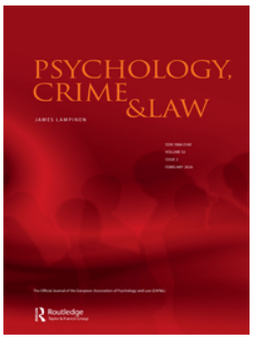

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Beyond interviewer demeanour and post-event misinformation: the influence of temperament and parenting styles on children's eyewitness reports

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ABSTRACT

Children often serve as key witnesses in child abuse investigations. However, prior research has shown that children's testimony may be inaccurate due to susceptibility to false memories and suggestibility. Existing studies have often assessed interviewing contexts with little consideration of the child's cultural context and reciprocal behaviour, potentially overlooking how individuals vary in their responses to different interview conditions. To explore the factors and conditions under which children can accurately report information and their vulnerability to suggestions, this study incorporated both situational and dispositional factors to explore the relative contributions of interviewing conditions (i.e. interviewer demeanour and exposure to misinformation) and individual differences variables (i.e. intelligence, temperament, trait and state anxiety, and parenting styles) on children's recall and suggestibility. One-hundred and sixty Malaysian children aged between 7 and 10 years ($M = 8.26$; $SD = 0.75$) were assessed using a video suggestibility paradigm. Multiple regression analyses revealed that non-supportive interviewer demeanour and non-exposure to misinformation predicted improved recall. Intelligence and temperament emerged as significant predictors of accurate recall. Notably, findings shed light on the role of authoritarian parenting on suggestibility. Future research is needed to enhance our understanding of how cultural factors and the environment influence children's eyewitness reports.

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Introduction

During child abuse or neglect investigations, children often serve as the key or sole witness to the alleged crimes. Prior research within the investigative interviewing context has shown that children's testimonies can be influenced by external factors, such as post-event misinformation and interviewer demeanour, and dispositional individual differences in responding to interview (see Bruck & Melnyk, 2004; Klemfuss & Olaguez, 2020; Korkman et al., 2024; Otgaar et al., 2023; Saywitz et al., 2019). Understanding the factors and conditions under which children can accurately report the remembered information is essential to ensure accurate information retrieval during investigative interviews. Despite this growing body of research, much of the literature has examined these influences in isolation, leaving limited knowledge about the combined effects of situational and dispositional factors on children's recall and suggestibility (Klemfuss & Olaguez, 2020). In practice, however, children's interview performance is rarely shaped by a single influence; rather, interview conditions and individual differences are likely to influence memory performance simultaneously (Gudjonsson, 2018). Addressing this gap requires an integrated approach that accounts for the relative contribution of multiple predictors, thereby enhancing ecological validity and providing a more comprehensive understanding of children's eyewitness performance.

The misinformation effect

Witness memory is malleable and vulnerable to the distorting effects of misinformation. The misinformation effect refers to the phenomenon where false information encountered after an event alters an individual's memories, leading to the incorporation of inaccuracies into their recollections of the witnessed event (Loftus, 2005). Misinformation has consistently been found to lead to false memories and lower recall accuracy (e.g. Jack et al., 2014; Stoll, 2021). These false details can be communicated through various means, including third parties like social media and police officers (Blom & Huang, 2021; Principe et al., 2000), as well as co-witness discussions (e.g. Jack et al., 2014; Paterson & Kemp, 2006).

The misinformation effect has been extensively studied in cognitive psychology and is a widely acknowledged concern in investigative interviewing among children (Ceci, 1994; Frenda et al., 2011). Specifically, this effect is more prominent in young children below the age of ten, who often struggle to retrieve detailed encoded information and to distinguish between their own experiences and information from others (Knutsson & Allwood, 2014). Additionally, children are more likely to experience discomfort when disclosing information to an unfamiliar adult interviewer (Vallano & Schreiber Compo, 2015). Children who struggle to cope with a stressful interview setting may have limited resources for processing information and reduced capacity to discern differences between their own memories and subsequent third-party information (e.g. Eysenck et al., 2007; Hyman et al., 2018). When cognitive resources are constrained, verifying the accuracy of post-event misinformation becomes difficult, making children less likely to reject new information and more susceptible to suggestive questions.

Interviewer demeanour

Witnesses often struggle to articulate their experiences or memories of the encountered event, which can be influenced by both individual characteristics and the interviewer's demeanour (Baldwin, 1993). Interviewer demeanour, which refers to the manner in which an interviewer interacts with an interviewee, can significantly impact the quality of information elicited. In general, it is recommended that investigative interviews with children should be conducted in a supportive manner to facilitate communication and establish a safe environment for disclosure (Lamb et al., 2018). Support occurs when individuals perceive communication from others as a signal that they are valued and that social resources are available to help them cope with stressful situations (Cohen, 2004).

In interview contexts, a supportive interviewer demeanour typically involves warm behaviours, such as open body posture, consistent eye contact, and a friendly tone (see Hritz et al., 2015; Saywitz et al., 2019). While supportiveness and rapport-building are related, they are often poorly distinguished, even though they encompass different aspects of interpersonal interaction (see Abbe & Brandon, 2013; Saywitz et al., 2015). Rapport is best understood not as a single behaviour but as a series of dynamic affective states (e.g. feeling listened to or accepted; Johnston et al., 2019). Rapport-building refers to broader efforts to establish trust and mutual understanding, such as engaging the child's attention (e.g. through active listening, like nodding or using minimal encouragers such as 'mm-hmm') and explaining the structure and expectations of the interview (Collins et al., 2014). As highlighted in a review by Saywitz et al. (2015), rapport-building strategies such as practice narratives (e.g. retelling a past event before substantive questioning) have been shown to improve children's subsequent recall. Supportiveness, on the other hand, focusses on immediate and interactional behaviours that maintain the psychological safety necessary for disclosure (Wilson & Powell, 2001). Behaviours such as adjusting one's tone of voice to convey warmth and showing patience when the child struggles to recall details can foster comfort and openness during the interview process (see Gabbert et al., 2020; Vallano & Schreiber Compo, 2015). In contrast, a non-supportive demeanour, which is characterised by more formal and distant behaviours like limited eye contact and a monotone speaking style, can create a less comfortable atmosphere that might limit communication (Saywitz et al., 2019). Given that supportiveness reflects the interviewer's observable interpersonal behaviours, the present study operationalised interviewer demeanour in terms of supportive versus non-supportive styles as the experimental manipulation.

Empirical evidence consistently demonstrates the positive influence of supportive interviews on interviewees' recall performance and suggestibility (see Gabbert et al., 2020; Gilstrap & Ceci, 2005; Vallano & Schreiber Compo, 2015). A key finding by Quas et al. (2014) revealed the benefits of supportive interviewing on resistance to suggestive questions across both children and adolescent groups. Participants in the supportive condition rated interviews as less stressful and reported lower susceptibility to suggestions. As predicted by attentional control theory (Eysenck et al., 2007), supportive interviewer demeanour may have a calming effect, mitigating anxiety and negative emotional states in the interviewee, thereby preventing disruptions in cognitive processing and enhancing the overall quality of the interview (Saywitz et al., 2019).

A recent survey by Snow et al. (2021) on interviewees' preferences for interviewer characteristics found that participants preferred specific qualities, such as friendliness and

understanding. The findings suggest that interviewees value strong interpersonal skills in interviewers, as these skills create a supportive environment that establishes conditions conducive to rapport and open communication. A supportive environment promotes cooperation and trust that encourages information sharing and the capacity to challenge adult suggestions without fear of negative consequences (Davis & Bottoms, 2002; Gilstrap & Ceci, 2005; Goodman et al., 1991). Thus, interviewer demeanour plays a crucial role in investigative interviewing with children. Establishing a positive connection between the interviewer and interviewee in a supportive interview setting not only improves communication but also reduces susceptibility to suggestion during questioning (Saywitz et al., 2019).

Individual differences in recall and suggestibility

Given the interpersonal nature of investigative interviewing, interview conditions are likely to be intertwined with individual differences, as each child brings unique perceptions and experiences to interactions with interviewers (Gudjonsson, 2018). A growing body of evidence suggests that individual differences in various cognitive abilities such as memory (e.g. Ceci & Howe, 1978; Farina & Greene, 2020), intelligence (e.g. Roebers & Schneider, 2001; Vagni et al., 2023) and language (e.g. Arslan et al., 2012; Bruck & Melnyk, 2004) and psycho-social factors (e.g. anxiety, peer pressure, and attachment) are related to the accuracy of children's eyewitness memory (see Klemfuss & Olaguez, 2020). Yet, questions remain regarding whether psycho-social factors, such as temperament and broader developmental variables, play any role in memory and suggestibility (Bruck & Melnyk, 2004). In this study, we are particularly interested in the role of intelligence, temperament, anxiety, and parenting styles in children's memory recall and suggestibility. Importantly, we are interested to examine these variables in a non-Western context that has not heretofore been examined.

