biases, involving fathers in these studies should provide us with more information about the process of parental transmission of cognitive bias.

In short, although inhibited temperament (children who rarely explore the social environment) and overprotective parenting (parents with anticipatory functioning patterns) are naturally associated with anxiety in children, there is much to know about their role in interpretive bias. The present study explores the intergenerational transmission of interpretative bias between parents and children and the role child characteristics (temperament), and parental behaviors (parenting styles) may have in this transmission.

Since children learn quickly during this time (Fox et al., 2005), it seems possible that the preferred transmission way between parents and children will be through verbal information. However, most literature on parental transmission of biases addresses school-age children. So, we expect that expanding the study of intergenerational bias transmission to younger children (preschoolers) may help us understand the initial phases of the interpretation bias development.

Therefore, due to the lack of conclusive studies involving preschoolers, we aimed (1) to explore the association between parent's predisposition to interpretation bias in ambiguous situations and the level of interpretation bias shown by their preschool-aged children; (2) to verify if the association between parents' and child's interpretation bias is mediated through the verbal transmission of threat interpretation from parents to children; and (3) to explore the moderation effect that individual characteristics of children – temperament, gender, and age – and of their parents (parental styles) might have on the association between parents and child's interpretation bias.

Method

Participants

One hundred thirty-two non-clinical Portuguese children (75 boys and 57 girls), aged between 48 and 70 months (mean age = 58.17 months, *SD* = 6.20 months), and their parents (129 mothers: mean age = 36.0 *SD* = 4.98 years; and 114 fathers: mean age = 38.9 *SD* = 5.59 years) participated in this study. We enrolled the participants through eleven preschool establishments (public and private) in the Alentejo region (Portugal). The families of all the children who collaborated in the first stage of this research (Chapter 1; n = 172) were invited to the second stage, but only 132 were accepted to participate (76.7%). No differences in the child's gender [$X^2(1) = 0.41$, $p = .523$] or age [$t(170) = 0.85$, $p = .398$] were found between those children who were included in the sample and those who left the study. However, the children of the families who accepted to participate apparently had higher interpretation bias than the remaining non-participants [CIBM Total score: mean = 42.4% ± 18.1 vs. 33.1% ± 15.9; $t(170) = 2.93$, $p = .002$, Cohen's $d = 0.53$].

To obtain informed parental consent, we send parents an information memo about the study and a consent form. All the children had Portuguese nationality. Most (64%) children lived with both parents in this sample, with 11% living only with their mother and 2% with their father. Most children (45%) are only children; however, 44% have one sibling, being the youngest sibling in 59% of the time. Most parents were married (55%), completed high school (37%), and were employed (83%). The study did not include children with identified neurodevelopmental disorders or severe organic diseases.

Measures

Children Interpretation Bias

The Portuguese version of the Children's Interpretation Bias Measure – Ambiguous Story-Stems (CIBM; Ooi, Dodd & Walsh, 2015), translated and adapted previously for this work (see Chapter I), was used to assess the cognitive bias of interpretation of preschool children. The CIBM comprehends eight narratives: four involving possible physical threats (e.g., "This is the park. Here is the family walking in the park. Look, there is a high rock. Maria wants to climb the rock. What is going to happen if she climbs the rock?"); two involving possible social threat (e.g., "This is the park. Maria is playing alone. A group of kids walks towards Maria. Why does this happen?"); and two related to separation anxiety (e.g., "Johana is having a fun party at her house. Maria wants to go to the party. Mom is busy, so she drops Maria at the party. Mom is about to drive away. What does Maria do? How does Maria feel?"). The child was invited to finish the story freely, and the content of their response was analyzed to identify the presence of a threat (see coding procedure below). To help children understand the narrative, graphic illustrations for each story were used. The CIBM scores correspond to the percentage of story endings that conveyed threat interpretations. According to the psychometric evaluation of this CIBM Portuguese version, four scores can be computed: a total interpretation bias score (CIBM Total), an interpretation bias score for physical threat (CIBM Physical), an interpretation bias score for social threat (CIBM Social) and an interpretation bias score for separation anxiety (CIBM Separation). These scores, although not reaching a satisfactory internal consistency level (for example, McDonald's ω coefficient, $0.40 \leq \omega \leq 0.55$), showed adequate temporal stability $0.54 \leq r \leq 0.63$). The CIBM Total score showed moderate correlations with measures of anxiety (Preschool Anxiety Scale – PAS; Almeida & Viana, 2013) and with a concurrent measure of interpretation bias (Ambiguous Situations Questionnaire for Preschoolers, ASQ-PS; Ooi, 2012).

Parent Transmission of Interpretation Bias

The Children's Interpretation Bias Measure – Ambiguous Story-Stems (Ooi, Dodd & Walsh, 2015) was used to evaluate if parents convey interpretation bias to their children when facing ambiguous situations. First, we instructed parents to complete the CIBM eight stories as if they were telling them to their children. Parents should write their answers; the responses were coded later by trained judges (see coding procedure below), considering the presence of negative interpretations. A total score was computed separately for mothers and fathers as the percentage of story endings that conveyed threatening interpretations. These scores were considered a measure of parents' tendency to transmit a malign biased interpretation to their children in ambiguous situations.

Parental Interpretation Bias

The Parent Interpretation Bias Measure – Ambiguous Scenarios (PIBM; Ooi, Dodd & Walsh, 2015) was used to evaluate parents' interpretation bias. The instrument consists of twelve ambiguous scenarios, six of which describe social situations (*e.g.,* "You walk into a party, and people turn to look at you, why?"), and the remaining six describe non-social situations (*e.g.*, "You are lying in your bed at night, and you hear a noise, what might it be?"). The PIBM Portuguese version was adapted following the translate-back method of Hill and Hill (2000) to achieve a translation that matched as precisely as possible to the original text, respecting the Portuguese language specificities. Firstly, the questionnaire was translated into Portuguese and then back-translated to English by a bilingual researcher. Finally, necessary adjustments were made to obtain the definitive version (see appendix 5). We asked parents to imagine themselves in the scenario described in each story and write their interpretation of the situation. Like in CIBM, responses were content analyzed to detect interpretation bias (see coding procedure below). A total score corresponding to the percentage of responses that expressed a threatening interpretation was used to measure the parent's malign interpretation bias. Like in CIBM, the internal consistency for the PIBM total score in this sample was below the desirable level (Kuder-Richardson coefficient for mothers = .59; for fathers = .56).

Child Temperament

The Children's Behavior Questionnaire - Short Form Version (Putnam & Rothbart, 2006; Portuguese version: Franklin, Soares, Sampaio, Santos, & Veríssimo, 2003) was used to evaluate the temperament of preschool children. The instrument consists of ninety-four items, distributed in fifteen scales which, in turn, are organized into three dimensions: the Extraversion/Surgency Dimension (Activity level, Impulsivity, High-intensity pleasure, Approach/Positive anticipation), the Effortful Control Dimension (Attentional control, Perceptual sensitivity, Low-intensity pleasure, Smiling and laughter, Inhibitory control) and the Negative Affectivity Dimension (Anger/Frustration, Sadness, Shyness, Falling reactivity/Soothability, Discomfort, Fear). Parents were asked to rate their child on each item using a 7-point scale.

The instrument also gave parents a "not applicable" alternative response choice when they have not observed their child in the described situation. In the present sample, reliability indexes were heterogeneous at the scale level: some scales showed good reliability (Cronbach's *alpha* ≥ .7; Shyness, Attentional Control, Anger/Frustration), and other scales had reasonable reliability (.6 ≤ *alpha* < .7; Approach/Positive anticipation, Low-intensity pleasure, Smiling and laughter, Falling reactivity/Soothability) and the remaining poor reliability (.45 ≤

alpha < .6; Activity level, Impulsivity, High-intensity pleasure, Perceptual sensitivity, Inhibitory control, Sadness, Discomfort, Fear).

At dimension levels, reliability indexes were always good: for the Extraversion dimension, *alpha* = .78; for the Effortful Control dimension, *alpha* = .74; and for the Negative Affectivity dimension, *alpha* = .74. These reliability indexes obtained in our sample do not contrast with those obtained in the original study, in which alpha values ranged between .75 to .72.

Parental Styles

The Parenting Styles and Dimensions Questionnaire (PSDQ; Robinson, Mandleco, Olsen, & Hart, 2001; Portuguese Version of Self-Report: Pedro, Carapito & Ribeiro, 2015) was used to evaluate the parenting styles of the parents involved in the study. Three parenting styles are assessed (authoritative, authoritarian, and permissive), according to Baumrind's (1971) classic typology. The authoritative style includes three subdimensions, each one with five items: Warmth and Involvement (*e.g.*, "I am sensitive to needs and my son's feelings."); Reasoning/Induction (*e.g.*, "I explain the consequences of my son's behavior."), and Democratic Participation (*e.g.*, "I allow my son to give his opinion on family rules."). The authoritarian style also includes three subdimensions: Corporal Punishment (*e.g.*, "I physically punish my son for disciplining him."), Verbal Hostility (e.g., "I reprimand and criticize my son for his good."), and Punitive Strategies (*e.g.*, "I use threats as punishment giving little or no explanation."). The permissive style has a single dimension scale, evaluating Indulgence (*e.g.*, "Threatens child with punishment more often than giving it.").

We asked parents (mother and father) to rate each item according to frequency, using a 5-point scale ranging from 1 (Never) to 5 (Always). In our sample, the internal consistency for the three dimensions was good in both parents' protocols: Authoritative (*α* = .83 and *α* = .86, for mother and father, respectively), Authoritarian (α = .69 and α = .82), and Permissive (*α* = .55 and *α* = .69). So, the PSDQ internal consistency in our sample does not contrast from the original study, in which alpha values range between .88 to .62.

Procedure

Data collection

Participants were recruited in schools belonging to the public education network. Thus, before data collection, we requested authorization from the Committee for Monitoring Surveys in School Environment (MIME, Portuguese Directorate-General for Education; approval code: 0652900002).

The schools' board administrations approved the data collection procedures. Subsequently, families were contacted through Class Educators and informed about the study's goals. Parents provided voluntary written informed consent for themselves and their children. Each child provided verbal assent to the study before completing the story-stem protocol in a quiet and noise-free environment in their preschool contexts.

A procedure script was defined to be followed during the interpretation bias assessment to ensure a standardized data collection methodology. The data collector told each participant they would tell stories with some illustrations, explaining that they would start each story and the child should finish it. The data collector entirely recorded the children's responses to story stems.

The questionnaires for adults were delivered to parents in a closed envelope. The questionnaires were completed at home and then returned to the Class Educator of the child.

Coding Scheme

Children's and parents' responses to story stems were transcribed and evaluated following the coding procedure described in the previous chapter. For applying this coding scheme, two independent judges read the answers to each story and assigned a score of 1 if the end of the story reflects a threat interpretation and a score of 0 if the end of the story does not reflect a threat interpretation. If the responses were vague, doubtful, or unrelated, or if there was a non-answer, the score was considered "missing" (Ooi et al., 2015).

The agreement level between judges was perfect for almost all CIBM stories, except for "Mom drops child at a party" (S05, 98.4%) and "Mom and Dad going out" (S06, 99.2%). Concordance among judges was lower for the more complex responses provided by parents: agreement for PIBM stories ranged between 94.2% (S05, "Funny stomach on the way to work") and 99.8% (S10, "See closest friends in the shopping center"), with an average level of 98.5%.

Data Analyses

Data analysis is almost based on correlations (Pearson *r*). For comparing measures across groups, independent samples t-test (for boys vs. girls comparison, for instance) as well as dependent-samples t-test (for comparing father vs. mother inside the couple, for example) were used. Mediation and moderation analyses were done through the PROCESS macro for SPSS (Hayes, 2018). Testing indirect effects involved computing percentile-based bootstrap 95% Confidence Intervals (based on 5000 bootstrap samples).

Results

Children's Interpretation Bias

Overall, children obtained 42.4% (*sd* = 18.1%) in the CIBM Total score, indicating that, on average, they provided a threatening ending on three out of the eight stories (Table 2.1). No differences between boys and girls were found regarding the interpretation bias scores, except a marginally significant stronger bias for boys regarding social threat (Cohen's *d* = -0.29, *p* = .099).

Concerning children's age, the correlations were positive but small. Only a minor positive age effect was observed for the CIBM Total score (*r* = .22; *p* = .012) and the CIBM Social score (r = .17, *p* = .058), indicating a more substantial interpretation bias among older children.

Table 2.1 Interpretation Bias in Children (N = 132); Effects of Gender and Age

CIBM	Total sample (n = 132)	Gender			Age
		Boys (n = 75)	Girls (n = 57)	test *t*	Pearson *r*
	mean ± sd	mean ± sd	mean ± sd		
Physical score	60.8% ± 23.2%	60.3% ± 25.4%	61.4% ± 20.1%	*t* = 0.26 *p* = .794 *d* = 0.05	*r* = .13 *p* = .143
Social score	33.3% ± 31.9%	37.3% ± 33.0%	28.1% ± 29.9%	*t* = -1.66 *p* = .099 *d* = -0.29	*r* = .17 *p* = .058
Separation score	18.9% ± 33.0%	18.7% ± 32.6%	19.3% ± 33.7%	*t* = 0.11 *p* = .914 *d* = 0.02	*r* = .06 *p* = .505
Total score	42.4% ± 18.1%	42.5% ± 18.4%	42.3% ± 17.8%	*t* = -0.06 *p* = .956 *d* = -0.01	*r* = .22 *p* = .012

CIBM – Children Interpretation Bias Measure.

Parents' Interpretation Bias

The interpretation bias level observed among parents is reduced (on average, 15.4% for fathers and 17.4% for mothers). That shows that, on average, they give a threatening ending

in two out of twelve PIBM stories (Table 2.2). The interpretation bias correlates positively with age, but correlations are small and only significant for mothers (r = .20; p = .030), suggesting that the tendency may increase slightly with age. Concerning educational level, a small negative significant correlation was found among fathers (r = -.22; p = .020), meaning that the high academic degree may attenuate the interpretation bias.

Table 2.2 Parents' Interpretation Bias; Correlations with Age and Educational Level (Pearson r)

PIBM	Mean ± SD	Correlation with age	Correlation with Education level
Fathers (n = 114)	15.4% ± 13.1	r = .13 p = .183	r = -.22 p = .020
Mothers (n = 129)	17.4% ± 14.5	r = .20 p = .030	r = .04 p = .680

PIBM – Parent Interpretation Bias Measure.

Only 111 families provided responses to PIBM from both parents. In this subsample, no significant differences between fathers and mothers were found regarding interpretation bias level [t(110) = 1.15, p = .253, Cohen's d = 0.13; mean ± sd: mothers = 17.1% ± 14.0; fathers = 15.3% ± 13.2]. Mother and father interpretation biases were weakly but positively correlated (r = .26; p = .005).

Parental Transmission of Interpretation Bias

To assess the transmission interpretations bias from parents to their children, we used the answers parents gave to the CIBM measure. They were instructed to complete the ambiguous stories as if they were telling them to their children. Overall, responses provided by parents to CIBM indicate a somehow reduced transmission of interpretation bias (on average, 17.7% for fathers and 20.9% for mothers; Table 2.3). These transmission levels seem to be negatively associated with fathers' education level (r = -.25; p = .009): fathers with lower education tend to interpret these ambiguous stories as threatening more often than higher educated fathers and, thus, may be transmitting more interpretation bias to their child; a negative correlation was also observed for the mother's educational level, but too small to be significant. Correlating parents' interpretation bias transmission with their own interpretation bias (measured by PICM), a positive correlation was observed for mothers (r = .38; p < .001) and fathers (r = .20; p = .034). These results suggest that parents with higher interpretation bias tend to transmit it

more to their children. The child's gender and age do not affect the transmission level, although a marginally significant positive correlation was observed for mothers (r = .15; p = .093). This result suggests that mothers tend to transmit more interpretation bias to older adults' children.

Table 2.3 Parents' Transmission of Interpretation Bias (CIBM): Pearson Correlation with Parents' (Age, Education Level, and Parents' IB) and Children's (Gender and Age) Variables

	Parents' CIBM	Correlations				
	Mean ± SD	Age	Education level	Parent's IB	Child's gender	Child's age
Father CIBM (n = 114)	17.7% ± 12.7	r = .07 p = .461	r = -.25 p = .009	r = .20 p = .034	r = -.12 p = .200	r = -.03 p = .738
Mother CIBM (n = 129)	20.9% ± 12.8	r = .01 p = .890	r = -.11 p = .234	r = .38 p < .001	r = .03 p = .674	r = .15 p = .093

CIBM – Children Interpretation Bias Measure; IB – Interpretation Bias.

A comparison of interpretation biases transmission within the parent's couple revealed a significant difference between mothers and fathers [t(110) = 2.51, p = .013, Cohen's d = 0.25]. On average, mothers transmit more interpretation bias (mean ± sd = 20.6% ± 11.8) than fathers (mean ± sd = 17.6% ± 12.9). Within the same couple, mother and father interpretation bias transmission were strongly and positively correlated (r = .47; p < .001).

The effect of parent interpretation bias transmission on their child's interpretation bias

Correlations were computed between measures to verify if individual differences in children's interpretation bias were associated with parents' own bias (Table 2.4). Although all correlations were non-significant (p > .1), we found a slight positive correlation between father interpretation bias (PIBM) and children's separation interpretation bias (r = .19; p < .05).

Regarding the association between children's interpretation bias and the level of bias transmission expressed by parents, once more, no correlation coefficient was significant (p > .3), either for Mother or Father, suggesting the absence of shared variance between those variables.

Table 2.4 Correlations between Parents' Interpretation Bias (PIBM), Parents of Interpretation Bias Transmission (CIBM), and Children's Interpretation Bias (CIBM)

	Children's CIBM			
	CIBM Total	CIBM Physical	CIBM Social	CIBM Separation
PIBM				
Mother	*r* = -.11	*r* = -.07	*r* = .02	*R* = -.02
(n = 129)	*p* = .233	*p* = .456	*p* = .862	*p* = .854
Father	*r* = .04	*r* = -.07	*r* = -.03	*r* = .19*
(n = 114)	*p* = .673	*p* = .465	*p* = .722	*p* = .040
CIBM				
Mother	*r* = -.01	*r* = .04	*r* = .08	*r* = -.02
(n = 129)	*p* = .917	*p* = .691	*p* = .389	*p* = .822
Father	*r* = -.02	*r* = .04	*r* = .03	*r* = -.02
(n = 114)	*p* = .824	*p* = .681	*p* = .727	*p* = .832

CIBM – Children Interpretation Bias Measure; PIBM – Parent Interpretation Bias Measure.

No significant association was observed between parents' and children's interpretation bias. Although, we formally proceeded with the test of the mediational hypothesis, stating that this association could be partially mediated through the level of bias transmission (models displayed in Figure 2.1).

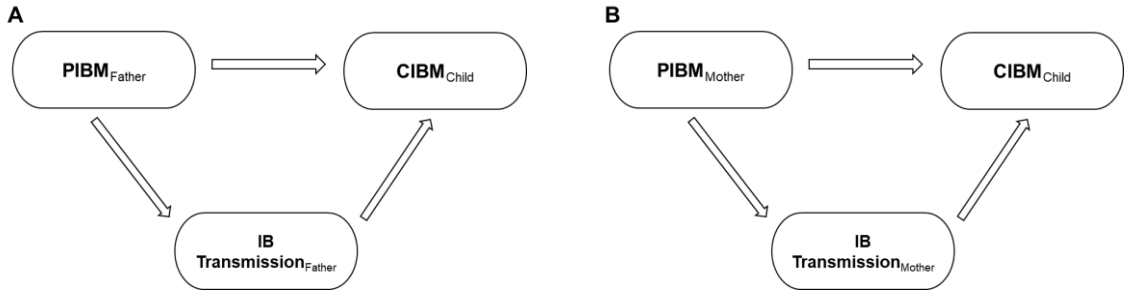

Figure 2.1 Mediation Models for the Transmission of Parents' Interpretation Bias (PIBM) to their Children: Mediation Model for Father (A) and Mother (B)

Since the total effect of Parental interpretation bias (either fathers or mothers) was non-significant ($p > .2$), mediation effects were – almost necessarily – null (the confidence intervals

for indirect effects always included the zero; see Table 2.5). So, the mediation hypothesis was not supported in this preschool sample.

Table 2.5 Effect of Parental Interpretation Bias (PIBM) on their Child Interpretation Bias (CIBM Total score) Mediated by the Parental Transmission of Interpretation Bias

	Total effect	Direct effect	Indirect effect (95% PBCI)
Mother	-.13 (p = .233) *beta* = -.11	-.15 (p = .215) *beta* = -.12	+.02 [-.08, +.14] *beta* = +.01 [-.06, +.11]
Father	.05 (p = .673) *beta* = .04	.06 (p = .636) *beta* = .05	-.01 [-.07, +.05] *beta* = +.01 [-.05, +.03]

PBCI – Percentile-based Bootstrap 95% Confidence Intervals.

Child Temperament and Interpretation Bias

In the correlation analysis for children's temperament and their interpretation bias (Table 2.6), no significant coefficients were found (p > .1), except two weak negative marginally substantial correlations between the "Smiling and Laughter Scale" and CIBM Separation score (r = -.16; p = .065) and between the "Impulsivity Scale" and CIBM Social score (r = -.15; p = .090).

Significant positive correlations were found between parents' transmission of interpretation bias and some temperament scales and dimensions. Thus, the level of mother transmission of interpretation bias is correlated with the impulsivity scale (r = .21; p = .019) and the approach/positive anticipation scale (r = .19; p = .033). Mothers' transmission of interpretation bias also correlates with the Negative Affectivity dimension (r = .21; p = .019), possibly due to its correlation with associated scales such as the Anger/frustration scale (r = .20; p = .031) and the Discomfort scale (r = .21; p = .018).

These correlations show that temperament negative affectivity (especially anger/frustration and discomfort) appears to be positively related to mothers' tendency to transmit biased interpretations to their children. In father transmission of interpretation bias, positive correlations were found with the Effortful Control dimension (r = .19; p = .045), reflecting the positive correlations with the Attentional focusing scale (r = .20; p = .036), as well as the Low-Intensity Pleasure scale (r = .26; p = .006). Such results indicate that the effortful control dimension of temperament (mainly attentional focus and low-intensity pleasure) seems to be positively related to the father's transmission of interpretation bias to his child.

Table 2.6 Correlation between Children's Interpretation Bias (CIBM) and Parents' Transmission of Interpretation Bias (CIBM) and Children's Temperament (CBQ) (Pearson Correlation)

Children Temperament (CBQ)	CIBM Total	CIBM Physical	CIBM Social	CIBM Separation	CIBM Mother	CIBM Father
Extroversion Dimension	.00	.03	-.03	-.02	.17	-.06
Activity Level Scale	-.04	-.01	-.03	-.10	.04	-.11
Impulsivity Scale	.04	-.02	-.15º	-.02	.21*	-.10
High-Intensity Pleasure Scale	.03	-.01	-.06	.03	.10	-.01
Approach/Positive Anticipation Scale	.00	-.05	.10	-.01	.19*	-.00
Effortful Control Dimension	.00	-.00	-.01	.00	-.06	.19*
Attentional Focusing Scale	-.02	-.01	.03	-.01	-.05	20*
Perceptual Sensitivity Scale	.14	.03	-.10	.11	-.07	.01
Low-Intensity Pleasure Scale	.02	.09	.03	-.04	.08	.26**
Smiling and Laughter Scale	-.13	-.08	-01	-.16º	-.04	.09
Inhibitory Control Scale	.05	.00	.01	.12	-.11	.12
Negative Affectivity Dimension	.03	.01	-.03	.02	21*	-.04
Anger/Frustration Scale	-.03	-.04	-.02	-.04	.20*	.06
Sadness Scale	.02	-.01	-.03	.09	.08	-.16º
Shyness Scale	.05	.07	.01	.05	.04	-.03
Soothability Scale	-.02	.04	.00	-.05	-.16º	.00
Discomfort Scale	.05	.02	.02	.04	21*	.08
Fear Scale	.01	.04	.00	-.07	.08	-.06

º $p < .1$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Parental Styles and Interpretation Bias

Only one significant coefficient was found regarding the correlation between parental styles and interpretation bias (children's, parents, and transmitted) (Table 2.7). A positive correlation between permissive maternal style and mothers' interpretation bias transmission ($r = .23$; $p = .008$) suggests that permissive mothers tend to transmit more interpretation bias to their children. We also found a marginally significant correlation between the mother's permissive

parental styles and the mother's interpretation bias (r = .17; p = .061). Concerning the father's parental styles, no significant correlations were observed.

Table 2.7 Correlation between Parental Styles (PSDQ) and Children's Interpretation bias (CIBM), Parents' Transmission of Interpretation Bias (CIBM), and Parental Interpretation Bias (PIBM) (Pearson Correlation)

Parental Styles	CIBM Total	CIBM Physical	CIBM Social	CIBM Separation	CIBM Mother	CIBM Father	PIBM Mother	PIBM Father
Mother								
Authoritative	-.05	-.01	-.01	-.01	-.10	- -	-.03	- -
Authoritarian	-.05	-.05	.00	-.14	-.11	- -	-.09	- -
Permissive	-07	-.01	-.02	.04	.23**	- -	.17º	- -
Father								
Authoritative	.02	-.01	-.09	.00	- -	-.07	- -	-.08
Authoritarian	-.05	.00	-.09	-.11	- -	.01	- -	.09
Permissive	.05	-.03	.08	.15	- -	.03	- -	.04

º p < .1; * p < .05; ** p < .01; *** p < .001.

Moderators of the Interpretation Bias Transmission between Parents and their Children

The selected set of moderators (child's characteristics: gender, age, temperament; parents' characteristics: age, educational level, the transmission of interpretation bias, and parental styles) was tested for their effects on the association between parent's and children's interpretation bias (Table 2.8). Most moderation effects are null ($p \geq .1$); only four moderation effects are significant ($p < .05$), and two are marginally substantial ($p < .1$). The magnitude of such effects is relatively small ($\Delta R^2 \leq .04$, except in one case).

The magnitude of the association between the father's and children's interpretation bias (expressed by *beta* regression coefficients) seems moderated by the child's age (p = .036). This moderation effect results from a positive association between the father's and child's interpretation bias for older children (*beta* = +.24, $p < .1$). In comparison, such an effect does not occur for younger children (*beta* = -.21, $p > .1$).

Table 2.8 Test of the Moderation Effects of Child's and Parents' Characteristics on the Association between Parents' Interpretation Bias (PIBM) and their Child's Interpretation Bias (CIBM Total Score); Percentage of the Variance Explained by the Moderation Effect

	Father PIBM → Child CIBM	Mother PIBM → Child CIBM
Child's characteristics		
Gender	ΔR^2 = .00, p = .821	ΔR^2 = .03º, p = .057
Age	ΔR^2 = .04*, p = .036	ΔR^2 = .00, p = .696
Number siblings	ΔR^2 = .02, p =.129	ΔR^2 = .02, p =.106
Child's temperament		
Extroversion	ΔR^2 = .00, p =.856	ΔR^2 = .01, p =.310
Negative Affectivity	ΔR^2 = .00, p =.822	ΔR^2 = .00, p =.922
Effortful Control	ΔR^2 = .00, p =.582	ΔR^2 = .00, p =.513
Parents' characteristics		
Age	ΔR^2 = .00, p =.695	ΔR^2 = .00, p =.582
Educational level	ΔR^2 = .04*, p =.038	ΔR^2 = .04, p =.990
Father's transmission of IB	ΔR^2 = .00, p =.989	ΔR^2 = .00, p =.989
Mother's transmission of IB	ΔR^2 = .06*, p =.011	ΔR^2 = .00, p =.506
Father's parenting style		
Authoritative	ΔR^2 = .00, p =.668	ΔR^2 = .01, p =.343
Authoritarian	ΔR^2 = .01, p =.457	ΔR^2 = .00, p =.836
Permissive	ΔR^2 = .00, p =.954	ΔR^2 = .00, p =.584
Mother's parenting style		
Authoritative	ΔR^2 = .04*, p =.044	ΔR^2 = .01, p =.411
Authoritarian	ΔR^2 = .01, p =.335	ΔR^2 = .00, p =.748
Permissive	ΔR^2 = .04º, p =.089	ΔR^2 = .00, p =.495

PIBM – Parental Interpretation Bias Measure; CIBM – Children Interpretation Bias Measure; ΔR^2 – added contribution of the model to the explanation of CIBM score when the moderation effect is included.

The association between the father's and child interpretation bias also seems to be moderated by the educational level of the father (p = .038): for higher educated fathers, there is a negative association between the father's and child's interpretation bias (*beta* = -.28, p < .1), while such effect does not occur for less-educated fathers (*beta* = +.18, p > .1). Neither paternal parenting styles nor child's temperament dimensions seem to reliably affect the association between father's and child's interpretation bias.

Interestingly, some maternal variables seem to moderate the association between fathers' and child's interpretation bias. For instance, when the mother's level of interpretation bias transmission is low, the association between the father's and child's interpretation bias is negative (*beta* = -.33, $p < .05$). Mother's parenting styles also affect the association between the father's and child's interpretation bias ($p = .044$): the stronger the authoritative style of the mother, the less influence the interpretation bias of the father has on his child's interpretation bias (less authoritative mothers: *beta* = +.36; more authoritative mothers: *beta* = +.34; $p < .05$). An opposite pattern was observed for the permissive style of the mother, although only marginally significant ($p = .089$): the more permissive the mother, the greater the influence of the interpretation bias of the father on his child's interpretation bias (less permissive mothers: *beta* = -.23; more permissive mothers: *beta* = +.28).

Considering the association between the mother's and child's interpretation bias, no significant effects were found ($p > .05$). Only marginal moderation effects of a child's gender ($p = .057$) can be reported. In comparison, the association between the mother's and child's interpretation bias is negative for girls (*beta* = -.36, $p < .1$), and it seems to be null for boys (*beta* = +.13, $p > .1$).

Discussion

Due to the lack of conclusive studies addressing the developmental origins of interpretation bias, the present study intended to explore the extent of intergenerational transmission of interpretation bias between parents and their young children (namely, preschoolers), considering the putative influence of characteristics of the child (such as gender, age, temperament) and both parents (age, education level, parenting styles, interpretation bias level).

Overall, preschoolers provided a threatening ending to three out of eight CIBM stories describing ambiguous situations (42%). Although we found no gender differences in the CIBM Total score, boys are slightly more biased than girls in ambiguous social stories. We also observed a small effect of age on the CIBM Total and Social scores, being older children more susceptible to interpretation bias, a result already described in the previous chapter.

Concerning parents' interpretation bias, low average scores were observed both for mothers (17%) and fathers (15%). No significant gender effects were detected. Older parents tended to reveal higher interpretation bias, although the effects were small and only significant for mothers. Educational effects only appeared for fathers, suggesting that high education may attenuate the presence of interpretation bias in men. A positive correlation ($r \sim .3$) was found between PIBM scores for the wife and husband within the couple.

The main goal of this study was to understand if parents' predisposition to interpret ambiguous situations as threatening (as measured by PIBM) is associated with the interpretation bias shown by their preschool children (as measured by CIBM), thus providing evidence for intergenerational transmission of this cognitive bias. The direct correlation between PIBM and CIBM scores revealed almost null results. Thus, contrary to our first hypothesis (parental transmission of interpretation bias), the individual differences observed in parents' interpretation bias (both for father and mother) do not correspond to the differences in bias observed in their offspring. This null result suggests that no bias transmission seems to exist in these families, corroborating Ooi, Dodd and Walsh's (2015) findings. As in our study, these authors reported a non-significant correlation between the PIBM score and the CIBM score provided by infants and preschool children. Previous studies with older samples also have failed to find this association (Gifford et al., 2008; Neil et al., 2019). In a recent meta-analysis, Subar and Rozenman (2021) reported a small positive correlation ($r \sim .15$) between parent and child interpretation biases; however, all the studies reviewed in this meta-analysis – except for the Ooi and colleagues' study (2015) – were conducted with school-aged children or adolescents (Creswell & O'Connor, 2006; Creswell, Schniering & Rapee., 2005; Pasarelu et al., 2017; Podina, Mogoase & Dobrean, 2013). Overall, these results seem to indicate that intergenerational transmission of interpretation bias does not manifest itself during the preschool period but can occur more explicitly later during school years and, to a large extent, during adolescence. The exact developmental mechanisms explaining the absence of this link during pre-school years and its subtle appearance in later periods (school-age and adolescence) are still not known (Aktar, 2022). Future longitudinal studies are required to clarify when the link between information processing bias in parents is transmitted to children and which conditions encourage its emergence during development.

However, several alternative explanations for the absence in our study of a significant correlation between parents' and children's interpretation biases can be considered: parents' responses to PIBM referred to themselves, whereas children's responses to CIBM referred to external characters (i.e., João and Maria); although boys and girls received same-gender CIBM scenarios (to increase the opportunity for self-projection), it might be possible that telling the story in the third person evokes a less consistent biased effect than telling the story in the first person as an adult. In addition, different response methods were used to measure interpretation bias in parents and children. While children completed the stories orally, their parents used paper and pencil. Finally, to make the stories developmentally appropriate, CIBM had physical, social, and separation-related themes, while general and social biases drove the parents' interpretive tasks. Although these are just possible ad-hoc attempts to explain the absence of results, in the future, a parallel interpretive task for parents and young children

could be developed, at least in terms of content, to exclude such methodological threats to the internal validity of the study.

In our preschool sample, only a significant positive correlation was found between the father's PIBM score and the CIBM separation score (r ~ .2), indicating a possible contribution of paternal interpretive bias to the child's predisposition to interpret separation situations negatively. This is a specific, small-sized association, but a tentative interpretation can be provided. Among men, taking risks in the outside world is seen as a way to promote self-confidence in their children (Paquette, 2004). In this context, Bögels and Perotti (2011) suggest that fathers with more biased behaviors would substantially influence the child's information processing more than mothers, as fathers' avoidance and withdrawal behaviors are not expected and could be interpreted as signals of outside danger. Thus, a father prone to threat interpretations could strongly influence how his child interprets ambiguous situations.

Our second hypothesis assumed that the intergenerational transmission of interpretation bias is mediated by the level at which parents communicate explicit negative interpretations to their children when facing ambiguous situations. Specifically, in this study, this behavior was operationalized as transmitting negative interpretations during storytelling. To probe such propensity, parents were invited to complete the CIBM stories as they would tell them to their children. The number of malign interpretations expressed in their responses was counted as a measure of their propensity to transmit threatening interpretations to children. The results show that the transmission degree expressed by parents was positively associated with their interpretation bias level, especially for mothers (r = .20 for fathers; r = .38 for mothers), suggesting that story-telling behavior can be a potential vehicle for transmitting bias. Comparable results were observed in the previous study with preschoolers (Ooi, Dodd & Walsh, 2015), although the correlations obtained by Ooi and colleagues were weaker and non-significant (r = .13, p > .1). Thus, when they faced ambiguous situations, biased parents are prone to convey their own biased interpretations to their offspring. It is not possible to know if this is a deliberate strategy for warning children (projecting their own fears onto them) or a spontaneous way of facing potentially threatening situations. One way or another, the focus on adverse outcomes could prevent them from recognizing benign ones, extending their own bias to situations involving their children (Lester, Field & Cartwright-Hatton, 2012) and, consequently, transmitting a biased negative interpretation. This trend attenuates slightly with higher educational levels, especially for fathers. It is possible that more educated parents may be wary about communicating threats to their children and try to restrain ending stories in a non-threatening manner, regardless of their own interpretation bias. On average, mothers seem to transmit more interpretation bias than fathers.