Child cognitive and emotional traits

Intelligence, particularly non-verbal standardised intelligent quotient (IQ) measures, has consistently been linked positively with recall accuracy and negatively to suggestibility (e.g. Henry & Gudjonsson, 2007; Vagni et al., 2023). Past research has suggested that higher cognitive functioning, including enhanced processing speed and fluid reasoning skills, is associated with improved recall performance and may potentially offer a degree of protection against memory errors and susceptibility to suggestions (e.g. Dehon, 2020; Greene et al., 2020). Additionally, individuals with higher intelligence are less likely to incorporate post-event misinformation into their recollections of the original event (Hritz & Ceci, 2021; Zhu et al., 2010).

Temperament, on the other hand, refers to biologically based behavioural and emotional tendencies that emerge early in life and remain relatively stable over time (Zentner & Bates, 2008). Although there have been inconsistent patterns of the direct association between temperament and interview performance, certain temperament characteristics interact with other factors to predict children's recall and suggestibility during interviews (see Klemfuss & Olaguez, 2020). For instance, traits such as high activity level and low task persistence may in combination disrupt attentional focus during both the encoding and retrieval process. This disruption can limit attentional resources for memory process and compromise the subsequent capacity to resist suggestions during

questioning (e.g. Hershkowitz et al., 2017). Withdrawal and emotionality that are associated with social competence may predispose children to social pressure, reducing their ability to cope with new situations and affect their recollection of events (e.g. Saywitz et al., 2017). Chae and Ceci (2005) also reported that children with higher shyness tended to be more reluctant to engage with interviewers and reported fewer details compared to less shy children. Furthermore, research indicates that shyness can moderate the effects of specific interview characteristics (e.g. interviewer demeanour; Lee & Kwak, 2013) and the effectiveness of auxiliary tools (e.g. drawing activities; Lee, 2024) on the accuracy of children's recall reports. For instance, Lee (2024) found that drawing activities enabled children with higher levels of shyness to better resist misinformation from interviewers compared to those with lower shyness. Overall, the existing literature suggests that the influence of temperament on recall and suggestibility often depends on the interplay with situational and social aspects of the interview setting (Klemfuss & Olaguez, 2020). Additional work on how specific temperamental traits influence children's responses across various interviewing and cultural contexts may enhance our understanding.

In the context of investigative interviewing, Kassin and Kiechel (1996) suggested that anxiety, which relates to interview performance, should be investigated thoroughly. Indeed, children often experience anxiety during an event and subsequent police interviews (Vallano & Schreiber Compo, 2015). As discussed previously, extensive evidence supports the detrimental impact of anxiety on children's recollections of event (e.g. Eysenck et al., 2007; Quas et al., 2014). For instance, Almerigogna et al. (2007), measuring self-reported anxiety at encoding and retrieval, found that children scoring high on both trait and post-interview state anxiety were more inclined to report false information to a non-supportive interviewer. It is crucial to distinguish between state anxiety (i.e. reactive to stressful events) and trait anxiety (i.e. a stable stress sensitivity feature), as they play distinct roles in the underlying causal mechanism (Saviola et al., 2020). For instance, state anxiety manifests as a temporary response to immediate stressors that can disrupt information processing during interviews and potentially influence recall accuracy and suggestibility; while trait anxiety reflects a persistent sensitivity to stressors across various situations, influencing how individuals consistently process and respond to information over time. While existing research has primarily focussed on state anxiety (e.g. Bruck & Melnyk, 2004; Klemfuss & Olaguez, 2020), Drake (2014) found that higher trait anxiety with heightened stress-sensitivity may amplify the negative interpretation of the interview situation, leading to greater suggestibility.

Parenting influences

Reviews of individual differences in children's suggestibility have highlighted the significant influence of parenting on children's interview responses (e.g. Bruck & Melnyk, 2004; Klemfuss & Olaguez, 2020). For instance, highly elaborative parents (i.e. those who frequently ask open-ended questions and engage their children in detailed descriptions of events) often encourage their children to provide more information about their experiences, thereby enhancing recall during interviews. Yet, the key variable of parenting styles, which shapes the emotional climate for children and inevitably impacts their behavioural development (Spera, 2005), has received minimal attention in the investigative interviewing literature (e.g. Deshmukh, 2019; Wong et al., 2024; see Klemfuss & Olaguez, 2020).

The theoretical model of parenting styles was developed by Baumrind (1971), who identified three primary parenting styles based on Schaefer's (1959) concepts of parental demandingness and responsiveness. Parental responsiveness refers to behaviours that are loving, supportive, and provide guidance, while parental demandingness involves setting expectations, enforcing rules, and controlling bad behaviour. Based on these dimensions, Baumrind categorised parenting into three styles: authoritarian, authoritative, and permissive. Authoritarian parenting, characterised by high demandingness but low responsiveness, typically involves a less nurturing approach and limited flexibility. Authoritative parenting, on the other hand, entails high levels of both demandingness and responsiveness, fostering close parent–child relationships. Permissive parenting, characterised by low demandingness but high responsiveness, often involves a friendlier approach, blurring the lines between parental authority and companionship. Maccoby and Martin (1983) later expanded this model by introducing a fourth style, namely neglectful or uninvolved parenting, characterised by both low demandingness and responsiveness. While uninvolved parents may provide for their child's basic needs, they generally remain detached from the child's life and exhibit a lack of interest in their upbringing (Nnani et al., 2020). A summary of these four parenting styles, mapped onto the dimensions of responsiveness and demandingness, is presented in Figure 1.

In the context of investigative interviewing, authoritarian and authoritative parenting, which are related to children's autonomy and compliance, may play significant roles in how children respond to interview scenarios. For instance, Clarke-Stewart et al. (2004) found that children raised by parents with a high authoritarian parenting style may exhibit a higher tendency to unquestioningly comply with orders and conform to adult expectations, rendering them more susceptible to suggestions during questioning. Conversely, children raised by authoritative parents are encouraged to think independently and have been shown to have higher levels of self-confidence and social competence, making them more resistant to suggestions that conflict with their own experiences (Deshmukh, 2019). A recent study by Wong et al. (2024) discovered that adults who reported having been raised by parents who adopted a permissive or authoritarian parenting style tended to be more susceptible to suggestive questions. It is therefore interesting to explore how children's developmental environment influences their interview behaviour. This approach examines the ongoing impact of parenting by investigating whether real-time assessment of parenting styles, as opposed to post-hoc reports, still reveals significant associations with children's susceptibility to suggestions during interviews.

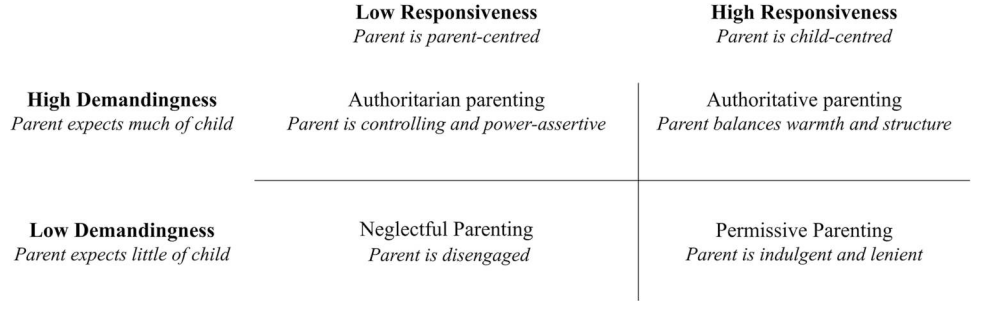

Figure 1. Parenting style matrix. Adapted from Baumrind (1971), and Maccoby and Martin (1983).

The current study

Research on investigative interviewing has largely been conducted in Western, Educated, Industrialised, Rich and Democratic (WEIRD; Henrich et al., 2010) societies, limiting the generalisability of findings to non-WEIRD contexts. While this body of work has offered valuable insights, it may not fully capture how culturally influenced factors shape children's memory and suggestibility. There have been calls for cross-cultural research to examine how cultural differences influence behaviour during interviews (Brady et al., 2018; Gelfand et al., 2017) and to refine investigative interviewing practices for diverse cultural settings (Hope et al., 2022). The current study in the Malaysian context provides an opportunity to explore how cultural, developmental, and individual differences influence children's behaviours and responses during interviews.