However, this “overt” manifestation of parental interpretation bias in storytelling did not correlate with preschool children’s interpretation bias (| *r* | < .1), a finding that leads to the rejection of our mediation hypothesis. Together, these results show that, although parents partially express their interpretative bias in the storytelling context, such behavior does not appear to affect their child. Thus, we can conclude that the transmission through storytelling does not occur in this sample of preschoolers; therefore, we rejected the hypothesis. It is possible that other means of influence might exist, but apparently not in this specific and artificial context of the "storytelling" with these CIBM stories stems. Parents’ manifestations of bias in natural contexts (for example, when facing a real dog; or when they are with strangers) may be more effective on their children than the bias manifested through “storytelling”. Finally, we can not discard the possibility that this methodological approach (asking parents to complete stories as if they were going to tell them to their children) may have induced parents to report their own bias instead of the way they used to tell children how to cope with ambiguous situations; so, our operationalization of the way parents communicate explicit negative interpretations to children may not be valid and ecologically relevant.

Ooi, Dodd and Walsh (2015) study had a design similar to ours and reported a significant positive correlation between parents’ biased storytelling and the CIBM score of children (*r* ~.4). However, their effect was moderated by age (and gender): transmission was statistically significant only for infants (2-3 years old) but not for preschoolers (4-5 years old). This result indicates that younger children are particularly receptive to verbal information from parents, with girls being more affected than boys. Since most parents participating in Ooi and colleagues' study were mothers, the transmission between parents and offspring may be more robust when there is a same-sex identification between the child and the mothers. Considering our null results, they seem to go in the same direction as published evidence since our preschooler sample does not support the hypothesis that parental interpretation bias is transmitted to children through verbal interaction when facing ambiguous situations.

Several individual variables were explored for their effects on children’s interpretation bias measures. Unexpectedly, child’s temperament does not affect CBIM scores: correlations were weak and non-significant (-.13 ≤ *r* ≤ .14), except for a small negative association with the amount of positive affect in response to changes in stimulus intensity and complexity. Thus, theoretically relevant temperament dimensions such as Shyness, Fear, Approach/Positive Anticipation, Low-Intensity Pleasure, or Inhibitory Control appear unrelated to predisposition to interpretation bias. However, the lack of significant association between shyness and threat interpretation in preschool children was already reported in previous studies (Dodd et al., 2012; Ooi, 2012). Although being considered temperament facets related to anxiety, behavioral inhibition and shyness might not be specifically associated with the cognitive bases of anxiety

(namely, information processing biases) until children are older and more cognitively mature. It may also be that such temperament facets are associated in young children with other cognitive processes involved in anxiety (e.g., attention) rather than with interpretation bias.

Children's temperament establishes more reliable associations with how parents end CIBM stories. This finding is supported by previous literature suggesting that children's characteristics might influence parents' behaviors and cognitions (Wheatcroft & Creswell, 2007). Preschoolers perceived by parents as temperamentally more quickly initiating responses (impulsive) or suffering higher negative distress related to task interruption (anger/frustration) and discomfort seem to induce mothers to provide harmful endings to ambiguous stories. It is possible that the mother chose to transmit negatively biased information through storytelling to avoid and prevent their children from experiencing negative emotions in ambiguous situations. In fact, impulsive children tend to behave more actively and imprudently, and consequently, mothers tend to be more worried and biased when facing ambiguous situations to prevent harm from happening (Scheper et al., 2017).

The effortful control dimension of temperament (mainly through attentional focus and low-intensity pleasure) seems positively related to the father's transmission of interpretation bias through storytelling. According to this surprising result, although more conscious children (keeping attentional concentration on a task and appreciating low stimulus intensity situations) tend to "slow down" automatic, threat-driven interpretations (Raines et al., 2019), they still receive more threatening information from their fathers.

The effect of parental variables (parental style) on children's interpretation bias was also explored. The parenting styles of both the father and the mother seemed not to affect their child's bias (CIBM, $-13 \leq r \leq .17$). Although non-significant, the higher correlations were between the CIBM Separation score and the mother's authoritarian style ($r = -.13$) and the father's permissive style ($r = .17$). Overall, these opposite results suggest that the separation anxiety context is more permeable to parenting style influences. Children of authoritarian mothers tend to show less interpretation bias in ambiguous separation situations. Possibly, these children learn to cope with separation situations from their mothers' affectionate and firm behavior when facing temporary separation (e.g., dropping the child off at preschool). In contrast, children of permissive fathers seem more vulnerable to that bias in this specific domain. Perhaps, permissive fathers who might say dramatic goodbye to their child on temporary separations occasions, due to their guilty feelings and pity, would increase the child's perceived inability to cope in that environment without his/her father's presence. In short, permissiveness can highlight the message of bias transmitted by parents.

The effect of parenting styles on the way parents ended CIBM stories revealed that permissive mothers tend to transmit more interpretation bias to their children (r = .23). This finding is surprising since it contradicts the psychological concept that permissive parenting involves more parental concessions, fewer demands, and conflict avoidance in the relationship with their children (Baumrind, 1971). However, permissive mothers may be more insecure and fearful regarding their children's behavior in ambiguous situations, transmitting more biased interpretations through storytelling narratives. In contrast, the father's parenting style seems not to influence the transmission of malign interpretation through storytelling reliably.

Finally, we extensively explored the moderation effects of the child's and parents' characteristics on the association between parents and their child's interpretation bias. This analysis is particularly interesting since, although no reliable association was observed in the whole sample, the analysis of moderating effects may reveal intergenerational transmission conditional to specific individual characteristics. However, the results were again mostly null; only four significant moderation effects can be reported. Considering the link between father and child's interpretation bias, it appears to be strengthened with the child's age: older preschoolers shared a significantly greater amount of interpretation bias with their fathers. Older preschoolers may be more attentive and sensitive to fathers' prevention and withdrawal behaviors, which are unexpected but interpreted as reliable signs of environmental danger to the children. On the contrary, the father's educational level seems to attenuate the association between the father's and the child's interpretation bias: a significant negative association emerged for higher educated fathers but not fathers with lower education levels. Perhaps, highly educated fathers might have more psychological resources to reduce the impact that their own interpretation bias has on their child's ability to cope with ambiguous situations.

Surprisingly, some characteristics of the mother seem to moderate the association between father and child interpretation bias. When mothers transmit less interpretation bias, the effect of father interpretation bias on their children's bias is also weaker, a result that suggests that mother's bias can tune the impact that father's bias has on their child. Thus, if mother and father (spouses) share similar low interpretation bias, this might mitigate children's own threat interpretations. In addition, a robust maternal authoritative style seems also to reduce the impact of the father's interpretation bias on his/her child. Perhaps mothers who are emotionally responsive and warm, listening and communicating with their children (Kuppens & Ceulemans, 2019) might lead their children to develop secure attachments, possibly reducing the impact of father's interpretation biases. On the contrary, more permissive mothers strengthen a father's influence. Possibly, since permissive mothers rarely enforce rules or consequences and avoid confrontation with their children (Hosokawa & Katsura, 2018), it might be the father

who has a more critical role in child education. So, children's information processing may be more influenced by the father's interpretation biases.

All variables considered do not moderate the link between the mother's and child's interpretation bias. Only the marginally significant moderation effect of the child's gender can be reported: the association between the mother's and child's interpretation bias is negative for girls (*beta* = -.36, $p < .1$) but null for boys (*beta* = +.13, $p > .1$). These gender-dependent effects deserve a deep exploration in future specifically designed studies.

At this point, it should be noted that in similar previous studies, the parents-children dyads involved mostly mothers (Creswell, Schniering & Rapee, 2005; Creswell & O'Connor, 2011; Gifford et al., 2008; Neil et al., 2019; Ooi, Dodd & Walsh, 2015; Pasarelu et al., 2017; Podina, Mogoase & Dobrean, 2013). In our study, the presence of father-child dyads allows us to observe effects not previously reported in the literature that deserves to be explored in future research.

In the current study, we identified several limitations. First, sample selectivity (children from the families that accept to participate have more substantial interpretation bias than the remaining invited children) might have affected the magnitude of correlations (attenuate correlations due to range restriction on interpretation bias), possibly contributing to the study's close to zero correlations. Second, demand characteristics may have influenced parents' responses to CIBM stories: it is possible that written stories might not accurately reflect what parents really convey to their children, making this measure less valid; indeed, parents may complete the stories according to their expectations about the child's responses to ambiguity and not expressing how they would effectively narrate the stories to their children in an everyday situation (Creswell et al., 2011). Finally, although three hypotheses were formulated and guided the data analysis, this is primarily an exploratory study. Accordingly, noteworthy results must be considered cautiously due to the risk of overcapitalizing chance due to multiple testing. Thus, such significant results should be considered suggestions to be tested and replicated in subsequent confirmatory studies.

Conclusion

The present study aimed to characterize the intergenerational transmission of interpretation bias between parents and their preschool children and explore its mechanisms. Regardless of the study limitations, our findings suggest that an evident pattern of intergenerational transmission of interpretation bias is not verified in preschoolers. Despite some evidence that parents may verbally transmit their own interpretation bias to their offspring, this transmission does not seem to influence their preschool-age children's interpretation bias. Furthermore, our results suggest that the intergenerational transmission of interpretation bias may depend on

factors associated with both the child and family functioning. We have put forward many possible explanations for the results. However, they should be viewed carefully and considered as paths for exploring future studies. Considering the limited existing literature on parental transmission of cognitive bias at these ages, the results may reflect specificities of the sample and the methodology used and not necessarily reliable characteristics of the transmission process. Further longitudinal studies are required to clarify if and when children's vulnerability to parental influence develops and which conditions favor its emergence.

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Chapter III. The Importance of Parental Benign Interpretation on Modifying their Children's Interpretations Bias

Introduction

Researchers have recently explored cognitive bias modification as a modality for psychotherapeutic intervention in anxiety. Mathews and Mackintosh (2000) pioneered a study that demonstrated that people could change their anxiety levels by simply interpreting ambiguous situations in a threatening or nonthreatening way. Participants were randomly allocated to two training conditions and presented with ambiguous vignettes with a word fragment at the end that they should complete considering the previous information. In one condition, the word fragment induced a positive interpretation of the vignette, while in the other condition, a negative interpretation was induced. For the participants in the positive interpretation condition, cognitive biases at the end of the training were successfully reduced compared to a pre-training baseline (Mathews & Mackintosh, 2000). In addition, positive induction training increased the tendency to adopt a more lenient criterion for acceptance of positive responses toward ambiguous scenarios. These results were later confirmed by Hallion & Ruscio (2011) and supported the idea that modification bias intervention might be helpful for clinical practice, considering its effects on anxiety reduction.

In the literature, we found results from training intervention studies that provided significant evidence for reducing negative interpretation bias in adults (Hallion & Ruscio, 2011; MacLeod & Mathews, 2012; Mathews & Mackintosh, 2000; Wilson, MacLeod, Mathews & Rutherford, 2006) and children (Muris et al., 2008; Muris et al., 2009; Lau, Belli & Chopra, 2012; Lau, Pettit & Creswell, 2013; Vassilopoulos, Banerjee & Prantzalou, 2009). Experimental cognitive bias modification of interpretation (CBM-I) aims to modify negative interpretation through training by repeatedly presenting participants with unfinished ambiguous scenarios. These scenarios can only be reasonably completed by supporting a positive situation evaluation. The main goal is for these favorable resolutions to become progressively automatic over time so that harmful interpretative errors are ignored and, consequently, vulnerability to anxiety is reduced. In adults, CBM-I programs have shown encouraging results in reducing anxiety symptoms (Beard, Weisberg & Amir, 2011; Hallion & Ruscio, 2011). The literature shows that socially anxious adults can benefit from symptom reduction through bias modification (e.g., Beard & Amir, 2008; Mobini, Reynolds & Mackintosh, 2013; Murphy et al., 2007; Yeung & Sharpe, 2019).

Although most of these results were reported primarily in adult subjects, interpretation bias modification has also been observed in adolescents and children (Blanchette & Richards,

2009; Castillo & Leandro, 2010; Muris & Field, 2008), making it particularly important to manipulate this bias and analyze its effects on anxiety symptomatology.

To date, the studies that have used (variations of) this paradigm have shown that cognitive biases can be successfully manipulated in young people: negative training promotes interpretative biases, while positive training corrects and reduces this type of cognitive bias (Lester et al., 2009; Muris et al., 2008; Muris, Huijding et al., 2009; Vassilopoulos, Banerjee & Prantzalou, 2009). To our knowledge, Muris and Field (2008) were the first to use an innovative modification of cognitive bias (called the 'Space Odyssey Paradigm') to change the interpretative bias in children. In this paradigm, clinically anxious and non-anxious children aged 8 to 12 were first instructed to imagine a journey to an unknown planet. They were then presented with ambiguous scenarios, such as "On the street, you encounter a spaceman. He has a sort of toy handgun, and he fires at you…" and were given as response options either a positive outcome, such as "You are laughing: it is a water pistol, and the weather is fine anyway", or a negative result, such as "Oops, this hurts! The pistol produces a red beam which burns your skin!" After children decide on an outcome, they receive feedback on whether their decision was correct or incorrect. Interpretation bias training was conducted by consistently reinforcing either the threatening or the harmless outcomes. The children were then presented with various ambiguous scenarios simulating everyday situations on Earth. The results showed that the children who received a threat-related modification interpreted the ambiguous scenarios more strongly as threats in the posttest than those who received a benign modification (Muris et al., 2008; Muris et al., 2009).

In another study using the modification bias paradigm, Vassilopoulos, Banerjee and Prantzalou (2009) attempted to manipulate interpretation bias in highly anxious adolescents (10 to 11 years old) using the CBM-I training program. This program consisted of 45 narratives representing ambiguous scenarios presented to participants in three sessions of 15 scenarios each. Each ambiguous scenario was shown to the youth on individual cards, and they were asked to choose one of two alternative endings: threatening or non-threatening. For example, "You made plans to go to the cinema with your schoolmates. When you reach the meeting point outside the cinema, you find no one there. What would you think if this happened to you?". Then two opposite solutions are suggested: "(a) My schoolmates are just late" (benevolent interpretation); or "(b) My schoolmates do not come because they try to stay away from me" (negative interpretation). After participants selected their answers to all the cards, they turned each card over to check the matching answer printed on the back (benign interpretation) and marked it as 'correct." No further feedback or explanation was given for the correct answer. Then the participant was asked to compare his or her answers to the correct ones and think about how the benign interpretations could explain what was happening in the

vignettes. This procedure was repeated in three training sessions. Participants were assessed (before and after training) with a measure of interpretation bias (using ambiguous scenarios). Results suggest that adolescents' negative cognitions are flexible and that interpretation training could influence biases in a less harmful direction.

Moreover, changes in negative interpretation ratings were positively associated with changes in social anxiety, $r(43) = .34$, $p < .05$. This implies that reductions in negative interpretation bias can reduce symptoms of social anxiety, which was later confirmed by Vassilopoulos and Banerjee (2012). However, in a follow-up study, Vassilopoulos, Moberly and Zisimatou (2013) were unable to replicate the effects of interpretative training on adolescents' social anxiety. They recommend investigating the causal effects of interpretative biases on youth social anxiety symptomatology and continuously improving the CBM-I procedure.

To examine whether training benign interpretative styles in children (aged 7 to 11 years old) is effective in reducing social anxiety symptoms, Lau, Pettit and Creswell (2013) used a CBM-I Training Task based on the procedure previously developed by Vassilopoulos and colleagues (2009) but introduced a specific modification. Their procedure assumes that negative interpretative styles are adopted in children by imitating the styles of their parents, and, consequently, benign styles could be more easily changed if the children's role models, namely their parents, conduct the training. Indeed, family environment, as well as genetic factors, are considered important factors for the development of cognitive biases. According to Field and Lester (2010), there is some evidence that parents may involuntarily convey fear to their children by providing harmful/threatening feedback about everyday ambiguous situations. Cognitive biases have been shown to be positively related in school-aged children and their parents (Creswell, O'Connor, & Brewin, 2006; Creswell, Schniering, & Rapee, 2005; Creswell, Shildrick, & Field, 2011; Lester, Field, Oliver, & Cartwright-Hatton, 2009; for a meta-analytic study, see Subar & Rozenman, 2021) and this association can be related to learning through modeling or by parental explicit communication of threatening information to children. Thus, since they sought to enhance the therapeutic effects of CBM-I in children, Lau and colleagues (2013) asked parents to present the training content (stories with ambiguous social content) to their children as bedtime stories three nights a week. Each time, the parents should reinforce the benign interpretation of the situation presented. Similar to Vassilopoulos and colleagues (2009; 2012; 2013), children were assessed in their schools (before and after training) with a measure of interpretation bias (Ambiguous Situations Interpretation scale, an adaptation of the Vassilopoulos and colleagues' procedure). The main findings indicated that the parent-delivered intervention could significantly reduce negative interpretation bias over the week. The authors concluded that positive verbal information provided by parents through storytelling reduced the interpretation bias.

Cristea and colleagues (2015) conducted the first meta-analysis looking at the effects of interventions to change cognitive bias in children and adolescents in a sample of twenty-three published studies. Only fourteen studies addressed CBM-I interventions, while the other nine examined attention bias modification (ABM). They found significant moderate effects of CBM interventions on the targeted interpretation biases (Hedges' g = 0.53) but with no reliable effect on mental health outcomes (g ~ 0.12). Thus, the authors expressed strong doubts about the clinical utility of CBM-I interventions in nonadult populations. Orchard and colleagues (2017) reached similar conclusions in a later study aimed at changing interpretation bias in children with SAD (7-12 years old) through CBM-I training procedures. They reported that there was no significant relationship between bias modification and reduction in children's social anxiety (a finding previously reported by Lau, Pettit & Creswell, 2013). The conclusions suggest that interpretation bias does not play an independent causal role in children's anxiety. Cristea and colleagues (2015) suggest that the CBM-I intervention effect may be transient and not strong enough to change deeper maladaptive cognitive patterns. This effect fades outside of the experimental setting or with a longer follow-up.

A more recent meta-analysis conducted by Krebs and colleagues (2018), including twenty-six studies addressing CBM-I intervention with children or adolescents younger than 18 years, reported a moderate-to-large effect on the reduction of malignant interpretations (g = 0.70); furthermore, after training, the intervention groups showed a stronger positive interpretation bias when compared to controls (g = 0.52). These results indicate that CBM-I has a statistically reliable effect on both decreasing negative interpretations and boosting positive interpretations. In contrast to the previous meta-analysis, the meta-analysis also reported a small but significant anxiety-reducing effect (g = -0.17). The authors believe that their meta-analysis detects the effect of CBM-I training on anxiety due to a greater statistical power (more studies were included than in the previous meta-analysis) and because the reviewed studies used more specific outcome measures (the previous meta-analysis used a broader mental health measure). Krebs and colleagues, therefore, pointed out that it may be too early to overlook the potential importance of CBM-I research and recommend further studies in this area.

Considering the factors that might affect the responsiveness to CBM-I interventions, the literature reports that the youngest participants are more likely to benefit from cognitive bias modification training, whether the studies involve adults (Liu, Li, Han, & Liu, 2017) or children (Klein et al., 2015). Also, some studies suggest that this intervention paradigm tends to be more effective in women (Liu, Li, Han, & Liu, 2017; Menne-Lothmann et al., 2014). However, contradictory results suggest that outcomes are not moderated by age or gender (Lau & Pile, 2015). Notably, no information seems to be available concerning younger populations.

Therefore, it is essential to understand if individual variables, such as age or gender, might influence children's responsiveness to the cognitive bias modification intervention. In addition, temperament may also impact the effectiveness of bias modification training in preschoolers. However, although temperament predisposes children to react in specific ways to stimuli and situations, little is known about such putative effects. No references were found in the literature concerning the effect of parental variables on children's responsiveness to CBM-I interventions. Studies addressing responsiveness to anxiety treatment showed that parental variables did not predict treatment response consistently (Norris & Kendall, 2021), despite their maintenance role in children's anxiety disorders (Schleider et al., 2015; Settipani et al., 2013). Since the research on preschool-aged children's responsiveness to CBM-I intervention is nonexistent, we believe it is important to identify child's and parental's variables that could influence the effectiveness of this intervention paradigm.

Given these mixed results and the lack of studies involving preschool children, we believe it is essential to understand if, at such younger ages, manipulating interpretational patterns through parent-child interaction might produce the expected effects. Like Lau, Pettit and Creswell (2013), we assume that children's ability to acquire new cognitive styles might be maximized through social learning processes by parental behavior modeling (Field, 2006). Including parents in the bias modification training replicates the natural processes through which children effectively learn certain interpretation styles, a situation previously explored in previous studies (e.g., Cox, Bamford & Lau, 2016; Lau, Pettit & Creswell, 2013, Wilkinson, 2017). Thus, considering children's negative interpretative biases may have been adopted through social modeling of parents' behavior, the benign interpretation style may also be more easily trained if the parents administer CBM-I training programs.

As we mentioned before, the present study was the first attempt to adapt the parent-administered Cognitive Bias Modification Training Intervention (CBMT-I; Lau, Pettit, & Creswell, 2013) to the Portuguese preschooler population, along with the assessment of the effects of a parent-delivered CBM-I intervention in preschool-aged children with high interpretation bias levels. The CBMT-I aims to reduce interpretation bias in children by manipulating the nature of parent-child interaction in ambiguous situations. Therefore, we hypothesized that:

1. preschoolers who receive the CBM-I training will show a reduction in negative interpretation bias compared with those who do not receive CBM-I training.

2. the level of interpretation bias reduction in preschoolers who received the CBM-I training is moderated by individual child characteristics (such as sex, age, and temperament) and parental variables (such as age, education, and parenting styles).

Since interpretation bias plays a key role in the origin and maintenance of anxiety disorders, we believe that if interpretation bias at early ages (preschoolers) can be successfully reduced through CBMT-I intervention, this study will be a relevant contribution to the development of clinical strategies that might help prevent the onset of anxiety symptoms in later childhood stages.

Method

Participants

Forty preschoolers (26 boys; mean age = 66.28 months) and their parents participated in this study. Thirty-five children lived with both parents, while four lived with their mothers only and one with the father. The sample was randomly split into two groups (target group *vs.* control group) of twenty preschoolers each. A detailed comparison of the groups is presented in the Results section.

The participants were recruited from the larger sample of 132 non-clinical children (48 to 70 months of age) described in the previous chapter and were enrolled in eleven preschool establishments in the Alentejo region, Portugal.

Materials

Children Interpretation Bias

The Portuguese version of the Children's Interpretation Bias Measure – Ambiguous Story-Stems (CIBM; Ooi, Dodd & Walsh, 2015), translated and adapted previously for this work (see Chapter I), was used to assess the cognitive interpretation bias in preschool children. The CIBM comprehends eight-story stems: four involving possible *physical threats* (e.g., "This is the park. Here is the family walking in the park. Look, there is a high rock. Maria wants to climb the rock. What is going to happen if she climbs the rock?"); two involving possible *social threat* (e.g., "This is the park. Maria is playing alone. A group of kids walks towards Maria. Why does this happen?"); and two related to *separation anxiety* (e.g., "Johana is having a fun party at her house. Maria wants to go to the party. Mom is busy, so she drops Maria at the party. Mom is about to drive away. What does Maria do? How does Maria feel?"). The child is invited to finish the story freely, and the content of their response is analyzed to identify the presence of a threat (see coding procedure below).

To help children understand the narrative, graphic illustrations for each story were used. The CIBM scores correspond to the percentage of story endings that conveyed threat interpretations.

According to the psychometric evaluation of this CIBM Portuguese version, four scores can be computed: a total interpretation bias score (CIBM Total), an interpretation bias score for physical threat (CIBM Physical), an interpretation bias score for social threat (CIBM Social) and an interpretation bias score for separation anxiety (CIBM Separation). These scores, although they did not reach a satisfactory internal consistency index (for example, McDonald's ω coefficient, $0.40 \leq \omega \leq 0.55$), showed adequate temporal stability $0.54 \leq r \leq 0.63$).

The CIBM Total score showed moderate correlations with measures of anxiety (Preschool Anxiety Scale – PAS; Almeida & Viana, 2013) and with a concurrent measure of interpretation bias (Ambiguous Situations Questionnaire for Preschoolers, ASQ-PS; Ooi, 2012).

Child Temperament

The Children's Behavior Questionnaire - Short Form Version (CBQ; Putnam & Rothbart, 2006; Portuguese version: Franklin, Soares, Sampaio, Santos, & Veríssimo, 2003) was used to evaluate the temperament of preschool children. The instrument consists of fifteen scales, organized into three dimensions: the Extraversion/Surgency Dimension (Activity level, Impulsivity, High-intensity pleasure, Approach/Positive anticipation), the Effortful Control Dimension (Attentional control, Perceptual sensitivity, Low-intensity pleasure, Smiling and laughter, Inhibitory control) and the Negative Affectivity Dimension (Anger/Frustration, Sadness, Shyness, Falling reactivity/Soothability, Discomfort, Fear).

Parents were asked to rate their child on each item using a 7-point scale. In the present sample, reliability indexes for CBQ dimensions were always good: Extraversion dimension, alpha = .69; for the Effortful Control dimension, alpha = .76; and for the Negative Affectivity dimension, alpha = .74. These reliability indexes of CBQ in our sample do not contrast with the original study, in which alpha values range between .75 to .72.

Parental Styles

The Parenting Styles and Dimensions Questionnaire (PSDQ; Robinson, Mandleco, Olsen, & Hart, 2001; Portuguese Version of Self-Report: Pedro, Carapito & Ribeiro, 2015) was used to assess the parenting styles of the parents involved in the study. The PSDQ assesses three parenting styles, according to Baumrind's (1971) classic typology: authoritative, authoritarian, and permissive. Parents (mother and father) were asked to rate each item according to frequency, using a 5-point scale ranging from 1 (Never) to 5 (Always) in separate protocols.

In our sample, the internal consistency for the three dimensions was good in both parents' protocols: Authoritative (α = .86), Authoritarian (α = .69), and Permissive (α = .62) for the mothers, and Authoritative (α = .90), Authoritarian (α = .81), and Permissive (α = .66) for the

fathers. Therefore, the PSDQ internal consistency in our sample does not differ from the original study, in which alpha values range between .88 to .62.

Cognitive Bias Modification Training Task

This study's intervention program adapts the Cognitive Bias Modification Training Task (Lau, Pettit, & Creswell, 2013) to preschool age. The adaptation process involved using fewer stories, adapting them to preschoolers' specificities, reducing the number of program sessions, and making minor adjustments in the application procedure. Twenty-four stories from the Novel Parent-Administered Cognitive Bias Modification Training Intervention (CBMT-I; Lau, Pettit, & Creswell, 2013) were translated into Portuguese and adapted to the preschool age group.

The translation process followed the translate-back method of Hill and Hill (2000) to obtain a translated version corresponding to the original text but respecting the Portuguese language specificities. First, the questionnaire was translated into Portuguese and then back-translated to English by a bilingual researcher. After comparing the different versions of each story, necessary adjustments were made to obtain the definitive Portuguese version (see appendix 6).

The original intervention program consisted of forty-five stories with ambiguous content, initially designed by Vassilopoulos, Banerjee and Prantzalou (2009) to use with children aged 7 to 11. Since our participants were preschoolers, we selected only the twenty-four stories that better reflected younger children's everyday situations and were easily understandable. Even then, some stories had to be adapted. For example, in the original CBMT-I, one of the stories was: "You get up and go to the blackboard to solve an exercise, and you are not very sure about the answer. The schoolteacher asks you, "Let us see if you can get it!" Why do you think this happens?". Next, after hearing this story, the experimenter would ask the child why the situation happened and provide two alternative explanations. The positive explanation (benign) was: "1. He said it because it is a difficult problem, and few people would be able to get it right", and the negative was: "2. He said it because he thinks I am stupid." After the child had indicated their preferred explanation, the experimenter gave them feedback: 'correct' (if the benign interpretation was chosen) or 'wrong' (if the negative interpretation was chosen). Then, the experimenter asked the child to "take a moment to think about the correct explanation" and read another sentence that paraphrased and reinforced the benign interpretation. Finally, the child is asked to listen to another sentence and tell if it is "True" (if they think it is true/right) or "False" (if they think it is not true/wrong): "The teacher would have said the same thing to any student who was having a go at the exercise".

In our Portuguese adaptation of the same story, we tried to adjust the situation to the daily experience of preschool children: "You get up to go to the presence board and tell what the

day of the month is, but you are not sure of the correct answer. The class educator says, "Let us see if you can get it right!" Why do you think this happens?". Then, the parents read two alternative endings. The child should pick only one: "1. She said that because the question is difficult and not all children can get it right", or "2. She said that because she thinks I do not know the answer". The parents classified the answer as correct (benign interpretation) or incorrect (malign interpretation; in this example, the correct is the first alternative). Next, parents ask children to imagine the situation, giving a briefly positive explanation to reinforce the benign interpretation: "The class educator likes to explain things well for the children to learn. And she likes to ask everyone difficult questions to help them learn better". Here, we introduced a change in the original procedure, adding a positive reinforcing explanation, adapted to preschoolers' development age, and aimed to compel the transmission of the benign interpretation (the program's primary objective). Lastly, the child was asked to listen to a final sentence and tell if it were "True" (if they think it is true/right) or "False" (if they think it is not true/wrong): "The class educator would say the same to any colleague who would answer that question".

We adopt Lau, Pettit and Creswell's (2013) procedure, asking parents to work on the training stories with their children. Parents were instructed to read the twenty-four stories to their children four nights in a row (six per night). This procedure also modified the original program and tried to adapt it to our younger participant's characteristics. When reducing the number of stories to be read each night by the parents, we aimed to preserve and maintain children's attention and interest in the task throughout the intervention program. Each story was presented on a single page with an accompanying graphic stimulus. Again, including a picture allusive to the story content was an innovation introduced to the original procedure, aiming to increase the engagement of our young participants. A preschool educator developed the pictures. Overall, the procedure was adapted to facilitate the preschooler's understanding and collaboration in the intervention program.

Procedure

Sample selection

The sample was selected from the larger sample of non-clinical children described in the previous chapter. Only children with higher interpretation bias scores participated in this study. They should have provided a threat interpretation at least in four out of eight CIBM stories in the previous study. After a preliminary selection of the children, parents were contacted through children's class educators, and the purpose and objectives of the intervention program were explained. Depending on the parent's willingness to participate, adjustments in the sample were made until we had the acceptance of 40 parent-children dyads. Subsequently,

participants were pseudo-randomized into two groups through a random number generator (intervention group vs. control group), ensuring a balanced sex distribution across groups. Since the present sample was selected from the previous study (chapter II), the children's temperament and parents' parental styles scores previously collected were used in this study.

Program Planification

The sample under study was recruited at schools in the public education network, so authorization from the Committee for Monitoring Surveys in School Environment (MIME, Portuguese Directorate-General for Education; approval code: 0652900002) was obtained before data collection.

The families that agreed to collaborate in the present study were informed about its objectives and procedures and provided written consent to participate. Participants were also authorized to use the information from the previous study (Children's Behavior Questionnaire and Parenting Styles and Dimension Questionnaire). The procedures in this intervention study began six months after the first evaluation made for the previous studies, as described in Chapters I and II. Each child participant verbally agreed to collaborate in interpretation bias assessment (CIBM). The preschoolers' assessments were done in a quiet environment in their preschool contexts. The researcher read the CIBM stories to each participant, explaining that he would start each story and that the child should finish it. Children's responses were audio-recorded for posterior analysis and coding.

After the pre-intervention interpretation bias assessment, the families allocated to each group were informed about the procedures for this study stage. Parents were instructed orally by the experimenter and the children's class educator (in preschools) to administer the intervention program to their children four nights in a row. They received a booklet containing twenty-four stories (six stories per night) and instructions. For the intervention group, parents followed the intervention procedure described in the CBMT-I protocol: each story should be read by the parents; the child should choose one of two alternative endings; the parents gave feedback, indicating the correct ending (the one expressing the benign alternative) and asked the child to think about this ending; then, parents give a briefly positive explanation to reinforce the transmission of benign interpretation; finally, parents read a final sentence and asked children to tell if it was true or false.

For the control group, the story is read by parents, and two alternatives are provided for the child to choose; no feedback is provided, and the parents repeat the procedure, reading the following story. After the parents had applied the intervention program (at home), the children were again evaluated for interpretation bias (CIBM) at school, following the same protocol (pre- vs. post-test interval: mean = 15 days, *sd* = 2).

Coding Scheme

Children's responses to CIBM stories were transcribed and evaluated following the coding procedure described in the previous chapters. To apply this coding scheme, two independent judges read the responses to each story and assigned a three-category coding scheme (Ooi et al., 2015). The score of 1 if the end of the story reflects a threatening interpretation and the score of 0 if the end of the story reflects a non-threatening interpretation. If the story-stem responses were vague, doubtful, or unrelated, or if there was a non-answer, the score was considered "missing". The agreement level between judges was perfect for almost all stories, except for "Mom drops child at a party" (S05, 98,4%) and "Mom and Dad going out" (S06, 99,2%).

Data Analysis

To assess the effect of the intervention program on the interpretation bias scores, we used a mixed repeated-measures ANOVA model. Post hoc analysis used independent samples and paired-sample *t*-tests. Independent samples *t*-tests and chi-square independence tests were used to assess the matching between intervention and control groups. Spearman correlation coefficients were used to analyze the association between relevant variables and the change in interpretation bias observed in the intervention group (a non-parametric coefficient was used due to the small group size).

Results

After controlling gender, the sample was randomly distributed into two groups (intervention group *vs.* control group). Both groups had twenty participants, with thirteen boys and seven girls each. The comparison between the control and intervention group means is reported in Table 3.1. We found no differences between groups regarding the participants' mean age (p = .980, Cohen's d = 0.00). Although fathers of children in the control group were older (Cohen's d = 0.57), the difference between groups was still non-significant (p = .099). No differences were found in mothers of children of both groups (intervention and control) (p = .32, Cohen's d = .32). In parents' education level, the difference between groups was also insignificant (p > .6).

Children's interpretation bias scores measured before the selection procedure do not show significant differences between groups (p = .732, Cohen's d = 0.11). There were no differences in fathers' interpretation bias scores between groups (p = .631, Cohen's d = -0.16). Although the mother´s interpretation bias scores were somehow higher in the control group (Cohen's d = -0.28), the difference between the groups was non-significant (p = .419).

Table 3.1 Comparison between the Control and intervention groups on personal and psychological variables

	Intervention (n = 20) (mean ± sd)	Control (n = 20) (mean ± sd)	*t*	*p*	Cohen's *d*
Age					
Children (months)	66.30 ± 6.11	66.25 ± 6.16	0.03	.980	0.00
Fathers (years)	33.77 ± 6.34	41.11 ± 5.44	-1.70	.099	-0.57
Mothers (years)	35.70 ± 5.22	37.47 ± 5.80	-1.00	.322	-0.32
Previous IB					
Children (CIBM)	63.12 ± 11.09	61.88 ± 11.09	0.34	.732	0.11
Fathers (PIBM)	17.70 ± 10.60	18.42 ± 14.10	-0.49	.631	-0.16
Mothers (PIBM)	16.25 ± 13.91	20.18 ± 20.29	-0.82	.419	-0.28
Temperament Dimensions					
Extroversion	4.91 ± 0.58	4.92 ± 0.52	-.09	.934	-0.02
Effortful Control	5.23 ± 0.71	5.46 ± 0.46	-1.2	.225	-0.40
Negative Affectivity	4.43 ± 0.41	4.54 ± 0.54	-.77	.448	-0.24
	N (%)	N (%)	X^2	*p*	
Father Educational Level					
Basic Level	7 (41.2%)	10 (52.6%)			
Secondary Level	8 (47.1%)	6 (31.6%)	0.91	.635	
High Education	2 (11.8%)	3 (15.8%)			
Mother Educational Level					
Basic Level	7 (35.0%)	6 (31.6%)			
Secondary Level	7 (35.0%)	5 (26.3%)	0.67	.715	
High Education	6 (30.0%)	8 (42.1%)			
Parental Status					
Both parents	17 (48.6%)	18 (51.4%)	0.23	.633	
Only parent	3 (60.0%)	2 (40.0%)			

Previous IB - Interpretation Bias; CIBM - Children Interpretation Bias Measure; PIBM - Parent Interpretation Bias Measure.