Malaysia is a country characterised by collectivism and high-power distance, where family cohesion and respect for authority are emphasised (Sumari et al., 2019). Within this cultural framework, local research has shown that parents predominantly adopt authoritarian or authoritative parenting styles (e.g. Keshavarz & Baharudin, 2009; Salehuddin & Winskel, 2016; Shahlal et al., 2021). These parenting approaches reflect norms that prioritise rule adherence, respect for authority, and strong familial bonds. Such culturally shaped parenting styles may play a significant role in influencing children's susceptibility to suggestive questioning, particularly when interacting with authority figures such as interviewers.

Additionally, in existing studies, the bulk of research has focussed on either the effects of interviewing conditions or individual differences, with little consideration of the reciprocal situational or dispositional factors (see Gilstrap & Ceci, 2005; Klemfuss & Olaguez, 2020). This approach may overlook the inherent variability in how individuals respond to different interviewing contexts (Johnston et al., 2019), especially in a non-Western cultural context. To address this gap, the present study incorporated both situational and dispositional factors to explore factors influencing children's accuracy in reporting remembered information and their vulnerability or resistance to suggestions during interviews. In doing so, this study extends methodological practice by actively exploring the interactivity between these previously isolated predictors, whilst also investigating the role of parenting styles, which remain an underexplored developmental factor in the investigative interviewing literature. Beyond this, the study contributes to cross-cultural developmental psychology by testing whether findings derived from predominantly Western samples generalise to Malaysian children.

This study focussed on children in the early primary school years (i.e. Standard 1 to Standard 3 in Malaysia, typically age 7–9), representing the beginning stages of formal education. Focussing on this age group ensured that participants were relatively similar in terms of educational experience, while still allowing examination of how situational and individual difference factors shape children's interview performance. The study therefore investigated the relative contributions of interviewing conditions (i.e. interviewer demeanour and exposure to post-event misinformation) and individual differences variables (i.e. intelligence, child's temperament traits, trait and state anxiety, and parenting styles) on children's recall and suggestibility. Based on the theoretical and empirical literature, we formulated six hypotheses examining these situational and dispositional factors.

Research on interviewing conditions suggests that both interpersonal interactions and post-event misinformation influence children's memory reports.

H1 predicted that supportive interviewer demeanour would be positively linked to accurate recall and negatively linked to suggestibility, as supportive interviewing styles reduce psychological distance between the interviewer and interviewee, enhancing memory performance and reducing susceptibility to leading questions (see Gabbert et al., 2020; Gilstrap & Ceci, 2005; Vallano & Schreiber Compo, 2015).

H2 predicted that exposure to misinformation would be negatively linked to accurate recall and positively linked to suggestibility, consistent with the misinformation effect, whereby misleading post-event information distorts memory reports (e.g. Jack et al., 2014; Loftus, 2005; Stoll, 2021).

Beyond interviewing conditions, prior research highlights that children's cognitive capacity and emotional functioning influence their memory performance and responses in interview settings.

H3 predicted that intelligence would be positively linked to accurate recall and negatively linked to suggestibility, as higher cognitive abilities have been found to be associated with improved recall and greater resistance to suggestions (e.g. Henry & Gudjonsson, 2007; Vagni et al., 2023).

H4 predicted that negative reactivity, withdrawal, and activity level would all be negatively linked to accurate recall and positively linked to suggestibility; while task persistence would be positively linked to accurate recall and negatively linked to suggestibility. Heightened emotional reactivity and avoidance tendencies can undermine attentive processing and openness during interviews (e.g. Chae & Ceci, 2005; Saywitz et al., 2017), whereas sustained attentional control, reflected in higher task persistence, enhances memory performance (e.g. Hershkowitz et al., 2017).

H5 predicted that trait and state anxiety would be negatively linked to accurate recall and positively linked to suggestibility, because heightened anxiety can disrupt memory processes and increase susceptibility to external influence (e.g. Almerigogna et al., 2007; Quas et al., 2014).

Finally, parenting styles were expected to influence children's expectations and behaviour during interviews.

H6 predicted that permissive and authoritarian parenting would be negatively linked to accurate recall and positively linked to suggestibility; while authoritative parenting would be positively linked to accurate recall and negatively linked to suggestibility. Parental emphasis on autonomy and reasoned communication, characteristic of authoritative parenting, is likely to foster confidence and resistance to suggestion in children (e.g. Deshmukh, 2019). Conversely, permissive parenting, with its lack of structure and boundaries, and authoritarian parenting, with its emphasis on obedience and compliance, might undermine children's independence and increase their susceptibility to interviewer influence (e.g. Wong et al., 2024).

Method

Participants

A priori power analysis was conducted using G*Power 3.1 (Faul et al., 2009) to estimate the required number of participants at an alpha level of 0.05 and a medium effect size ($f^2 = 0.15$). For multiple regression analysis with 12 predictors, a minimum sample size of 127 participants was sufficient to achieve a power of .80.

A total of 160 Malaysian children (84 male, 76 female) aged between 7 and 10 years old ($M = 8.26$; $SD = 0.75$) participated in this study. All children were from the Klang Valley, an urban agglomeration in Malaysia, and represented a range of socioeconomic backgrounds. The age distribution of child participants and the descriptive profile of parental socioeconomic background are presented in Table 1.

Upon approval from the Ministry of Education Malaysia, child participants were recruited through information letters sent to parents or legal guardians, with the assistance of local primary schools. Written informed parental consent and child assent forms were obtained prior to the data collection. Ethics approval was granted by the University of Reading Malaysia Research Ethics Committee (UoRM REC 2021/20).

Materials

Memory recall and suggestibility

Memory recall and suggestibility were assessed based on the classic paradigm of the Video Suggestibility Scale for Children (VSSC; Scullin & Ceci, 2001), which involved children watching a video and answering questions about the content. Child participants were instructed to focus on a to-be-remembered event presented in a silent three-minute mock-crime video. The video, which was scripted and developed by Su (2025) based on previous similar studies (see Ceci, 1994; Ceci & Bruck, 1993), depicted a minor infraction in which a thief stole fruit from a picnic table while a young man and woman who owned the fruit were distracted.

Table 1. Descriptive profile of participants ($N = 160$).

Variables	*n*	Percentage (%)
Child Age		
7 years	24	15.00
8 years	75	46.90
9 years	56	35.00
10 years	5	3.10
Parental Education		
Incomplete schooling	4	2.50
Primary school	6	3.75
Secondary school	69	43.13
Pre-university or Diploma	30	18.75
Bachelor's degree	40	25.00
Postgraduate degree	7	4.37
Not disclosed	4	2.50
Parental Employment Status		
Full time	97	60.63
Part time	6	3.75
Self-employed / Freelance	34	21.25
Unemployed	17	10.62
Not disclosed	6	3.75
Monthly Household Income		
B40 (Below MYR 4,849)	64	40.00
M40 (MYR 4,850–10,959)	65	40.63
T20 (Above MYR 15,039)	13	8.12
Not disclosed	18	11.25

Note. MYR 1 ≈ USD 0.22. Household income classification categories (B40, M40, and T20) are based on Malaysia's income distribution guidelines from the Department of Statistics Malaysia (2023). The B40 group represents the bottom 40% of income earners (monthly income below MYR 4,849), the M40 group represents the middle 40% (income between MYR 4,850 - 10,959), and the T20 group represents the top 20% (income above MYR 15,039).

The recall tasks involved an open-ended prompt, asking the child to do a free recall (e.g. 'Tell me everything you remember about the video') and five unbiased directed probe questions about the video (e.g. 'You mentioned x (activity/ object). Tell me more about that'). Responses to both free recall and directed probe questions were coded as 'accurate', 'inaccurate', and 'I don't know'.

Scoring of recall was as follows:

(1) *Accurate recall*: the proportion of accurate details correctly recalled out of 83 possible accurate details. The list of 83 details was independently developed by two collaborators (the first and third authors), who each created a comprehensive list of recallable features from the mock crime video. These lists were then compared for interrater reliability, and a percent agreement score of 0.76 was calculated, indicating moderate to good agreement on the recallable details.
(2) *Inaccurate recall*: the proportion of inaccurate details recalled, denominated by the total number of details recalled (both correct and incorrect details). Details that were different and/or not presented in the to-be-remembered event were coded as 'inaccurate'. For example, if the child stated that '*The thief took three apples*', instead of '*two apples*' as shown in the original video, the response was coded for one incorrect detail.

A series of 20 questions was then administered in a fixed order: six of these 20 questions were suggestive in that they consisted of information that was not part of the to-be-remembered event, and 14 of the 20 questions were about true events presented in the video (control questions). Following children's initial responses, the interviewer provided negative feedback, informing participants that they had made some errors and that the questions would need to be repeated. This feedback was intended to evaluate participants' tendency to alter their original responses under the influence of social pressure or negative feedback from the adult interviewer (Scullin & Ceci, 2001). The same 20 questions were then re-administered in the same fixed order to assess the extent of children's shifting.

Scoring of suggestibility was as follows:

(1) *Yield*: the extent to which the participants yielded to the six suggestive questions during the first administration, with a maximum score of 6.
(2) *Shift*: the extent to which the participants shifted or changed their original answers in response to the negative feedback, with a maximum score of 20.
(3) *Total suggestibility*: the sum of Yield and Shift scores, with a maximum score of 26.

Intelligence

To minimise the influence of language ability on cognitive test performance, particularly given the multilingual context of Malaysian children and the lack of validated language measures across all spoken languages, only non-verbal intelligence was assessed. As non-verbal IQ has been consistently associated with higher recall accuracy and lower suggestibility (e.g. Henry & Gudjonsson, 2007; Vagni et al., 2023), the Wechsler Intelligence Scale for Children–Fifth UK edition (WISC-V; Wechsler, 2016) was administered to assess

the child's non-verbal intelligence (NVI) index. The NVI was derived from six of the ten primary subtests, including the subtests of Block Design and Visual Puzzles, which measure visual-spatial skills; Matrix Reasoning and Figure Weights, which evaluate fluid reasoning abilities; Picture Span, which measures visual working memory; and Coding, which assesses processing speed.

As Malaysian-specific norms for the WISC-V are not yet available, the UK normative data provided in the WISC-V manual (Wechsler, 2016) were applied, consistent with previous research conducted in Malaysia (e.g. Hairol et al., 2023; Huey et al., 2024). The WISC-V is widely used in Malaysian clinical and educational settings, and reliance on non-verbal subtests in the present study minimises the potential impact of cultural and linguistic differences.

Temperament

The parent-report version of the School-Age Temperament Inventory (SATI; McClowry, 1995) was administered to assess children's temperament. This scale comprises 38 items, assessing four dimensions of temperament: Negative Reactivity (12 items) refers to a tendency to respond to situations with intense negative emotions, such as frustration or distress (e.g. 'Gets upset when he/she can't find something'); Task Persistence (11 items) refers to a tendency to remain focussed and committed to completing tasks (e.g. 'Remembers to do homework without being reminded'); Withdrawal (9 items) refers to a tendency to avoid new situations or people, displaying shyness or reluctance to engage in unfamiliar activities (e.g. 'Seems uncomfortable when at someone's house for the first time'.); and Activity level (6 items) refers to a tendency to engage in high levels of physical movement and energy expenditure (e.g. 'Runs or jumps when going up or down stairs'). Parents indicated how often their child exhibited behaviours described in each item on a five-point Likert, ranging from 1 (never) to 5 (always). The items on each subscale were summed, with higher scores in Negative Reactivity, Withdrawal and Activity Level, and lower scores in Task Persistence indicating a more challenging temperament.

The SATI has also been employed in Southeast Asian contexts (e.g. Indonesia: Mabruria, 2013; Vietnam: Thanh et al., 2016), where it demonstrated adequate reliability, supporting its appropriateness for use in the present Malaysian sample.

Parenting styles

The revised parent self-report version of Parental Authority Questionnaire (PAQ-R; Reitman et al., 2002) was used to assess parenting styles. The PAQ-R was adapted from the original PAQ (Buri, 1991), which measured three of Baumrind's (1971) parenting styles through adolescents' retrospective ratings. The PAQ-R rephrases the items from the second person to the first person, making it suitable for parents to report their own parenting styles. This scale comprises 30 items, with three 10-item subscales representing each parenting style: Permissive, which is characterised by low demandingness and high responsiveness (e.g. 'I usually don't set firm guidelines for my children's behaviour'); Authoritarian, which is characterised by high demandingness and low responsiveness (e.g. 'I do not allow my children to question the decisions that I make'); and Authoritative, which is characterised by high demandingness and high responsiveness (e.g. 'I always encourage discussion when my children feel family rules and restrictions

are unfair'). Parents indicated how strongly they agreed or disagreed with each statement regarding their beliefs about parenting their child on a five-point Likert Scale. The items on each subscale were summed. Total scores range from 10 to 50 with higher scores indicating a greater appraised level of the parental authority prototype.

The PAQ has been widely used with Malaysian (e.g. Abu et al., 2021; Nordin et al., 2024) and wider Asian parent populations (e.g. China: Lin & Wang, 2022; Singapore: Lim & Ong, 2024), demonstrating good reliability and supporting its suitability for use in the present sample.

Trait anxiety

The 8-item parent-report version of Brief Spence Children's Anxiety Scale (SCAS-P-8; Reardon et al., 2018) was administered to assess the child's trait anxiety. Parents indicated how often their child exhibited behaviours described in each item (e.g. 'My child complains of feeling afraid') on a four-point Likert scale, ranging from 1 (never) to 4 (always). Total scores range from 8 to 32 with higher score indicating greater level of trait anxiety.

The SCAS has been extensively validated across diverse cultural contexts, including Asian populations in China (e.g. Li et al., 2011), Japan (e.g. Ishikawa et al., 2014), and Malaysia (e.g. Ahmadi et al., 2015), supporting its factorial validity and reliability (see Galan-Luque et al., 2025).

State anxiety

The 6-item version of Spielberger's (1983) State-Trait Anxiety Inventory (STAI-6; Marteau & Bekker, 1992) was administered to assess children's state anxiety. This measure has been widely applied in Malaysia with good reliability (e.g. Mazlan & Razak, 2023; Wong & Alias, 2021). At the end of the interview, the child participants were asked to indicate how they felt at that moment. A three-point Likert scale, ranging from 1 (not) to 3 (very), was adopted to make it more easily understood by children (Royeen, 1985). Pictures of facial expressions using Widgit Symbols were used to help children visualise each emotional state (Nilsson et al., 2012; Nilsson et al., 2019). Total scores range from 6 to 18 with higher scores indicating higher level of state anxiety.

Interviewer demeanour manipulation check

An adapted version of the interviewer demeanour rating form (Bain & Baxter, 2000) was administered to assess the participants' rating of interviewer manner between supportive and non-supportive interviewing conditions. The original form consisted of 18 items measured on a 5-point Likert scale and has recently been tested in a Malaysian sample, demonstrating acceptable internal consistency (Wong et al., 2024). The adapted version included 14 items with shorter descriptions (e.g. 'Approached me in a friendly way' was modified to 'Was friendly to me'), measured using a simplified 3-point Likert scale (1 = 'Disagree', 2 = 'Undecided (I don't know)', 3 = 'Agree'). Four original items were removed as they were less relevant to the current study context, such as 'Conducted the study effectively' and 'Seemed competent in managing the study'. This adjustment aimed to ensure clarity and ease of response for the school-age children in the current sample.

Additionally, prior to completing the form, the interviewer checked for understanding by asking the children if they encountered any unfamiliar words and provided brief explanations as needed. Participants were then asked to indicate how strongly they agreed or disagreed with each item. This adapted version retained key manipulation check items, which was evaluated on 14 aspects of interviewer's manner: friendly, understanding, nervous, professional, serious, confident, firm, respectful, strict, positive, formal, warm and sincere, negative, and pushy. Total scores range from 14 to 42 with higher score indicating a higher rating of supportive interviewer demeanour.

Procedure

Data collection took place in local primary schools and consisted of two parts. In the first part, parents interested in their child's participation signed the parental consent form and completed the parent survey, which gathered demographic information, SATI, PAQ-R, and SCAS-P-8 data. In the second part, child participants were invited to participate in an interview session at school, conducted in their preferred spoken language (i.e. English or Mandarin).