Overall, no significant differences were found between the two groups, indicating that they can be considered equivalent before intervention.

Intervention Program Evaluation

To assess the effect of the intervention program on interpretation bias, we conducted a mixed 2 × 2 ANOVA, with Group (Intervention *vs*. Control) as the between-subjects factor and Moment (pre- *vs*. post-intervention) as the within-subjects factor. The outcome variables were the interpretation bias measured by CIBM (total and partial scores). A significant large interaction effect (Group × Moment) was observed for the CIBM total score, $F(1, 38) = 24.6$, $p < .001$ (*partial*-$\eta^2 = 0.393$). Post-hoc comparison between means indicated that the two groups did not differ in the pre-intervention moment ($t(38) = -0.42$, $p = .677$, Cohen's $d = -0.13$). However, they markedly differ in the post-intervention moment ($t(38) = -5.53$, $p < .001$, Cohen's $d = -1.75$), with significantly lower CBIM scores for the intervention group.

Table 3.2 Intervention Effects in Changing Interpretation Bias Scores (CIBM Total; CIBM Physical; CIBM Separation): The Difference between Pre- and Post- Moments

	Pre- (mean ± sd)	Post- (mean ± sd)	*test t*	*p*	Cohen's *d*
CIBM Total					
G1 (Intervention)	40.6% ± 12.7%	18.1% ± 7.6%	7.62	<.001	2.15
G2 (Control)	42.5% ± 15.4%	36.9% ± 13.1%	3.33	.004	0.39
CIBM Physical					
G1 (Intervention)	63.8% ± 12.8%	35.0% ± 15.0%	6.33	<.001	2.07
G2 (Control)	62.5% ± 23.6%	57.5% ± 20.0%	2.18	.042	0.23
CIBM Social					
G1 (Intervention)	25.0% ± 30.4%	2.5% ± 11.2%	3.94	<.001	0.98
G2 (Control)	30.0% ± 29.9%	22.5% ± 30.2%	1.83	.083	0.25
CIBM Separation					
G1 (Intervention)	10.0% ± 20.5%	0.0% ± 0.0%	2.18	.042	0.69
G2 (Control)	15.0% ± 32.8%	10.0% ± 30.8%	1.45	.163	0.16

CIBM - Children Interpretation Bias Measure

Comparing the interpretation bias score across moments (Table 3.2), we observed a significant decrease in CIBM total score for both groups between the first (pretest) and the second (posttest) evaluation moment; however, the reduction in interpretation bias score was more robust for the intervention group (from 41% to 18%; $p < .001$, Cohen´s $d = 2.15$), when

compared to the control group (from 43% to 37%; p = .004, Cohen´s d = 0.39). The effect of the intervention program on the CIBM total score is shown in Figure 3.1.

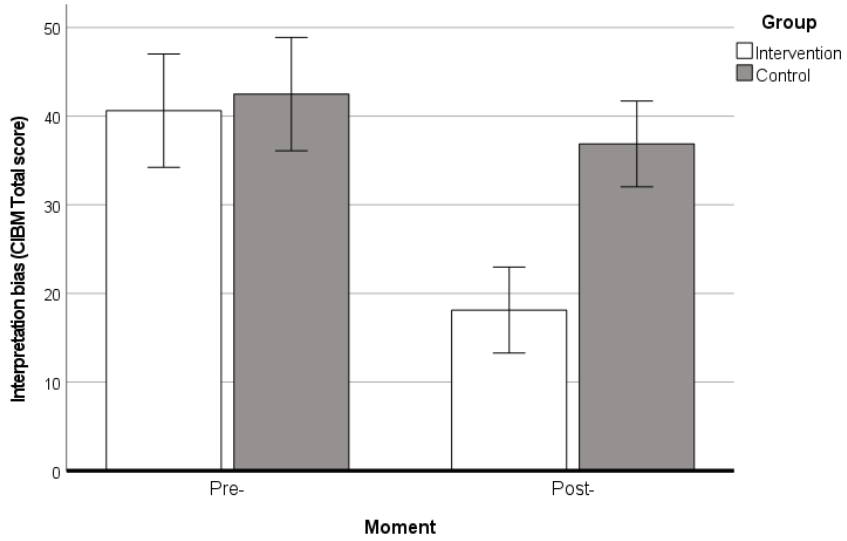

Figure 3.1 Effect of the Intervention Program on the Interpretation Bias (CIBM Total Score): Mean ± 95% Confidence Interval

The CIBM physical score also showed a significant large interaction effect (Group × Moment), $F(1, 38) = 21.8$, $p < .001$ ($partial\text{-}\eta^2 = 0.364$). Post-hoc comparison between means showed that in the pre-intervention moment ($t(29.2) = 0.21$, $p = .837$, Cohen's $d = 0.07$), the two groups did not diverge. Nonetheless, they distinctly contrast in the post-intervention moment ($t(38) = -4.02$, $p < .001$, Cohen's $d = -1.27$), with a reduced CBIM score for the intervention group.

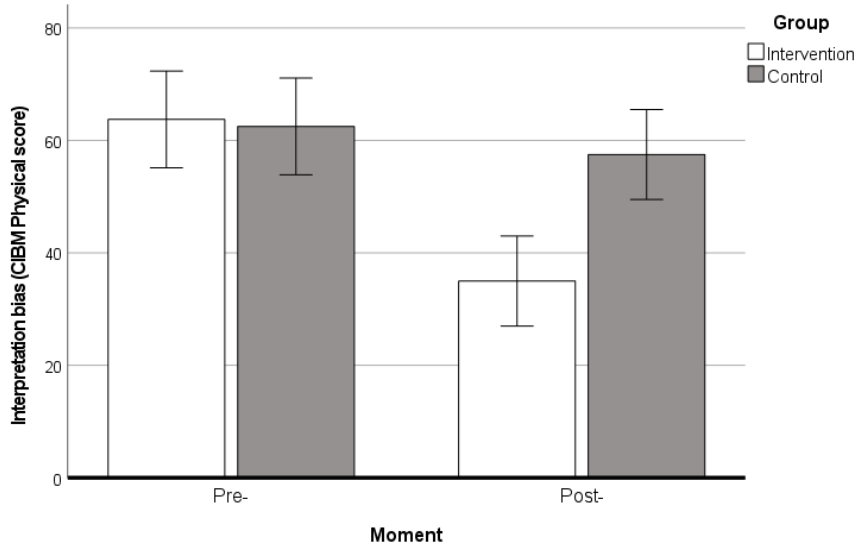

Figure 3.2 Effect of the Intervention Program on the Interpretation Bias for Physical Risky Situations (CIBM Physical Score): Mean ± 95% Confidence Interval

A substantial reduction in CIBM physical score was observed between the first and the second evaluation moment for the intervention group (from 64% to 35%; $p < .001$, Cohen´s $d = 2.07$; see Table 3.2).

The decrease was smaller for the control group (62% to 58%; $p = .042$, Cohen´s $d = 0.23$), although still significant. The effect of the intervention program on the CIBM physical score is represented in Figure 3.2.

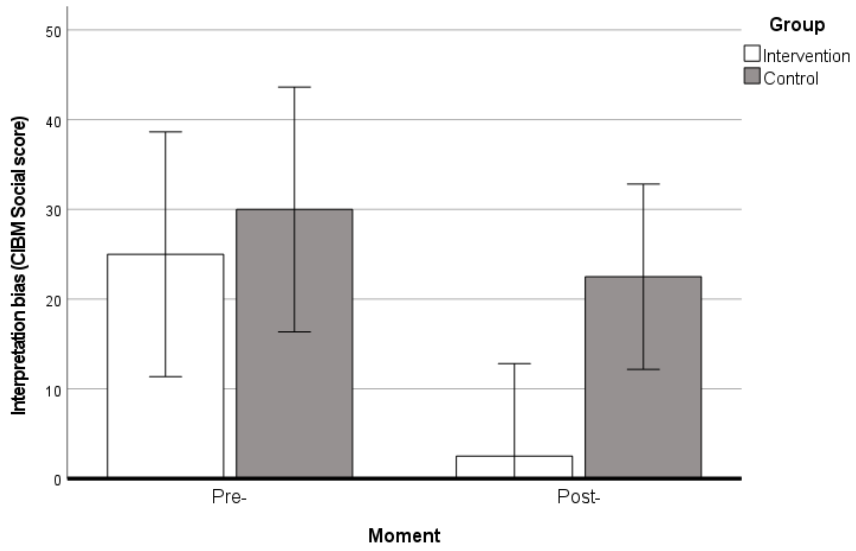

Figure 3.3 Effect of the Intervention Program on the Interpretation Bias for Social Situations (CIBM Social Score): Mean ± 95% Confidence Interval

The CIBM social score also showed a significant interaction effect (Group × Moment), $F(1, 38) = 4.6$, $p = .039$ (*partial-*$\eta^2 = 0.107$). Post-hoc comparison between means revealed that the two groups did not differ in the pre-intervention moment ($t(38) = -0.52$, $p = 0.603$, Cohen's $d = -0.17$). However, they differed in the post-intervention moment, with a lower CBIM score for the intervention group. This difference was large and significant ($t(24.1) = -2.77$, $p = 0.01$, Cohen's $d = -0.88$).

A substantial reduction in CIBM social score was observed between the first and the second evaluation moment for the intervention group (from 25% to 2%; $p < .001$, Cohen´s $d = 0.98$; see Table 3.2). Although marginally significant, this decrease was weaker for the control group (from 30% to 22%; $p = .083$, Cohen´s $d = 0.25$).

The effect of the intervention program on the CIBM physical score is represented in Figure 3.3.

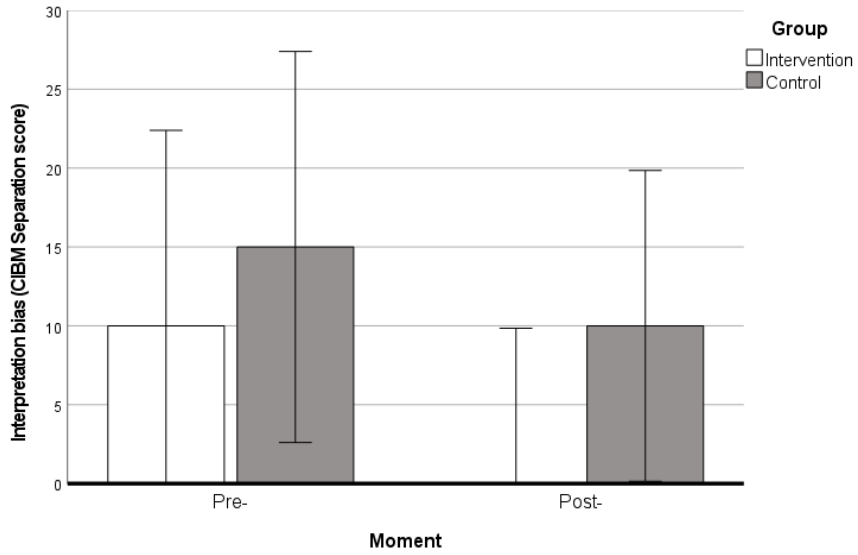

Figure 3.4 Effect of the Intervention Program on the Interpretation Bias for Separation Situations (CIBM Separation Score): Mean ± 95% Confidence Interval

Finally, in the CIBM separation score, a non-significant interaction effect (Group × Moment) was observed, $F(1, 38) = 0.8$, $p = .389$ (*partial-*$\eta^2 = 0.020$). Post-hoc comparison between means confirmed that both groups did not differ significantly in the pre-intervention moment ($t(38) = -0.58$, $p = 0.567$, Cohen's $d = -0.18$) as well as in the post-intervention moment ($t(19.0) = -1.45$, $p = 0.163$, Cohen's $d = -0.46$).

The effect of the intervention program on the CIBM separation score is depicted in Figure 3.4.

Covariates of interpretation bias reduction

To better understand the individual responsivity to the intervention, we analyzed the correlation between the change in interpretation bias (CIBM Total score) and individual differences in some relevant characteristics of the child and his/her parents. This analysis was restricted to the intervention group ($n = 20$) since only those children were exposed to the intervention procedure.

Table 3.3 presents the Spearman correlation coefficients between the change in interpretation bias (pre-intervention CIBM total score minus post-intervention CIBM total score, where positive values represent a reduction in the interpretation bias level) and child's (sex, age, temperament) and parental (age, education, and parental styles) characteristics.

Table 3.3 Correlation between the changes in Interpretation Bias (CIBM Total Score) in the Intervention Group (G1; n = 20) and Child Individual Characteristics and Parental Variables (Spearman Correlation Coefficients)

Children Variables	Intervention effect (G1)	Parents Variables	Intervention effect (G1)
Gender	.03	Age	
Age	.02	Mother	-.21
Siblings Number	.32	Father	-.02
Child Temperament (CBQ)		Education level	
Extroversion Dimension	-.11	Mother	-.20
Activity Level Scale	-.15	Father	-.02
Impulsivity Scale	-.18	Mother Parental style (PSDQ)	
High-Intensity Pleasure Scale	-01	Authoritarian	.12
Approach/Positive Anticipation Scale	-.15	Authoritative	-.15
Effortful Control Dimension	.00	Permissive	.38*
Attentional Focusing Scale	.12	Father Parental style (PSDQ)	
Perceptual Sensitivity Scale	-.01	Authoritarian	-.18
Low-Intensity Pleasure Scale	-.04	Authoritative	.24
Smiling and Laughter Scale	-.17	Permissive	-.13
Inhibitory Control Scale	.32		
Negative Affectivity Dimension	-.36		
Anger/Frustration Scale	-.35		
Sadness Scale	-.14		
Shyness Scale	-.18		
Soothability Scale	.36		
Discomfort Scale	-.19		
Fear Scale	.01		

º $p < .1$; * $p < .05$; ** $p < .01$; *** $p < .001$.

All correlations were non-significant ($p > .1$), except for the moderate positive correlation between the interpretation bias change and self-reported mother's permissive style ($r_s = .38$; $p < .05$). Although non-significant, moderate positive correlations were found between

interpretation bias change and the number of siblings (r_s = .32; p = .169), the negative affectivity dimension (r_s = -.36; p = .122) as well as the inhibitory control (r_s = .32; p = .166), the anger/frustration (r_s = -.35; p = .126), and the soothability scales (r_s = .36; p = .124). These correlations indicate that the existence of siblings, inhibitory control competencies, and recovery from distressed situations may be positively associated with the child's sensitivity to intervention. In the opposite way, negative affectivity (primarily related to anger/frustration) seems negatively associated with the child's response to the treatment.

Discussion

The present study aimed to assess the effects of a parent-delivered CBM-I intervention in preschool-aged children with elevated levels of interpretation bias. This program is intended to reduce preschoolers' interpretation bias by manipulating the nature of parent-child interaction in a specific ambiguous situation (reading and interpreting ambiguous narratives as bedtime stories). Two well-matched randomly defined groups of twenty preschoolers with high interpretation bias were evaluated with the CIBM in two moments, before and after applying the intervention program (CBMT-I). The first evaluation showed no differences between groups in children's interpretation bias levels. In the second moment (after the CBMT-I intervention), results show a clear interpretation bias reduction in the intervention group, both in the CIBM total score and in two subscales (the CIBM Physical and the CIBM Social score). These results confirm those obtained in previous studies with school-aged children (Beard & Amir, 2008; Cristea et al., 2015; Lau, Pettit, & Creswell, 2013; Vassilopoulos, Banerjee & Prantzalou, 2009).

Thus, this intervention program could apparently benefit children's capacity to acquire cognitive styles to cope positively with ambiguous situations. Furthermore, these results also propose that this change may result from social learning processes through parent behavioral modeling (Field, 2006). However, additional work is needed to clarify if CBM-I programs conducted by parents in children's natural environment are really a more robust approach than training through a computerized interface (Lisk et al., 2018; Orchard et al., 2017) or using a third-person (for instance, the researcher) to deliver the intervention program (Vassilopoulos, Banerjee & Prantzalou, 2009).

We also observed a reliable interpretation bias reduction in the control group, although smaller (effect size for the intervention group: 0.7 ≤ Cohen's d ≤ 2.0; effect size for the control group: 0.2 ≤ Cohen's d ≤ 0.4). Similar results have also been found in previous studies, suggesting that they might reflect a kind of "regression toward the mean" (Orchard et al., 2017). This explanation is particularly relevant since children included in this study were selected because they have shown a high level of interpretation bias in a previous assessment. So, a natural

measure reduction may be expected simply due to random variation. Changes in the control group could also arise from demand effects due to format similarities between the interpretation bias measure and the intervention task (both use story stems). A possible explanation is that since children were exposed to ambiguous narratives before, during, and after the program application, they might have perceived what was expected from them and responded accordingly, reducing the percentage of malign interpretations. Lau, Pettit and Creswell (2013) suggested that this possibility requires interpretation bias measures methodologically distinct from the material used in the intervention programs. Therefore, preventing demand effects and exploring new instruments' generalizability should be pursued in future studies. Despite the reduction in interpretation bias observed in the control group, the effect is clearly stronger and evident in the intervention group, so the efficacy of the CBMT-I intervention program can be recognized, at least in this sample of preschool children.

As previously said, the intervention effect was observed for three out of four interpretation bias measures provided by CIBM. The effect on the CIBM Separation score was non-significant (although a significant reduction was observed in the intervention group, the difference between groups after the intervention was non-significant). This almost null effect observed for Separation Anxiety Interpretation Bias may arise from the worse sensitivity of this subscale (it revealed a possible floor effect; Chapter I) or, instead, from less responsiveness of this threat domain to the intervention procedure. More research is needed, with more reliable measures, to test if the efficiency of the intervention procedure is similar across the main children's fear domains.

None of the previous studies directly addressed potential moderators to explain the reduction of negative interpretation bias in children exposed to this kind of intervention. To understand if the individual or family characteristics influence the child's predisposition for a positive reaction to the intervention program, we correlate the reduction in global interpretation bias (CIBM Total score) observed in the intervention group with relevant attributes of the child and of his/her parents. However, no significant correlations were found (with one exception). An explanation for these null results may be the interval between the data collection for those putative moderators and the intervention itself. As stated in the procedure description, most of those measures (namely, temperament and parental styles) were taken six-month before the intervention program. Such an interval between measures may attenuate correlations since, at such early ages, children's psychological characteristics change very fast, as well as parents' perceptions about their children. Similarly, parental behaviors change accordingly to adapt to their offspring's development. Another plausible reason for null results may lie in the small sample size of the group (n = 20), which does not provide enough statistical power to detect a moderate correlation as significant.

If we cautiously circumscribe our correlation analysis to the highest coefficients obtained (r > .3), we found a positive association between the number of siblings and the reduction in children's interpretation bias: a higher number of siblings seems to favor a reduction in interpretation bias. No literature supported this result. The existence of brothers or sisters may provide more interaction opportunities for the child to test the newly acquired benign interpretations of social interactions. We also observed a moderate correlation between the inhibitory control scale (CBQ) and interpretation bias changes. It suggests that the higher ability to plan and overturn inappropriate responses in new situations may contribute to more sensitivity to the effects of the intervention program. This result confirms previous studies with school-aged children. Susa-Erdogan and colleagues showed that anxious children with high inhibitory control are more efficient in discrimination tasks in the presence of an emotional distractor (angry and happy faces) (Susa-Erdogan, Bengà, Mone, & Miclea, 2016). Likewise, children with low inhibitory control are more predisposed to interpret ambiguous situations threateningly (Scheper et al., 2017). Higher effortful control (attention control and inhibitory control) might also permit children to take an earlier opposite path before engaging in negative thoughts (Raines et al., 2019). The moderate positive correlation between the soothability scale (CBQ) and the reduction in interpretation bias indicates that children with higher skills to recover from stressful situations seem to benefit more from the CBMT-I intervention program. Contrarily, negative affectivity related to anger and frustration delays intervention effectiveness. Children's psychological flexibility might explain part of these results. This cognitive ability is developed early in childhood, when children start to understand and produce rules and self-rules through social relations, facilitating self-regulation capacity development (Ruiz & Perete, 2015). Therefore, children with more cognitive flexibility might be able to engage and benefit more from treatment programs. Contrary, Simon and Verboon (2016) found a significant positive relationship between cognitive inflexibility and child anxiety, suggesting that anxious children showed higher levels of psychological inflexibility. Lastly, the only significant correlation (yet it should be looked at very carefully since we did not make corrections for multiple statistical testing) relates the more permissive parental style (as self-reported by mothers) to a stronger decrease in children's interpretation bias due to the intervention program. We found no literature to support this unexpected result. Children (with permissive mothers) are possibly used to being freer from parental influence, so the benign interpretations recently learned in the specific story-telling context may be more easily generalized to other contexts without special parental supervision to prevent problems from happening.

Finally, a reflection is necessary about the apparent contradiction between the effectiveness of a parent-delivered intervention to reduce interpretation bias (Chapter III) and the absence

of an association between parents' interpretation bias (or expressed by the parents) and the child's interpretation bias (Chapter II). While the measures used in Chapter II focused on the expression of negative interpretations (both for parents and children), the CBM-I intervention program is based on the intensive training of positive interpretations when facing ambiguous scenarios. Differences in children's information processing capacities according to emotional valence have been discussed in the literature: positive and negative information is possibly processed along separate (albeit related) paths and has both qualitatively and quantitatively distinct effects on infant learning and behavior (Vaish, Grossmann, & Woodward, 2008). Furthermore, it has been recognized that positive events are easier to express and comprehend verbally by young children since they require a simpler vocabulary (Bahn et al., 2017): younger children are more familiar with, i.e., have been more exposed to, positive words than negative ones. Thus, young children's responsiveness to parents' interpretation bias may depend on the valence of the information being conveyed. Further investigations are required to deepen this important topic.

We identified several limitations of the current study. First, given that parents administered the CBMT-I at families' homes, it was uncertain to know the participants' (parents-child dyad) commitment during the sessions and their adherence to the program instructions. Second, a follow-up assessment should be implemented to evaluate the temporal stability of the intervention effects since it has been questioned whether or not the effects of such interventions are temporary. Third, the measures characterizing the child and his/her parents were taken six months before the intervention program. Children's psychological characteristics change extremely fast, as well as parental behaviors at such young ages. In future studies, measures should be obtained during the same intervention period. Although relatively small, our sample size has provided statistical power enough to detect the strong intervention effects. However, it was insufficient to explore the more subtle effects of individual differences in the responsiveness to the intervention. So, sample size heightens the probability of Type II errors (Abraham & Russel, 2008). Conversely, exploring different potential response mediators to the intervention may have led to false positives due to multiple testing. So, the present results should be taken carefully, and we recommend future studies with a larger sample to cross-validate the current study's results.

Moreover, although both groups were randomized, there were significantly more boys than girls (almost a 2:1 ratio). Thus, our findings may be somehow constrained by the gender discrepancy in our sample. In a meta-regression, Jones and Sharpe (2017) suggested that, in the adult population, CBM-I tends to be more effective in women.

Conclusion

The present study was the first attempt to adapt the Cognitive Bias Modification Training Intervention (CBMT-I; Lau, Pettit, & Creswell, 2013) to reduce preschool children's interpretation bias by manipulating the nature of parent-child interaction in ambiguous situations. Despite the study's limitations, the most relevant finding is that the parent-administrated CBMT-I proved an effective intervention program to reduce interpretation bias in preschoolers. Additionally, CBMT-I seems to strengthen the concept that it is possible to modify the other's perspective (negatively or positively) through the transmission of verbal and non-verbal behavior. Also, involving parents in bias modification recruits the natural processes by which children learn interpretational styles. Nevertheless, due to our methodological limitations and the intervention program, our results should be interpreted as a step in improving CBMT-I quality for the preschooler population.

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General Limitations and Directions for Future Research

As we outlined previously, we identified several limitations characterizing our empirical work reported in the thesis chapters. Nevertheless, we believe it is important to underline a few generic significant limitations and set the main directions for future work.

First, conclusions regarding the developmental trends of the hypothesized association between parent and child interpretation bias cannot be drawn since we used a cross-sectional correlational design in all the studies. Although this association is apparently absent during the preschool period, future research using a longitudinal approach should be conducted to assess its developmental course and the psychological and environmental mechanisms involved in the emergence, attenuation or maintenance of the association between parent and child interpretation bias.

Second, the target of our study was the interpretation bias toward threat. As biases can occur across different stages of information processing, it will be relevant to explore the cooccurrence of such different forms of bias both in parents and children. Future research should consider assessing child and parent cognition bias in two or more stages of information processing in longitudinal studies.

Finally, the methods and instruments that have been used to measure parental and young children interpretation bias are highly heterogeneous across studies, susceptible to distortions (due to single-respondent biases or demand characteristics) and measurement errors and lacking ecological validity. With mobile eye-tracking technologies advancing, there is a unique opportunity to measure cognitive biases across various stages of information processing while capturing children's cognitive biases in daily situations (e.g., Allen et al., 2020). Future studies examining the link between cognitive biases in parents and children should adopt these more ecologically valid measures.

Final Considerations

The literature review on the scope of cognitive biases allowed us to identify the significant role interpretation bias has in the origin and maintenance of psychological disturbances, namely anxiety disorders. Since preschool-aged children have been outcasted from most interpretation bias studies, we aimed at three main objectives for the current research project. First, to develop a measure adequate to assess interpretation bias in young children; here, we adapted the Children's Interpretation Bias Measure – Ambiguous Story-Stems (CIBM; Ooi, Dodd, & Walsh, 2015) and evaluated the psychometric properties. Second, to explore the origins of interpretation bias, searching for indicators of intergenerational transmission between parents and their preschool children, considering the putative influence of the child's

(such as gender, age, and temperament) and parents' characteristics (age, education level, parenting styles, interpretation bias level) on this transmission. Third, to assess the effects of a parent-delivered Cognitive Bias Modification of Interpretation (CBM-I) intervention in preschool-aged children with elevated levels of interpretation bias. This intervention program proposes to reduce children's interpretation bias by modifying the parent-child interaction in a specific ambiguous social situation (reading and interpreting ambiguous narratives as bedtime stories); thus, CBM-I intervention results would provide a demonstration of the role parent-child interaction may have in the origins and maintenance of interpretation bias during childhood.

The three studies' findings supported the potentialities of using the ambiguous story-stems methodology as a measure (CIBM) and an intervention tool (CBMI-T) for preschoolers. Although this methodology seems particularly adequate for small children, CIBM needs further refinements to achieve more robust psychometric qualities and to be used as a reliable interpretation bias for preschool populations. Thus, our results should be interpreted only as an additional step toward improving CIBM quality.

Next, by exploring intergenerational transmission between parents and their preschoolers, we found that although parents may exhibit interpretation bias in ambiguous situations and verbally express their bias (particularly mothers) when facing ambiguous situations, this transmission does not appear to affect their children. We can conclude that the intergenerational transmission of interpretation bias seems not to occur at this developmental stage, at least in our sample of preschoolers. However, these findings appear to be moderated by the child's age (older preschoolers shared a large amount of interpretation bias with their fathers), a result that is corroborated by the literature that reports a significant, although weak, association between parents and older child’s interpretation bias. Furthermore, some parents' characteristics (namely, educational level and parenting style) seem to moderate the association between parent and child interpretation bias, indicating that all these variables interact in a complex way within the family. Our second study also explored the impact of child's and parents' characteristics on interpretation bias. Significant results were sparse, and the risk of overcapitalizing chance due to multiple testing cannot be ignored; however, interesting clues for future studies were obtained. First, age effects were identified, suggesting that older children are more susceptible to interpretation bias. Second, and unexpectedly, theoretically relevant dimensions of the child's temperament, such as Shyness, Fear, Approach/Positive Anticipation, or Inhibitory Control, seem not to affect the predisposition of preschoolers to interpretation bias: perhaps in preschool-aged children, these temperament dimensions may be associated with bias in other cognitive processing stages (e.g., attention) rather than interpretation. However, the child's temperament seems to modulate how parents choose to end ambiguous stories; thus, parents may adapt their behavior towards ambiguity to alert and

prevent their children from experiencing negative emotions in unclear situations. Third, although the parental style does not directly affect the child's interpretation bias, it seems to influence how parents verbally transmit to their offspring how to cope with ambiguous situations.

Finally, the parent-administrated CBMT-I proved an effective intervention program to reduce interpretation bias in preschoolers. The consequences of such positive results are twofold. At a more theoretical level, the results suggest that parents' verbal behavior conveying biased interpretation (in this case, positive interpretation of ambiguous situations) may affect their child's interpretation bias. From a more clinical-oriented perspective, our CBMT-I adaptation to preschool-aged children should be considered as a step toward improving the quality and generability of CBMT-I. Due to the high association between interpretation bias and social anxiety in school-aged children and adolescents, the CBMT-I efficacy among preschoolers suggests that they might also benefit from reducing interpretation bias and, by extension, from a decrease in social anxiety symptoms.

Overall, the results of our intervention study reinforce the importance of early interventions in young children's interpretation bias since a parent-administrated bias modification program (CBMT-I) seems to reduce interpretation bias for the youngest (preschoolers). Furthermore, the efficacy of the CBMT-I reinforces the idea that it is possible to change the other's perception (negatively or positively) by transmitting information through verbal and non-verbal behaviors. The emotional quality of information transmitted from parents to children seems to have a significant, relevant role here since preschool children apparently showed weak responsiveness to parents' negative interpretation bias but reacted favorably to an intervention based on parents' deliverance of positive interpretations when facing ambiguity.

In conclusion, we hope this work has contributed to a better understanding of some factors involved in preschool children's interpretation bias, namely the role parents' behavior might have in transmission and reducing interpretation bias in their children.

Appendixes

Children´s Interpretation Bias Measure – Ambiguous Story-Stems (CIBM)
(Ooi, Dodd, & Walsh, 2015)

Hora das Histórias para Crianças

1. A família do João está a passear pelo parque. Olha, está aqui um rochedo muito alto. O João quer subir o rochedo. O que iria acontecer se ele subisse o rochedo?

2. Olha. Estas crianças estão a jogar um jogo divertido. O João também quer jogar. Está a aproximar-se. Parece que as crianças estão a rir. De que é que eles estão a rir?

3. Aqui é o parque. O João está a brincar sozinho. Um grupo de crianças aproxima-se dele. Porque estavam as crianças a aproximar-se do João?

4. O João e a Mãe estão de pé na calçada. Querem atravessar uma rua movimentada para ir ao parque. Há muitos carros a passar. O que acontece à criança e à Mãe?

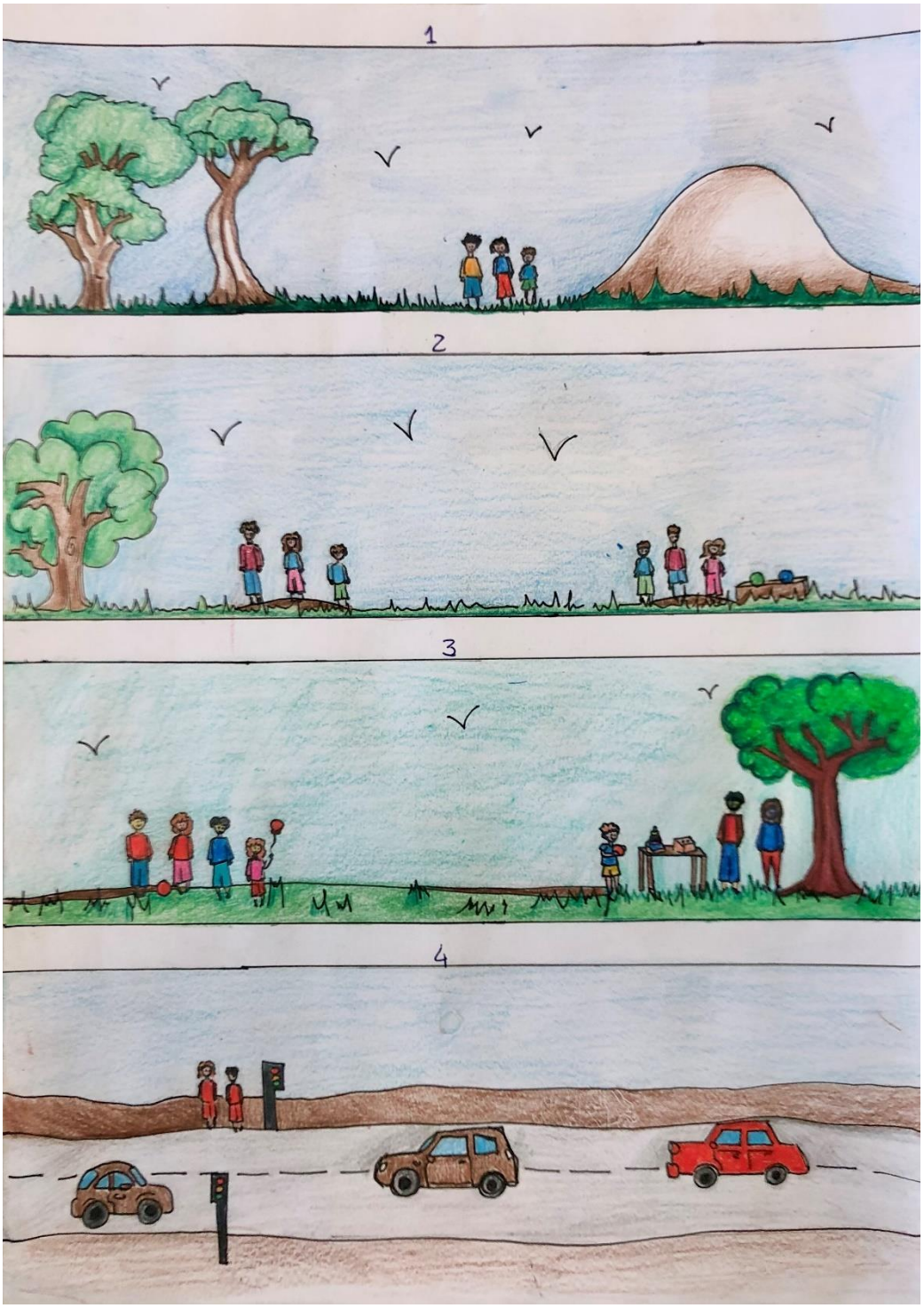
5. O Manuel está a dar uma divertida festa na sua casa. O João quer ir à festa. A Mãe está ocupada e deixa-o na festa. A Mãe está quase a ir embora. O que faz o João? Como se sente a criança?