The interview session involved experimental manipulations of interviewer demeanour (i.e. supportive vs. non-supportive interviewing style) and exposure to post-event misinformation (i.e. exposed vs. non-exposed). Child participants were pseudo-randomly assigned to one of four conditions with 40 participants in each condition: (1) supportive and non-exposed, (2) supportive and exposed condition, (3) non-supportive and non-exposed, and (4) non-supportive and exposed (see Figure 2 for a visual representation of the interviewing condition setup). To maintain the integrity of each interviewing condition and ensure consistency of demeanour across conditions, two trained interviewers were assigned: one (the first author) conducted interviews in a supportive manner, while the other maintained a non-supportive demeanour (the research assistant). In the supportive condition, the interviewer displayed a friendlier manner, including an open body

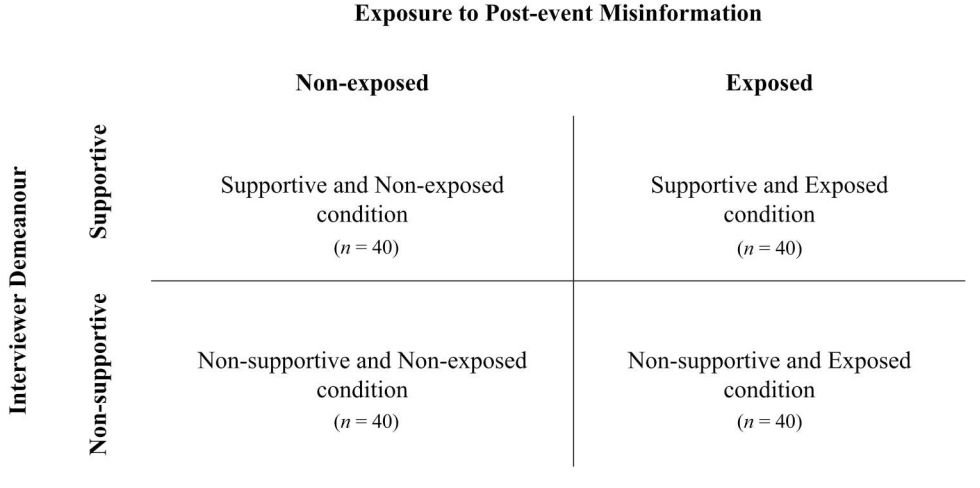

Figure 2. Interviewing condition setup: Supportive versus non-supportive interviewer demeanour crossed with misinformation exposure.

posture, casual attire, consistent eye contact, smiling, use of the child's name, and a warm tone. Conversely, in the non-supportive condition, the interviewer made no attempt to build rapport and maintained a distant manner, characterised by a closed body posture, formal attire, minimal eye contact, lack of smiling, infrequent use of the child's name, and a monotone speaking style. These elements of supportive and non-supportive demeanour were operationalised based on previous studies (see Saywitz et al., 2019).

The video suggestibility paradigm was administered individually during the interview session. Child participants were first instructed to watch the short mock-crime video in a neutral manner upon entering the room. This was to ensure minimal interaction with interviewer, which could potentially influence their subsequent behaviours. Next, they engaged in a 15-mins filler task using WISC-V's Coding and Symbol Search subtests. Immediately after the filler task, a mock investigative interview was conducted. The semi-structured interview was adapted from Su (2025), based on the Revised National Institute of Child Health and Human Development (NICHD) Protocol (Lamb et al., 2018).

The interview began with a pre-substantive phase lasting approximately five minutes. Firstly, ground rules were explained and practiced, including permissions to express 'I don't understand' or 'I don't know', with children engaging in practice scenarios (e.g. 'If I ask a question, and you don't know the answer, just tell me, 'I don't know'. So, if I ask you, what did I have for dinner last night, what would you say?'). Emphasis was placed on the importance of telling the truth. Secondly, episodic memory training was conducted, prompting child participants to describe a recent event (e.g. 'Tell me everything that happened last weekend/yesterday').

Next, participants in the exposed condition were presented with misinformation regarding the to-be-remembered event, while those in the non-exposed condition received no additional post-event information. The interviewer verbally presented the misinformation script, but each participant was informed that these details were reported by other child participants (e.g. 'I have been talking to a lot of children who watched that video, and now I will tell you what they remembered about the video'). The misinformation script comprised 18 pieces of false information that were not part of the original video.

The interview then entered the substantive phase to assess the child's recall and suggestibility. All participants performed a recall task, involving an open-ended free recall test and five follow-up questions about the video (see details above). Next, participants were asked 20 questions, six of which contained misleading items that were drawn from the post-event misinformation script. Participants were then provided with negative feedback (i.e. 'You made a few mistakes. Let's go through them again and see if you can do better this time'.), and the same 20 questions were re-administered. Their oral responses were audio-recorded (with parental and child consent) for transcription and coding later.

At the end of the interview, participants were requested to complete the STAI-6, the interviewer demeanour rating form, and the remaining WISC-V subtests. Participants were debriefed upon completion of the study. Each interview session lasted about 45–60 min.

Results

Data analyses focussed on three key measures: (1) accurate recall, which assessed participant's ability to correctly recall and report event details, (2) inaccurate recall, which

measured the prevalence of inaccuracies in participants' recall, (3) total suggestibility, which provided an overall measure of suggestibility, reflecting the general influence of predictors on children's susceptibility to suggestive information.

Preliminary analyses

Reliability and manipulation check

A summary of the reliability statistics is presented in Table 2. The Cronbach's alpha coefficients for all measurements ranged from .65 to .86, indicating satisfactory reliability. To assess inter-rater reliability, scoring for accurate recall, inaccurate recall, Yield, and Shift was first conducted by a trained research assistant using the standardised coding scheme (Su, 2025). The degree of agreement between two independent raters (i.e. the research assistant and the first author) was then evaluated. Intraclass correlation coefficients (ICC; Shrout & Fleiss, 1979) were computed using a two-way random effects model for average measures. Results indicated excellent reliability, with all ICC values greater than .90 and significant at $p < .001$, ranging from .899 to .970.

Participants' evaluations of the interviewers, assessed using the interviewer demeanour rating form, indicated that the manipulation was successful. An independent samples *t*-test on participants' ratings of interviewer demeanour revealed a significant difference between supportive ($M = 34.21$; $SD = 3.92$) and non-supportive ($M = 27.46$; $SD = 3.00$) conditions, $t\ (158) = -12.23$, $p < .001$, $d = -1.93$. Specifically, participants rated the supportive interviewer higher on items such as 'friendly' and 'positive', while the non-supportive interviewer received higher ratings on items like 'strict' and 'negative'.

Group comparisons and age effects

To examine potential imbalances in participant characteristics across the four interviewing conditions (supportive/non-supportive x exposed/non-exposed conditions), one-way ANOVAs were conducted. Descriptive statistics for individual difference variables are reported in the Supplementary Information (see Table S1). Results revealed no significant group differences for age, intelligence, temperament, and trait anxiety. A significant difference was observed for authoritative parenting scores, $F\ (3, 156) = 3.49$, $p = .02$, η^2

Table 2. Reliability statistics of scales.

Scale	No. of items	Cronbach's Alpha (α)
SATI		
Negative Reactivity	12	.73
Task Persistence	11	.86
Withdrawal	9	.81
Activity	6	.66
PAQ		
Permissive	10	.65
Authoritarian	10	.76
Authoritative	10	.79
SCAS-P-8	8	.65
STAI-6	6	.66
Interviewer demeanour rating form	14	.79

Note. SATI = School-Age Temperament Inventory; PAQ = Parental Authority Questionnaire; SCAS-P-8 = Brief Spence Children's Anxiety Scale; STAI = State-Trait Anxiety Inventory.

= .06. However, follow-up hierarchical regression analyses controlling for authoritative parenting confirmed that this imbalance did not alter the significance or pattern of the overall findings (see Supplementary Information for details).

To assess whether age influenced recall and suggestibility, two sets of analyses were conducted. First, bivariate correlations revealed no significant associations between age and accurate recall ($r = .05$, $p = .56$), inaccurate recall ($r = .03$, $p = .73$), or total suggestibility ($r = -.01$, $p = .88$). Second, hierarchical regression analyses were conducted with age entered as a covariate at Step 1 (Model 1), followed by interviewing conditions and individual differences variables at Step 2 (Model 2). Age was a non-significant predictor across all models (all βs < .10, ps > .17). Model 1 with age alone explained negligible variance (all R^2s < .002, ps > .56), whereas Model 2, which included other main predictors, significantly improved the models (accurate recall: $\Delta R^2 = .28$, F (12,146) = 4.74, $p < .001$; inaccurate recall, $\Delta R^2 = .18$, F (12,146) = 2.67, $p = .003$; total suggestibility: $\Delta R^2 = .16$, F (12,146) = 2.29, $p = .008$). Age was therefore not included as a covariate in the final models.