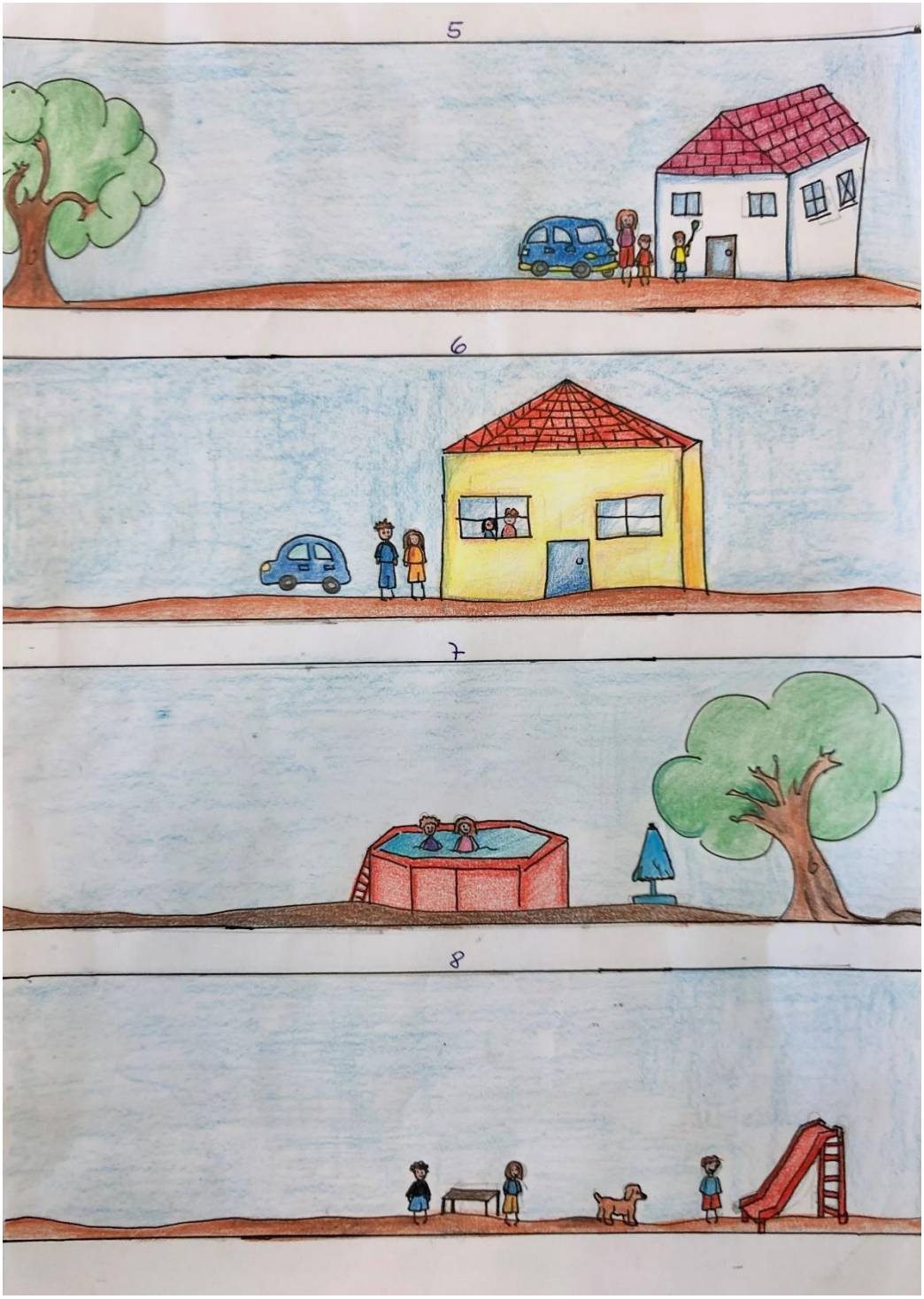
6. A Mãe e o Pai vão sair à noite. Teresa, a baby-sitter irá ficar com o João em casa. A Mãe e o Pai estão quase a sair. O que faz o João? Como se sente a criança?

7. A Mãe e o João estão a nadar na piscina. Estão de mãos dadas. O João larga a mão da Mãe. O que acontece à criança quando larga as mãos da Mãe?

8. O João está no parque. De repente, um cão corre em direção a ele. Por que correu o cão em direção ao João?

Appendix 2 Graphic Scenarios of Children´s Interpretation Bias Measure (CIBM)




5
6
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8

Appendix 3 Ambiguous Situations Questionnaire Preschoolers

Ambiguous Situations Questionnaire

(ASQ; Barrett, Rapee, Dadds, & Ryan, 1996)

Versão Adaptada Pré-Escolar

Vou contar-te algumas histórias sobre coisas que te podem acontecer. São coisas que podem ter já acontecido contigo antes, ou podes ter de imaginar como seria se isso te acontecesse. O importante é que me digas o que realmente pensaras se isso acontecesse contigo. Depois de eu ler cada história, por favor, aponta para a imagem que mais se parece com aquilo que pensarias.

1. Um dia, na escola, percebes que não encontras o teu brinquedo preferido.

Achas que:

a) Alguém te roubou o brinquedo.

OU

b) Nesse dia, tinhas deixado o brinquedo em casa.

2. A caminho da escola começas a ter dor de barriga.

Achas que:

a) Comeste pouco ao pequeno-almoço e estás apenas com fome.

OU

b) Comeste alguma comida estragada e vais ficar muito doente na escola.

3. Na escola, a Educadora chama-te à parte para conversar.

Achas que:

a) A Educadora precisa da tua ajuda.

OU

b) A Educadora pensa que fizeste alguma coisa errada.

4. Estás em casa de um amigo e a tua mãe aparece lá mais cedo.

Achas que:

a) Alguma coisa má aconteceu na tua casa.

OU

b) Ela veio visitar a mãe do teu amigo.

5. Estás a andar na rua e um cão grande aproxima-se de ti.

Achas que:

a) O cão quer dizer-te olá.

OU

b) O cão vai-te morder.

6. Estás a visitar a casa de um amigo e a mãe dele parece estar muito zangada.

Achas que:

a) Ela não quer que tu estejas lá e está zangada contigo.

OU

b) Ela está a ter um dia mau.

7. Vês um grupo de crianças a jogar um jogo divertido. Quando te aproximas para participar também, elas estão a rir.

Achas que:

a) Um deles disse uma piada má sobre ti.

OU

b) Eles estão a rir com o jogo.

8. Estás a brincar em casa e ouves alguém a bater à porta.

Acha que:

a) Alguém que conheces vem visitar-te.

OU

b) Alguém que não conheces está a tentar entrar na tua casa.

9. Estás na tua festa de aniversário e ainda ninguém chegou à tua casa.

Achas que:

a) Ninguém quer vir à festa.

OU

b) Eles estão um pouco atrasados.

10. Estás deitado na tua cama à noite quando ouves um grande barulho em casa.

Achas que:

a) Alguém deixou cair alguma coisa no chão.

OU

b) Um dos teus pais caiu e está ferido.

11. É a tua vez de contares uma história em frente dos teus colegas na escola e dois dos deles estão a rir.

Achas que:

a) Eles estão a rir de alguma coisa que disseste.

OU

b) Um deles contou uma piada, e eles riram disso.

12. Vais brincar com um brinquedo novo, mas não funciona.

Achas que:

a) Precisa de pilhas novas.

OU

b) Estragaste-o.

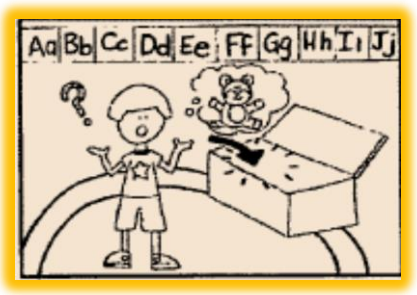
Appendix 4 Graphic Scenarios of Ambiguous Situations Questionnaire Preschoolers

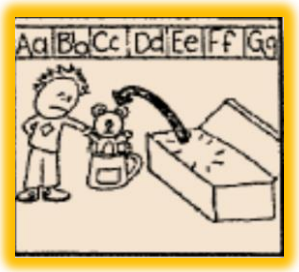
Ambiguous Situations Questionnaire

(ASQ; Barrett, Rapee, Dadds, & Ryan, 1996)

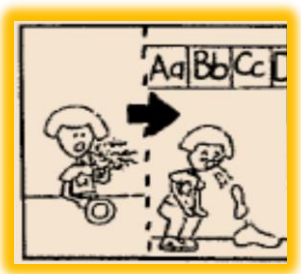
Versão Adaptada Pré-Escolar

1ª





2ª



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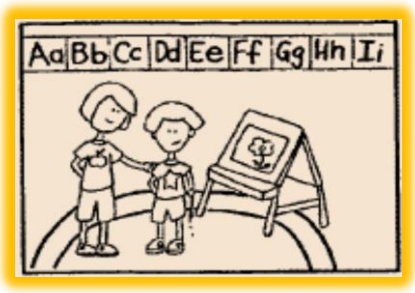

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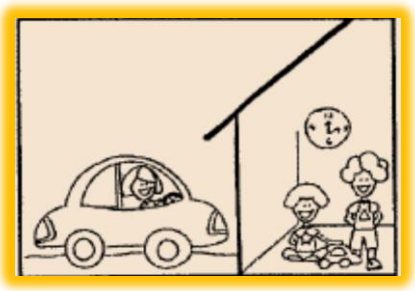

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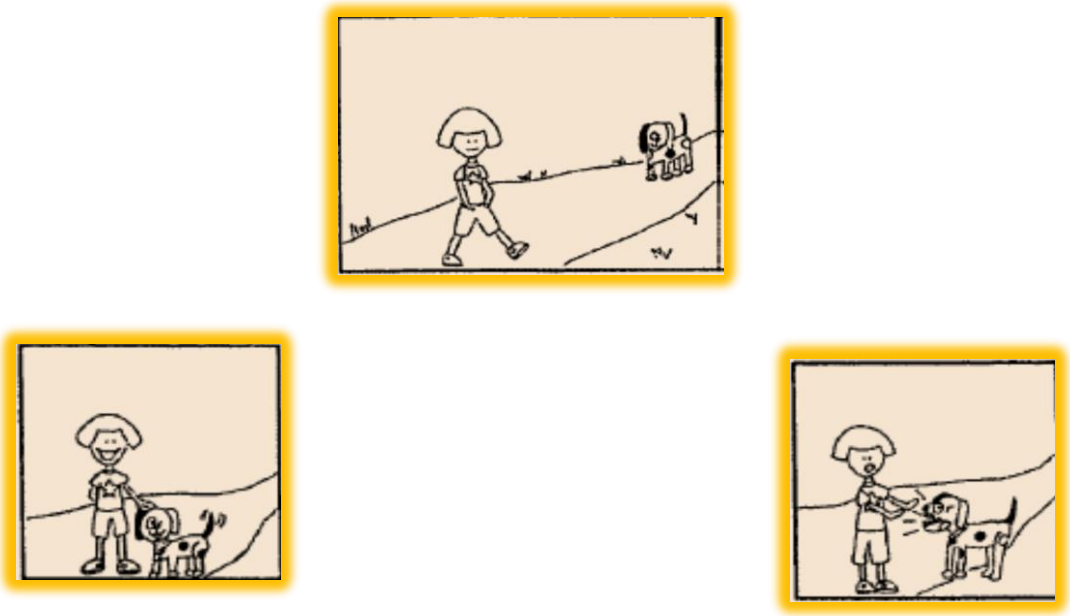

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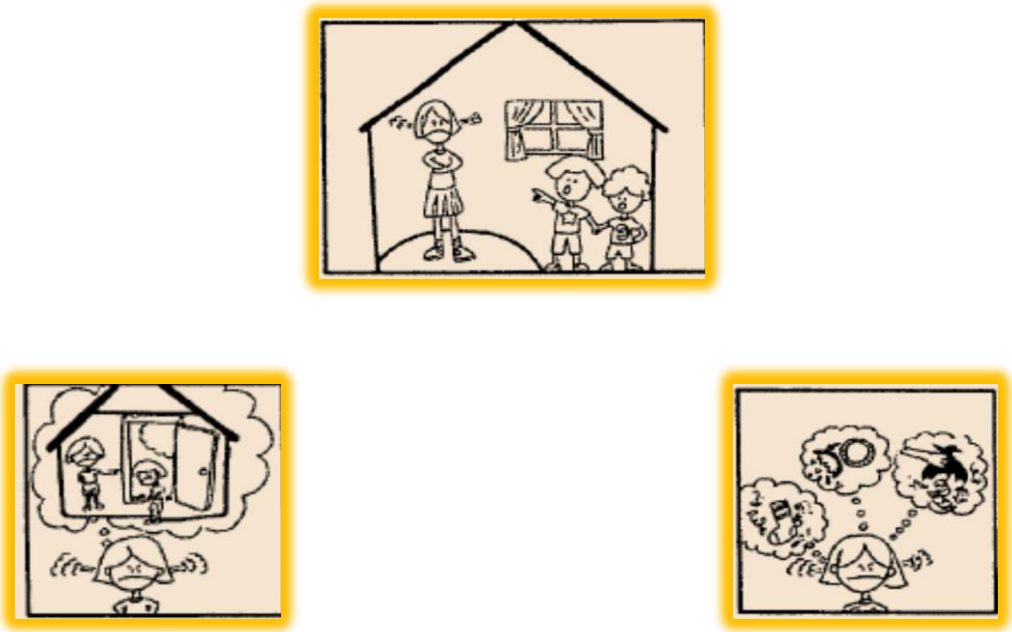

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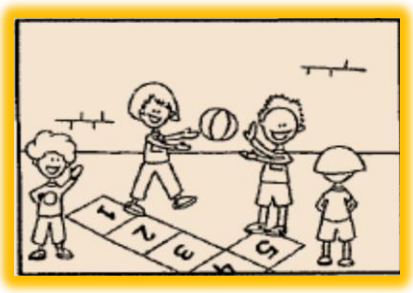

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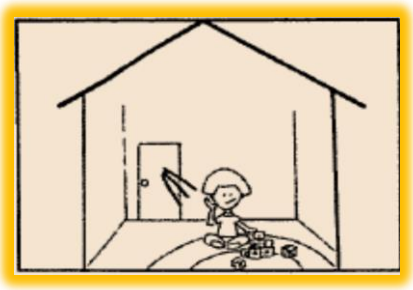

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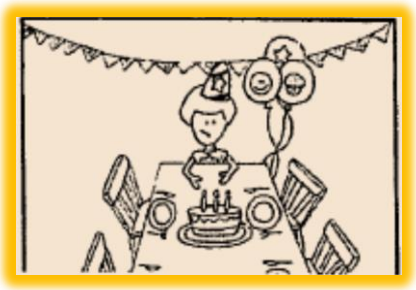

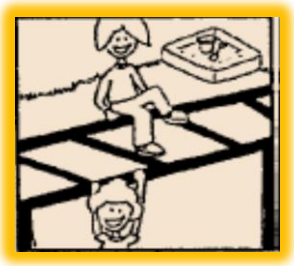

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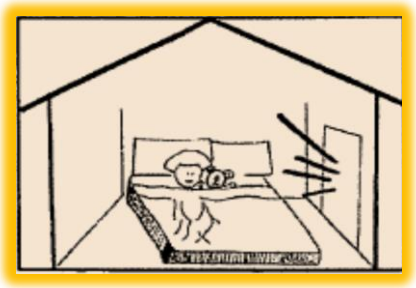

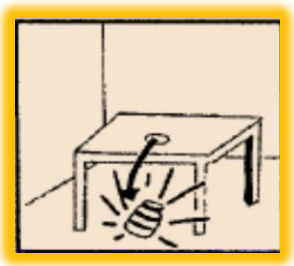

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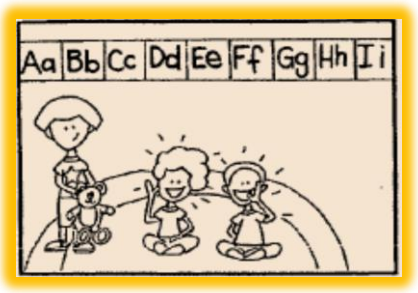
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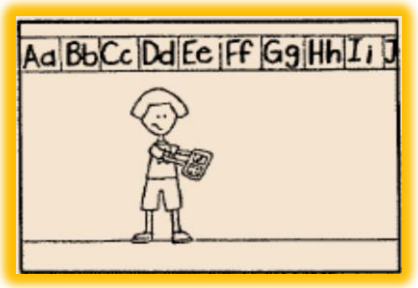
Aa Bb Cc Dd Ee Ff

Aa Bb Cc Dd Ee Ff

12ª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Aa Bb Cc Dd Ee F

Aa Bb Cc Dd Ee F

Appendix 5 Parent Interpretation Bias Measure – Ambiguous Scenarios (PIBM)

Parent Interpretation Bias Measure – Ambiguous Scenarios (PIBM)
(Ooi, Dodd, & Walsh, 2015)

Os cenários/situações ambíguas!

Por favor, leia cada uma das histórias e imagine que a situação acontece consigo. Depois em cada uma, escreva o que pensaria se estivesse nessa situação.

1. É a sua segunda semana no novo emprego. O/A seu/sua chefe passa no seu posto de trabalho de manhã e pede-lhe que vá ter com ele/ela ao seu gabinete no fim do dia. Porque é que o/a seu/sua chefe quer falar consigo?

2. O/a professor(a) do(a) seu/sua filho(a) telefona-lhe durante o dia quando o/a seu/sua filho(a) está na escola. Porque é que ele/ela está a telefonar?

3. Está deitado na cama à noite quando ouve um barulho, o que poderá ser?

4. Está num avião e o piloto pede para os passageiros regressarem aos seus lugares e apertarem os cintos de segurança, porquê?

5. A caminho do trabalho começa a sentir o seu estômago ficar “esquisito”, porquê?

6. Procura o telemóvel no seu casaco e não o encontra, porquê?

7. Um(a) amigo(a) telefona-lhe e deixa uma mensagem de voz a dizer, “Telefona-me. Preciso de falar contigo. É importante”. O que é que ele/ela quer falar consigo?

8. Está na sua festa de aniversário e meia hora depois do início ainda estão poucas pessoas presentes, porquê?

9. Entra numa festa e as pessoas viram-se para olhar para si, porquê?

10. Está no shopping e vê dois/duas dos(as) seus/suas amigos(as) mais próximos(as) juntos (as). Eles/elas não lhe disseram que iam. Porquê?

11. Está a descer a rua e vê um(a) dos(as) seus/suas amigos(as) com um grupo de pessoas no outro lado da rua. Acena, mas o(a) seu/sua amigo(a) não lhe responde? Porquê?

12. Está a dar um discurso. As pessoas na assistência começam a rir. Porquê?

Appendix 6 Cognitive Bias Modification Training Task (CBMT-I)

Cognitive Bias Modification Training Task (CBMT-I)

(Lau, Pettit, & Creswell, 2013)

História 1

Convidaste um dos teus amigos para ir brincar à tua casa.

O telefone toca e ele diz que já não vai.

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Ele já não gosta de mim e prefere brincar com outra criança.

2. Alguma coisa aconteceu que o impediu de vir à minha casa, talvez alguma coisa com os seus pais.

A resposta correta é …

2. Alguma coisa aconteceu que o impediu de vir à minha casa, talvez alguma coisa com os seus pais.

Pensa um pouco e imagina que isto aconteceu.

"Sabes que por vezes os pais têm imprevistos e as coisas que se combinaram não podem ser cumpridas. E se os pais têm de fazer outra coisa, as crianças também.

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro.

O meu colega teria gostado de vir brincar comigo se pudesse.

1. Verdadeiro 2. Falso

História 2

É o último dia que tens para devolver o livro que levaste da biblioteca da escola.

A tua professora lembra-te e diz-te que é importante não esquecer.

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Ela disse isso porque pensa que eu me distraio e esqueço-me das coisas.

2. Ela apenas me relembrou porque o livro tem de ficar disponível para outros colegas.

A resposta correta é…

2. Ela apenas me relembrou porque o livro tem de ficar disponível para outros colegas.

Pensa um pouco e imagina que isto aconteceu.

"Sabes que o trabalho dos professores é ensinar e ajudar as crianças, e por vezes lembrá-las de coisas que podem esquecer."

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro.

A professora também podia relembrar outro colega para devolver o livro.

1. Falso 2. Verdadeiro

História 3

Chegas ao parque da escola e vais andar no escorrega. Está lá um amigo teu e dizes-lhe "olá".

No entanto, ele não te responde.

Porque achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Ele estava a divertir-se tanto que nem me ouviu.

2. Ele já não gosta de mim.

A resposta correta é…

1. Ele estava a divertir-se tanto que nem me ouviu.

Pensa um pouco e imagina que isto aconteceu.

"Sabes que todas as pessoas por vezes estão distraídas e não ouvem quando falam com elas. O mesmo acontece com as crianças, que com a brincadeira não ouvem quando alguém fala com elas."

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro.

O meu amigo não me ouviu quando eu disse olá.

1. Falso 2. Verdadeiro

História 4

Durante um trabalho de desenho na escola, descobriste que alguns dos teus lápis estão partidos.

Porque achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. O meu colega partiu-os porque não gosta de mim.

2. Os lápis partiram-se ontem quando estávamos a fazer um trabalho juntos.

A resposta correta é…

2. Os lápis partiram-se ontem quando estávamos a fazer um trabalho juntos.

Pensa um pouco e imagina que isto aconteceu.

"Por vezes quando estamos a brincar ou a usar alguns objetos, eles podem partir-se ou estragar-se sem nós querermos."

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro.

Os lápis partiram-se sem querer.

1. Verdadeiro 2. Falso

História 5

Tu e os teus colegas estão a fazer um trabalho na escola, e a professora aproxima-se e fica a olhar para ti.

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. A professora olha para mim porque pensa que eu estou a fazer o trabalho mal feito.

2. Ela apenas que ver ser eu preciso de ajuda.

A resposta correta é…

2. Ela apenas que ver ser eu preciso de ajuda.

Pensa um pouco e imagina que isto aconteceu.

“Sabes que o trabalho dos professores é ensinar e ajudar as crianças na escola, e por vezes vão ao pé delas para as poderem ajudar melhor.”

Ouve a seguinte frase e seleciona “Verdadeiro” se pensas que isto é verdade ou “Falso” se pensas que isto não é verdadeiro.

A professora quer saber se alguém precisa de ajuda.

1. Verdadeiro 2. Falso

História 6

Durante uma brincadeira no recreio, atirei uma bola que partiu uma janela sem querer.

Algum tempo depois, o Diretor abre a porta e entra na sala.

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Ele apenas veio dizer uma coisa.

2. As outras crianças foram dizer e ele veio ralhar comigo.

A resposta correta é…

1. Ele apenas veio dizer uma coisa.

Pensa um pouco e imagina que isto aconteceu.

“Sabes que o Diretor da Escola tem que falar com todos os professores, alunos e auxiliares, e por vezes vai às salas de aula dizer coisas importantes a toda a gente.”

Ouve a seguinte frase e seleciona “Verdadeiro” se pensas que isto é verdade ou “Falso” se pensas que isto não é verdadeiro.

O Diretor quer dizer algumas coisas na nossa sala.

1. Verdadeiro 2. Falso

História 7

Perguntas aos teus colegas da escola se querem ir brincar contigo quando saírem da escola.

Todos dizem que não.

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Nenhum colega gosta de mim.

2. Todos têm de ir para casa quando saírem da escola.

A resposta correta é…

2. Todos têm de ir para casa quando saírem da escola.

Pensa um pouco e imagina que isto aconteceu.

“Todas as crianças adoram brincar com os colegas e amigos. Mas por vezes não podem porque têm de fazer outras coisas com os pais.”

Ouve a seguinte frase e seleciona “Verdadeiro” se pensas que isto é verdade ou “Falso” se pensas que isto não é verdadeiro.

Os meus colegas gostariam de brincar comigo se pudessem.

1. Falso 2. Verdadeiro

História 8

Levantas-te para ir ao quadro das presenças dizer qual é o dia do mês e não tens a certeza da resposta certa.

A professora diz: “Vamos lá ver se consegues acertar!”

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Ela diz isso porque a pergunta é difícil e nem todas as crianças conseguem acertar.

2. Ela diz isso porque acha que eu não sei a resposta.

A resposta correta é…

1. Ela diz isso porque a pergunta é difícil e nem todas as crianças conseguem acertar.

Pensa um pouco e imagina que isto aconteceu.

“A professora gosta de explicar bem as coisas para que as crianças aprendam. E gosta de fazer perguntas difíceis a todas para as ajudar a aprender melhor as coisas.”

Ouve a seguinte frase e seleciona “Verdadeiro” se pensas que isto é verdade ou “Falso” se pensas que isto não é verdadeiro.

A professora diria o mesmo a qualquer colega que fosse responder àquela pergunta.

1. Falso 2. Verdadeiro

História 9

Um amigo da escola convidou-te para brincar na casa dele com outras crianças. Mas não conheces nenhuma delas.

Depois vês algumas crianças a olhar para ti e a falar umas com as outras.

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Elas não gostam de como eu sou.

2. Elas vão convidar-me para brincar com elas.

A resposta correta é…

2. Elas vão convidar-me para brincar com elas.

Pensa um pouco e imagina que isto aconteceu.

“Sabes que quando os amigos nos convidam para brincar na casa deles é porque gostam de nós. E todas as crianças gostam muito de brincar umas com as outras.”

Ouve a seguinte frase e seleciona “Verdadeiro” se pensas que isto é verdade ou “Falso” se pensas que isto não é verdadeiro.

As crianças apenas querem falar e brincar comigo.

1. Falso 2. Verdadeiro

História 10

Levantas-te da tua cadeira na sala da Pré porque a professora te pediu para ires buscar uma borracha.

De alguma forma tropeças na perna de um colega e cais.

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Ele esticou a perna de propósito para eu cair.

2. Foi um acidente. Podia ter acontecido a qualquer um.

A resposta correta é …

2. Foi um acidente. Podia ter acontecido a qualquer um.

Pensa um pouco e imagina que isto aconteceu.

"Por vezes acontecem coisas que ninguém tem culpa, e que podem acontecer a qualquer criança."

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro

O meu colega não queria fazer-me cair. Foi um acidente.

1. Falso 2. Verdadeiro

História 11

Convidaste alguns dos teus colegas da escola para a tua festa de aniversário.

Eles vêm à festa, mas assim que sopras as velas do teu bolo de aniversário, a maioria dos colegas vão embora.

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Eles estavam aborrecidos e apenas vieram ver o que eu tinha preparado.

2. Já era tarde quando cantámos os parabéns e comemos o bolo e os seus pais queriam ir para casa.

A resposta correta é…

2. Já era tarde quando cantámos os parabéns e comemos o bolo e os seus pais queriam ir para casa.

Pensa um pouco e imagina que isto aconteceu.

"As crianças gostam muito de brincar, comer doces e divertirem-se nas festas de aniversário, mas são os pais das crianças que decidem quanto tempo elas podem ficar e quando têm de ir para casa."

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro

Os meus colegas gostaram da minha festa e teriam ficado mais tempo se pudessem.

1. Verdadeiro 2. Falso

História 12

Perguntas a alguns colegas teus se querem fazer uma brincadeira escolhida por ti.

Eles dizem não.

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Eles não gostam de mim e acham que eu não sei brincar.

2. Eles já tinham escolhido outra brincadeira para brincar.

A resposta correta é…

2. Eles já tinham escolhido outra brincadeira para brincar.

Pensa um pouco e imagina que isto aconteceu.

"Todas as crianças gostam de brincar, mas por vezes gostam mais de uma brincadeira num dia, e no dia seguinte gostam mais de outra brincadeira. E isso não quer dizer que não gostam da criança que escolheu a brincadeira, mas que naquele dia preferiam outra para brincar."

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro

Os meus colegas gostariam de ter brincado comigo.

1. Falso 2. Verdadeiro

História 13

Durante uma brincadeira um colega cai em cima de ti e suja a tua blusa nova.

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Ele fez de propósito pois não gosta de brincar comigo.

2. Foi sem querer, ele tropeçou e caiu em cima de mim.

A resposta correta é…

2. Foi sem querer, tropeçou e caiu em cima de mim.

Pensa um pouco e imagina que isto aconteceu.

"Quando as crianças andam muito divertidas a brincar, por vezes sujam as mãos, a roupa, os sapatos. E por vezes as crianças sujam-se umas às outras nas brincadeiras e nem reparam. Mas não é por mal, é porque estão muito entusiasmados a brincar."

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro

O meu colega não queria cair em cima de mim.

1. Falso 2. Verdadeiro

História 14

Ontem zangaste-te com um colega teu e hoje ele não te falou.

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Ele já não gosta de mim porque nos zangámos ontem.

2. Ele estava distraído com outra coisa e não me viu**.**

A resposta correta é…

2. Ele estava distraído com outra coisa e não me viu.

Pensa um pouco e imagina que isto aconteceu.

"Sabes que por vezes as crianças zangam-se umas com as outras por qualquer coisa. Mas não deixam de ser colegas e amigos, pois é muito mais importante fazer as pazes e ter amigos para brincar do que ficar zangado com eles e não ter amigos."

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro.

O meu colega não me ouviu quando eu falei com ele.

1. Verdadeiro 2. Falso

História 15

Queres fazer uma pergunta à tua professora, mas ela diz que não tem tempo para te responder.

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Ela nunca tem tempo para me responder porque pensa que eu não sei as coisas.

2. Ela tem de ir a uma reunião, mas irá responder-me mais tarde.

A resposta correta é…

2. Ela tem de ir a uma reunião, mas irá responder-me mais tarde.

Pensa um pouco e imagina que isto aconteceu.

"Sabes que os professores têm de falar com muitas pessoas na escola, e por vezes as crianças têm de saber esperar para poderem falar com a professora, mas quando ela puder responder."

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro.

A professora irá responder à minha pergunta mais tarde.

1. Verdadeiro 2. Falso

História 16

Enquanto vais a andar, sentes um puxão e cais.

Depois vês um grupo de crianças a rir.

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Eles fizeram-me cair de propósito para me fazerem sentir mal.

2. Eu tropecei e caí de uma forma engraçada e as crianças estavam a rir da forma como tropecei, e não porque caí.

A resposta correta é…

2. Eu tropecei e caí de uma forma engraçada e as crianças estavam a rir da forma como tropecei, e não porque caí.

Pensa um pouco e imagina que isto aconteceu.

"Por vezes as crianças distraem-se quando vão a andar e tropeçam em coisas que não conseguem ver. E esses tropeções podem ser engraçados se não nos magoarmos!"

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro.

As crianças estavam a rir porque é engraçado ver como alguém tropeça e cai.

1. Falso 2. Verdadeiro

História 17

Entras no parque e vês dois colegas da escola.

Eles não te dizem olá quando passas por eles.

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Eles não gostam de mim.

2. Talvez estivessem a conversar e não me tenham visto.

A resposta correta é…

2. Talvez estivessem a conversar e não me tenham visto.

Pensa um pouco e imagina que isto aconteceu.

"Sabes que por vezes as crianças quando estão muito divertidas a brincar não ouvem quando alguém fala com elas, mas não quer dizer que não queiram falar ou que não gostem de quem lhes falou. É apenas porque estavam entretidos com outra coisa."

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro.

Eles estavam ocupados quando passei por eles.

1. Verdadeiro 2. Falso

História 18

No intervalo um colega teu vem ter contigo a rir e pergunta-te se queres brincar.

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Ele convidou-me porque gosta de brincar comigo.

2. Ele convidou-me porque acha que eu não sou bom o suficiente e quer envergonha-me em frente aos outros.

A resposta correta é…

1. Ele convidou-se porque gosta de brincar comigo.

Pensa um pouco e imagina que isto aconteceu.

"É sempre bom quando nos convidam para brincar, pois deve ser porque gostam de nós e de brincar connosco."

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro.

O meu colega gosta quando brincamos juntos.

1. Falso 2. Verdadeiro

História 19

Na escola, fizeste um desenho na sala. O colega sentado ao teu lado pega no teu desenho e diz em alto "Colegas, olhem para isto, está perfeito!".

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Ele quer que os outros riam do meu desenho.

2. Ele gostou muito do meu desenho e quer mostrar a todos.

A resposta correta é…

2. Ele gostou muito do meu desenho e que mostrar a todos.

Pensa um pouco e imagina que isto aconteceu.

"Quando as crianças fazem um trabalho bem feito e têm colegas que gostam delas, é bom quando eles as ajudam a mostrar aos outros o que fazemos de bom."

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro.

Os meus colegas acharam que o meu desenho estava mesmo bom.

1. Verdadeiro 2. Falso

História 20

Na aula de ginástica, a professora divide-os em duas equipas e os colegas dizem-te: "Anda para a minha equipa. É divertido jogarmos juntos!".

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Eles querem-me na equipa deles para gozarem comigo.

2. Eles gostam de mim e divertimo-nos muito quando jogamos juntos.

A resposta correta é…

2. Eles gostam de mim e divertimo-nos muito quando jogamos juntos.

Pensa um pouco e imagina que isto aconteceu.

"Sabes que quando os amigos nos convidam para a equipa deles ou para as brincadeiras deles é porque gostam de nós. E todas as crianças gostam muito de se divertir umas com as outras."

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro.

Os meus colegas gostam realmente de jogar comigo.

1. Verdadeiro 2. Falso

História 21

É o teu aniversário e encontras três dos teus colegas na rua.

Eles sabem que fazes anos hoje. Após falarem um pouco, percebes que eles não te deram os parabéns.

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Eles não gostam de mim.

2. Querem fazer-me uma surpresa.

A resposta correta é…

2. Querem fazer-me uma surpresa.

Pensa um pouco e imagina que isto aconteceu.

"Quando se faz uma surpresa a alguém que faz anos, não podemos falar sobre isso com o aniversariante senão estragamos a surpresa. É mais divertido fazer uma festa surpresa!"

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro.

Os meus colegas estão a preparar-me uma surpresa para mais tarde no meu aniversário.

1. Verdadeiro 2. Falso

História 22

Estás na escola a jogar um jogo de mesa com um colega e ganhas.

Ele deixa as peças e diz que tu ganhas sempre.

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Ele já não gosta de jogar comigo.

2. Está na hora de ir arrumar os jogos para ir lanchar.

A resposta correta é…

2. Está na hora de ir arrumar os jogos para ir lanchar.

Pensa um pouco e imagina que isto aconteceu.

"Sabes que quando jogamos a um jogo podemos ganhar umas vezes e perder noutras. Se perdermos podemos sempre tentar jogar novamente para tentar ganhar. Se ganharmos podemos dar oportunidade ao nosso colega para ele tentar ganhar. Mas se estamos na escola a jogar, os horários são para cumprir e temos de arrumar."

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro.

Se tivéssemos tempo o meu amigo gostaria de jogar comigo outra vez.

1. Verdadeiro 2. Falso

História 23

É o aniversário de um dos teus colegas de escola e ele convidou algumas crianças para irem à casa dele.

Ele ainda não te convidou.

Por que achas que isto acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Ele vai convidar-me daqui a pouco.

2. Ele não me quer convidar porque não gosta de mim.

A resposta correta é…

1. Ele vai convidar-me daqui a pouco.

Pensa um pouco e imagina que isto aconteceu.

"Quando uma criança faz anos e vai convidar os colegas da escola, não consegue convidá-los todos ao mesmo tempo. Pode convidar uns primeiro e outros depois."

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro.

O meu colega vai provavelmente convida-me para o seu aniversário um pouco mais tarde.

1. Verdadeiro 2. Falso

História 24

A professora pede para ficares na sala da Pré quando os teus colegas vão brincar no parque.

Por que achas que isso acontece?

Seleciona 1 se pensas que a resposta 1 está correta, ou 2 se pensas que a resposta 2 está correta

1. Ela quer ralhar comigo porque acha que eu me portei mal.

2. Ela só quer dizer-me alguma coisa.

A resposta correta é...

2. Ela só quer dizer-me alguma coisa.

Pensa um pouco e imagina que isto aconteceu.

"As professoras gostam de falar com as crianças e por vezes têm coisas para lhes dizer quando os colegas estão fora da sala. Mas isso não quer dizer que vão ralhar com elas."

Ouve a seguinte frase e seleciona "Verdadeiro" se pensas que isto é verdade ou "Falso" se pensas que isto não é verdadeiro.

A professora não está zangada comigo.

1. Verdadeiro 2. Falso