Descriptive statistics and correlations

Table 3 presents descriptive statistics for accurate recall, inaccurate recall, and total suggestibility across four conditions, varying by interviewer demeanour (non-supportive vs. supportive) and exposure to post-event misinformation (exposed vs. non-exposed). Contrary to our first hypothesis, participants in the non-supportive interview condition reported higher accurate recall and lower inaccurate recall compared to those in the supportive interview conditions. Total suggestibility scores were similar between the interviewer demeanour conditions. As predicted, participants exposed to post-event misinformation generally exhibited lower accurate recall, higher inaccurate recall, and higher total suggestibility compared to those not exposed.

Means, standard deviations, and correlations for individual difference variables, accurate and inaccurate recall, and total suggestibility are presented in Table 4. Pearson's correlation tests were conducted with a Bonferroni-adjusted significance level of $p < .004$ (0.05 divided by the 13 comparisons) to account for multiple comparisons. Results showed that accurate recall had no correlation with inaccurate recall ($r = -.12$, $p = .14$). After Bonferroni correction, total suggestibility also had no significant correlation with accurate recall ($r = -.18$, $p = .02$) or inaccurate recall ($r = .19$, $p = .02$). Overall accurate recall was positively correlated with intelligence after Bonferroni correction ($r = .24$, $p = .003$) and negatively correlated with withdrawal trait ($r = -.28$, $p < .001$). Inaccurate

Table 3. Mean and standard deviation scores of accurate recall, inaccurate recall, and total suggestibility across interviewing conditions ($N = 160$).

Dependant Variables		Non-Supportive Interviewer	Supportive Interviewer	Total
Accurate Recall	Non-Exposed	0.55 (0.16)	0.50 (0.15)	0.52 (0.15)
	Exposed	0.49 (0.18)	0.41 (0.14)	0.45 (0.17)
	Total	0.52 (0.17)	0.45 (0.15)	0.49 (0.17)
Inaccurate Recall	Non-Exposed	0.19 (0.13)	0.22 (0.12)	0.20 (0.12)
	Exposed	0.29 (0.15)	0.31 (0.15)	0.29 (0.15)
	Total	0.23 (0.15)	0.26 (0.14)	0.24 (0.14)
Total Suggestibility	Non-Exposed	6.92 (2.20)	6.80 (2.88)	6.86 (2.55)
	Exposed	7.68 (2.90)	7.83 (2.70)	7.75 (2.79)
	Total	7.30 (2.59)	7.31 (2.82)	7.31 (2.70)

Table 4. Means (M), standard deviations (SD), and correlations for the measures of intelligence, temperaments, parenting styles, trait and state anxiety, accurate and inaccurate recall, and total suggestibility ($N = 160$).

	M	*SD*	IQ	NR	TP	WD	AV	*P*	AR	AT	TA	SA	AccR	InaccR	TS
IQ	99.13	12.18		.02	.32*	−.13	−.10	−.06	−.04	.08	−.16	−.07	.24*	−.06	−.15
Negative Reactivity	3.01	0.68			−.38*	.19	.42*	−.09	.18	−.04	.27*	−.08	.07	.03	−.01
Task Persistence	3.30	0.70				−.24*	−.49*	−.08	−.15	.17	−.32*	−.02	.04	−.09	−.11
Withdrawal	2.61	0.69					.09	.03	.18	−.02	.38*	.22	−.28*	−.01	−.07
Activity	2.87	0.64						.03	.14	−.01	.14	.05	.12	−.13	−.08
Permissive Parenting	3.15	0.42							.08	.12	.10	.13	.02	−.12	−.08
Authoritarian Parenting	3.03	0.52								−.06	.11	−.03	−.03	.05	.20
Authoritative Parenting	3.96	0.41									.01	−.01	−.02	−.15	−.07
Trait Anxiety	1.81	0.38										.18*	.05	−.05	.03
State Anxiety	1.68	0.39											−.12	−.05	.06
Accurate Recall	0.49	0.17												−.12	−.18
Inaccurate Recall	0.25	0.14													.19
Total Suggestibility	7.31	2.70													

Note. IQ = intelligent quotient; NR = Negative Reactivity; TP = Task Persistence; WD = Withdrawal; AV = Activity; *P* = Permissive; AR = Authoritarian; AT = Authoritative; SA = State Anxiety; TA = Trait Anxiety; AccR = Accurate Recall; InaccR = Inaccurate Recall; TS = Total Suggestibility.

* Statistically significant at $p < .004$ (0.05/13) after Bonferroni correction.

recall and total suggestibility did not correlate with any of the individual difference variables after Bonferroni correction (all $rs < .20$, all $ps > .01$).

Regression analyses

Multiple regression analyses were performed to explore the relative contributions of interviewing conditions (i.e. interviewer demeanour and exposure to post-event misinformation) and individual differences variables (i.e. intelligence, child's temperament traits, parenting styles, trait and state anxiety) on children's recall and suggestibility. The categorical variables of interviewing conditions were dummy-coded, where supportiveness = 1, and non-supportive = 0, for interviewer demeanour; and exposed = 1, and non-exposed = 0, for exposure to misinformation. The regression coefficients for each predictor predicting accurate recall, inaccurate recall, and total suggestibility are presented in Table 5.

The false discovery rate (FDR) was controlled at 5% to account for multiple comparisons at the parameter level (Benjamini & Hochberg, 1995). Using the Benjamini-Hochberg procedure, the adjusted *p*-value thresholds were calculated as *(i/m)*Q*, where *i* is the *p*-value's individual rank, *m* is the total number of tests (i.e. 12 tests of significance), and *Q* is the FDR of 0.05. Statistically significant *p*-values after this correction are marked with an asterisk (see Table 5).

Predictors of recall and suggestibility

In terms of the recall measures, the significant models explained 27.2% of the variance in accurate recall, $R^2 = .27$, F (12, 147) = 4.59, $p < .001$, and 18% of the variance in inaccurate recall, $R^2 = .18$, F (12, 147) = 2.69, $p = .003$. Results demonstrated that non-supportive interviewer demeanour ($\beta = -.23$, $p = .002$, $sr^2 = .05$), non-exposure to misinformation ($\beta = -.21$, $p = .004$, $sr^2 = .04$), higher intelligence ($\beta = .21$, $p = .006$, $sr^2 = .04$), and lower withdrawal trait ($\beta = -.33$, $p < .001$, $sr^2 = .08$) significantly predicted higher accurate recall. Unlike accurate recall, which was related to both situational and dispositional factors, only exposure to misinformation significantly predicted higher inaccurate recall ($\beta = .31$, $p < .001$, $sr^2 = .09$).

For total suggestibility, the model explained 16.1% of the variance, $R^2 = .16$, F (12, 147) = 2.35, $p = .009$. Results indicated that only authoritarian parenting style significantly predicted higher total suggestibility ($\beta = .25$, $p = .002$, $sr^2 = .06$). None of the interviewing conditions were significantly related to suggestibility.

Discussion

The variables of interest in this study were examined within two overarching categories: interviewing contexts (i.e. interviewer demeanour and exposure to misinformation) and individual differences (i.e. intelligence, temperament, anxiety, and parenting styles). In this study, we were particularly interested in exploring how variations in interviewing conditions, as well as children's temperament and their developmental environment, influence their recall and susceptibility to suggestions. As summarised in Table 6, the findings provided partial support for the proposed hypotheses. Specific factors such as non-supportive interviewer demeanour, non-exposure to misinformation, higher intelligence, lower withdrawal trait, and authoritarian parenting style were significantly related to children's interview performance.

Table 5. Unstandardised (B) and standardised (β) regression coefficients for each predictor in the regression models of accurate recall, inaccurate recall, and total suggestibility ($N = 160$).

	Accurate Recall					Inaccurate Recall					Total Suggestibility				
Predictors	*B*	SE	*β*	95% *CI*	*P*	*B*	SE	*β*	95% *CI*	*p*	*B*	SE	*β*	95% *CI*	*p*
Supportiveness	−0.07	0.02	−.23	[−.12, − .03]	.002*	0.02	0.02	.09	[−.02, .07]	.276	−0.05	0.42	−.01	[−.88, .79]	.913
Misinformation	−0.07	0.02	−.21	[−.12, − .02]	.004*	0.09	0.02	.31	[.05, .13]	<.001*	0.90	0.42	.17	[.06, 1.73]	.036
IQ	0.00	0.00	.21	[.001, .005]	.006*	0.00	0.00	−.03	[−.002, .00]	.684	−0.03	0.02	−.12	[−.06, .01]	.140
Negative Reactivity	0.01	0.02	.04	[−.03, .05]	.678	0.01	0.02	.05	[−.03, .05]	.578	−0.08	0.36	−.02	[−.79, .64]	.833
Task Persistence	0.02	0.02	.07	[−.03, .06]	.465	−0.04	0.02	−.18	[−.08, .003]	.066	−0.71	0.38	−.18	[−1.47, .05]	.067
Withdrawal	−0.08	0.02	−.33	[−.12, − .04]	<.001*	0.00	0.02	−.02	[−.04, .03]	.831	−0.71	0.34	−.18	[−1.37, − .04]	.038
Activity	0.03	0.02	.12	[−.01, .07]	.176	−0.04	0.02	−.19	[−.08, − .002]	.038	−0.75	0.39	−.18	[−1.52, .03]	.059
Permissive	0.02	0.03	.06	[−.04, .08]	.454	−0.04	0.03	−.12	[−.09, .01]	.115	−0.85	0.50	−.13	[−1.84, .14]	.090
Authoritarian	−0.00	0.02	−.01	[−.05, .04]	.912	0.02	0.02	.07	[−.02, .06]	.386	1.32	0.41	.25	[.51, 2.14]	.002*
Authoritative	−0.03	0.03	−.08	[−.09, .03]	.278	−0.02	0.03	−.07	[−.08, .03]	.382	0.06	0.51	.01	[−.95, 1.07]	.909
Trait Anxiety	0.07	0.04	.15	[−.004, .14]	.065	−0.01	0.03	−.02	[−.07, .06]	.846	0.34	0.63	.05	[−.91, 1.59]	.592
State Anxiety	−0.04	0.03	−.10	[−.11, .02]	.197	−0.01	0.03	−.03	[−.07, .05]	.710	0.62	0.56	.09	[−.50, 1.73]	.274

Note. *B* = Unstandardised regression coefficient; SE = Standard error; β = Standardised regression coefficient; *CI* = Confidence interval.
* Statistically significant *p* values at FDR of 5% following the Benjamini-Hochberg procedure.

Table 6. Summary of hypotheses and findings.

Hypotheses	Predictors	Findings	Result of test
H1	Interviewer demeanour	• Non-supportive demeanour predicted higher accurate recall. • No effect on inaccurate recall. • No effect on suggestibility.	Partially supported (*recall only*)
H2	Exposure to misinformation	• Non-exposure to misinformation predicted higher accurate recall. • Exposure to misinformation predicted higher inaccurate recall. • No effect on suggestibility.	Partially supported (*recall only*)
H3	Intelligence	• Higher intelligence predicted higher accurate recall. • No effect on inaccurate recall. • No effect on suggestibility.	Partially supported (*recall only*)
H4	Temperament	• Lower withdrawal predicted higher accurate recall. • No effect on inaccurate recall. • No effect on suggestibility.	Partially supported (*recall only*)
H5	Anxiety	• No effect on recall. • No effect on suggestibility.	Not supported
H6	Parenting Styles	• No effect on recall. • Authoritarian style predicted higher suggestibility.	Partially supported (*suggestibility only*)

Interviewing contexts

In contrast to previous findings indicating that interviewer support bolsters children's accuracy (see Saywitz et al., 2019), the present study found that the non-supportive interview condition significantly predicted higher accurate recall (H1 was not supported). This unexpected result may be due to social desirability (i.e. tendency to please adults and seek approval), influenced by the bidirectional nature of the interview process. As suggested by Quas et al. (2014), children in the non-supportive condition may put in more effort in reporting accurate details to impress the interviewer and garner more support or approval, both of which were sufficiently present in the supportive interviewing and thus required no additional effort on the child's part to seek the interviewer's approval. Clearly, this is speculative, and a definitive test would require additional research.

Cultural differences might also play a role (Anakwah et al., 2023; Korkman et al., 2024). For instance, Hofstede's (2003) global survey highlighted that in Malaysia, a society with a 'high-power distance culture', children may perceive the adult interviewer as an authority figure and show deference to individuals of higher social status. Contrary to findings from studies conducted in 'lower power distance cultures' (see Gabbert et al., 2020), the high-power distance culture may lead children to strive to meet the expectations of a non-supportive interviewer. This also addresses Hope et al.'s (2022) commentary that rapport-building techniques may not always be effective in hierarchical societies. Their commentary draws on Gabbert et al.'s (2020) systematic review, which examined verbal (e.g. using the interviewee's name) and non-verbal (e.g. maintaining eye contact) rapport behaviours

in professional information-gathering contexts. These rapport behaviours closely align with the supportive behaviours operationalised in this study. Thus, while this study focusses specifically on interviewer support rather than rapport-building per se, it contributes to addressing the need for culturally adapted approaches that Hope and colleagues have advocated. Furthermore, the protective effect of supportive interview conditions might have been precluded due to the short interval between the to-be-remembered event and interview. As Saywitz et al. (2019) has argued, the impact of interviewer demeanour becomes more prominent at longer delays (over one month) when the memory trace is weaker. Future longitudinal studies are needed to assess how children's recall accuracy changes after longer intervals and to examine the impacts of interviewer supportiveness over time.

As hypothesised, exposure to post-event misinformation significantly reduced accurate recall and was associated with higher inaccurate recall (H2 was partially supported for recall). These findings align with past studies on misinformation, indicating that post-event misinformation can interfere with original memories, leading to memory distortion and the creation of false memories (see Loftus, 2005). Consistent with Knutsson and Allwood (2014), this study is consistent with the idea that young children, especially those below the age of ten, are more likely to struggle with retrieving encoded information in detail and distinguishing between sources of information. Despite the short delays between encoding and retrieval, the present study illustrated a significant distorting effect of misinformation on children's recall during an investigative interview.

However, contrary to previous studies (e.g. Gabbert et al., 2020; Saywitz et al., 2019), the present study did not find any significant relationship between the manipulated interviewing conditions and suggestibility. This null effect may be due to the limited impact of specific elements within the interviewing contexts, including interviewer demeanour and exposure to post-event misinformation. These results imply that children's responses to suggestive questions may be more strongly influenced by other factors, particularly individual differences, as we explain below. Additionally, the descriptive statistics showed similar total suggestibility scores across interviewer demeanour conditions, suggesting a potential limitation in the effectiveness of the non-supportive demeanour manipulation. The young female interviewer in this study may not fully represent a typical police investigator in Malaysia (although she would be similar to the typical social service interviewer). This difference could have influenced how intimidating the non-supportive condition appeared to the children. While the manipulation check showed that children found the non-supportive interviewer less friendly, it is uncertain if they perceived this condition as genuinely unfriendly. It is important to note that this study deliberately avoided explicitly unsupportive behaviours such as coercion and criticism documented in some field studies (e.g. Teoh & Lamb, 2013). This reflects contemporary best practices in child interviewing, where truly intimidating or hostile interviewer demeanour is becoming increasingly rare due to advances in training and protocols (e.g. Lamb et al., 2018). However, in extreme cases where interviewers do exhibit outright intimidating or hostile behaviour toward children, the effects on suggestibility could be substantially different from those observed in this study. The relatively mild nature of the non-supportive manipulation, while ethically appropriate and reflective of contemporary interviewing standards, might therefore have weakened the intended adverse effects on suggestibility.

Individual differences

In terms of individual differences, accurate recall was positively related to intelligence (H3 was partially supported for recall). Children with higher scores on the WISC-V's non-verbal intelligence index demonstrated better cognitive functioning, including enhanced working memory, processing speed, and fluid reasoning skills. These findings align with past studies on intelligence (e.g. Dehon, 2020; Greene et al., 2020; Hritz & Ceci, 2021), which indicate that higher cognitive functioning is significantly related to improved report accuracy.

Withdrawal temperament, on the other hand, was negatively related to accurate recall (H4 was partially supported for recall). Children high in withdrawal trait tend to avoid new situations or people (McClowry, 1995), which may make them feel uncomfortable in unfamiliar interview settings. It is therefore not surprising for their reluctance to engage with the interviewer and less willing to share details during recall task (e.g. Saywitz et al., 2017). As reviewed by Klemfuss and Olaguez (2020), children's temperament traits often intersect with other factors in predicting recall and suggestibility. Given that withdrawal was correlated with anxiety levels, it might be the combined influence of these related factors in the regression model. Therefore, the role of withdrawal temperament in recall may be more complex than initially considered. Further research is needed to examine how these factors collectively impact children's recall performances.

With regard to anxiety, the present findings were in contrast with past studies (e.g. Almerigogna et al., 2007; Drake, 2014), as neither trait nor state anxiety served as a predictor of recall or suggestibility (H5 was not supported). This discrepancy suggests that the direct impact of anxiety on children's responses is marginal and may interact with other individual differences or contextual factors, rather than acting as an independent predictor as previously suggested. As discussed above, the positive correlations between withdrawal trait and anxiety factors suggest that anxiety may influence children's responses in nuanced ways that do not necessarily translate into recall performance. Additionally, given the significant effect of interviewer demeanour, future research could explore its potential moderating or mediating roles in the relationship between individual differences, such as anxiety, and children's memory performance, to better understand these interactions in real-world settings.

Authoritarian parenting emerged as the only significant predictor of suggestibility (in the regression analysis H6 was partially supported for suggestibility). Children raised by higher authoritarian parenting tended to exhibit greater suggestibility during interviews, which is consistent with previous research (e.g. Burgwyn-Bailes et al., 2001). Authoritarian parenting which prioritises obedience and compliance over the encouragement of independent thinking and assertiveness, may lead to lower self-confidence and lead children to discount their own memories or interpretation of events (Baumrind, 1991). Consequently, these children may be more likely to defer to external cues and suggestions, especially from authority figures, during questioning, rather than insist on their genuine recollections of events. Moreover, both permissive and authoritative parenting, characterised by high responsiveness, did not serve as significant predictors of suggestibility. These parenting styles often create a nurturing environment that encourages children to express their thoughts and feelings openly, fostering self-confidence and assertiveness (Baumrind, 1991). As a result, children raised with these parenting styles

may be more inclined to trust their own memories and interpretations of events, making them less prone to influence from external suggestions during interviews. These findings suggest that parental responsiveness might play a role in maintaining a level of assertiveness and self-assurance that could potentially buffer against suggestibility.

Overall, it is important to acknowledge that the present study examined a wide range of situational and dispositional factors simultaneously, which represents both a methodological strength and a source of complexity in interpreting the findings. This approach increases ecological validity, as children's interview performance is rarely shaped by a single influence in isolation. Instead, factors such as interviewer demeanour, misinformation exposure, cognitive abilities, and aspects of the child's developmental environment likely interact in complex and dynamic ways during the interview process. Such complexity can help explain why some hypotheses were supported while others were not, as the effects of one factor may be moderated or mediated by the presence of others. While isolating individual factors remains important for establishing causal relationships, examining multiple influences together allows for a more integrated understanding of how cognitive and social factors shape children's recall accuracy and suggestibility. Future research would benefit from testing these interactions more systematically, ideally with larger samples enabling more advanced statistical modelling.

Limitations

In the present study, the exposed group received misinformation, whereas the non-exposed group did not. One potential issue with this approach is that the exposed group received an additional memory load, which might have affected the recollection of the event. To mitigate the impact of load differences, the non-exposed group could have been exposed to a neutral story unrelated to the to-be-remembered event. This adjustment would better demonstrate the effect of misinformation on children's recall.

Additionally, the interviewer's dual role as both a source of misinformation and the individual responsible for assessing the children's recall may have influenced the children's memory performance. The observed strong effects of misinformation on both accurate and inaccurate recall in this study imply that children may have perceived the interviewer as a credible source, which could have heightened their susceptibility to the false information (Hope et al., 2008; Lampinen & Smith, 1995). Research indicates that children are more likely to view adults as trustworthy, making them particularly vulnerable to external suggestions, even when they notice contradictions (Bruck & Ceci, 1999). Carol and Compo (2017) also found that misinformation from an adult co-witness had a greater impact on children's recall accuracy compared to misinformation from a peer (see also Ceci et al., 1987 for a similar result). This suggests that children may evaluate the credibility of the source before deciding whether to incorporate the information into their reports. It may therefore be valuable for future research to examine the influence of varying sources of misinformation on children's recall and suggestibility.

Another limitation concerns the assessment of parenting styles, which was conducted using the PAQ-R (Reitman et al., 2002), a parent self-report adaptation of Buri's (1991) original PAQ. This measure assesses three of Baumrind's (1971) parenting styles (i.e. authoritarian, authoritative, and permissive parental authority prototypes), but omits the

neglectful or uninvolved parenting style identified later by Maccoby and Martin (1983) as a distinct fourth dimension. Consequently, this study cannot address the potential influence of neglectful parenting on children's recall and suggestibility. Although neglectful parenting is relatively uncommon among Malaysians, where authoritarian and authoritative parenting styles are predominant due to collectivist cultural values (e.g. Salehuddin & Winskel, 2016; Shahlal et al., 2021), future studies could include all four styles for a more comprehensive understanding of parenting's influence on memory. Broader assessment tools, such as the Scale of Parenting Style (Gafor & Kurukkan, 2014), which measure parenting style across both parental responsiveness and demandingness, might enhance understanding of parenting influences across different cultural contexts.

As Bruck and Melnyk (2004) suggested, language ability is a multifaceted factor affecting interrogative suggestibility and should be considered independently of other cognitive measures, including IQ. To minimise language impact on cognitive test performance, especially among multilingual children in Malaysia, verbal comprehension subtests were removed from the WISC-V assessment, and non-verbal intelligence was measured with minimal verbal instructions. This approach was taken as there are currently no validated language ability tools available in all languages spoken in Malaysia. This could have limited our understanding of how verbal IQ relates with children's recall and suggestibility.

Finally, in view of research showing the influence of socioeconomic status (SES) on children's report accuracy (e.g. Chae et al., 2016), the broad socioeconomic diversity of the sample represents a strength in terms of diversity within a non-WEIRD context like Malaysia (i.e. being non-Western, an emerging rather than advanced economy, upper-middle income, and a flawed democracy; Hendriks et al., 2019). The Klang Valley sample successfully captured families across the full socioeconomic spectrum from lower-income to higher-income (i.e. T20 group) households. However, this diversity means that some participants, particularly those from higher-income and highly educated families, might resemble 'WEIRD-like' profiles, whereas others are more representative of typical non-WEIRD populations. While such internal diversity enhances the ecological validity of the findings, it also introduces interpretive challenges in generalisability to the broader Malaysian population. In addition, the use of measures developed primarily in Western contexts requires careful consideration when applied in non-WEIRD populations. By employing these measures and demonstrating acceptable reliability in the current Malaysian sample, this study contributes to the growing evidence base on their applicability in non-Western contexts. Although some items might not fully capture the cultural nuances of parenting practices or child behaviours in Malaysia, the findings provide important preliminary data to inform further cross-cultural research. Future research would benefit from cross-cultural adaptation and psychometric evaluation to ensure that the measures adequately represent the intended constructs within the Malaysian cultural context, thereby strengthening local norms and validity.

Conclusion

The present study contributes to existing literature by highlighting the significant role of parenting styles in shaping children's behaviour and performance during interviews. Our data show that children of more authoritarian Malaysian parents were more willing to

change their answers, even in the absence of group-level differences in suggestibility across interviewing conditions. An interesting, albeit counterintuitive, finding is that non-supportive interviewer demeanour predicted higher accurate recall in Malaysian children. Future research is needed to explore whether the anticipated protective effect of supportive interview conditions, which are widely endorsed in English-speaking Western cultures (Ceci & Hembrooke, 1998), might be non-optimal under specific conditions or factors, such as cultural influences. This study also highlighted the significant distorting effect of misinformation on children's recall and memory. Although this finding was expected, it drives home the need to conduct investigative interviews that are free from bias and misleading information to safeguard the quality of children's testimony. Regarding temperament traits, the present study sheds light on the role of withdrawal. Future research could productively explore the potential interaction effects of withdrawal, anxiety levels, and authoritarian parenting on children's recall performances. In addition, future research should continue to explore these relationships to enhance our understanding of how the developmental environment influences children's eyewitness memory reports. Overall, this study provides valuable insights into how cultural, developmental, and individual differences influence children's behaviours and responses during interviews. Our findings raise important considerations for interviewers to adapt their practices and ensure that investigative protocols are culturally sensitive, which may enhance the accuracy and reliability of children's testimonies across diverse cultural contexts.

Open Scholarship

This article has earned the Center for Open Science badge for Open Data. The data are openly accessible at https://osf.io/ns86c/?view_only=7f51dcfca935459684880377b83d9ae6.

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Data availability statement

The data that support the findings of this study are openly available in the Open Science Framework at https://osf.io/ns86c/?view_only = 7f51dcfca935459684880377b83d9ae6.

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