2021 PSYC447: Psychological Science Using R

# **3. Results**

## **3.1. Linear Mixed Model**

We fitted a LMER model in which the ratings given by participants were predicted by the evaluative measures/categories (memory, suggestibility, and ability to testify in court), the presence/absence of an ID in different age groups, and their interaction. Overall, the model explained a substantial amount of variance (conditional *R2*=.39). We found significant main effects for the target and groups, and we found several significant interactions (see Appendix G for full results). To ease interpretation of the two-way interaction, we visualize the results in Figure 2. Overall, we found a negative trend of suggestibility across age-groups, and potentially cubic slopes for both memory and ability to testify. We computed the EMM for the interaction term using a Tukey correction to adjust the p values for multiple comparisons (see Appendix H for the full table). Focussing on the theoretically predicted comparisons, we found significant (*p*<.001) increases in memory, ability to testify, and decreases in suggestibility across most measures in the expected hierarchical order. However, we found non-significant (*p*>.98) differences between AWID and TD middle childhood in ability to testify and memory, and all three (CWID, TD pre-schoolers, and TD middle childhood) child groups in suggestibility.

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**3.2. Exploratory Analyses**

We fitted another LMER model in which the participants’ ratings were predicted by non-evaluative (the “don’t know’s”) answers for the groups (children and adults), the presence/absence of an ID in these groups, and their interaction. Overall, the model explained a substantial amount of the variance (conditional *R2*=.54). We found significant main effects for the target and groups, and significant interactions (see Appendix I for full results). Again, to streamline interpretation, we visualise the results in Figure 3. Overall, we found a positive trend between non-evaluative responses and the presence of an ID. We computed the EMM for the interaction term using a Tukey correction to adjust the p-values for multiple comparisons (see Appendix J for full table). Both the CWID and AWID, and the TD Child and TD Adult pairings yielded non-significant differences, but all other TD vs. ID pairings were significantly different (*p*<.001).

Chart, scatter chart

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# **4. Discussion**

## **4.1. Findings**

Overall, our model showed partial support for hypothesis 1, as children were largely evaluated more negatively in our measures (memory, suggestibility, and ability to testify). However, the hierarchical structure, and linear development trajectory were not found, as TD Children in middle childhood were not found to be more negatively evaluated than AWID in ability to testify and memory. The expected linear development appeared moreover to be cubic in these age-groups. This suggests that jurors may carry biases about AWID, and not account for their development beyond childhood (Emerson et al., 1999; Brookbanks, 1999). Hypothesis 2a was also partially supported, as all child groups had non-significant differences in our suggestibility measure, yet as predicted, each increasing age group was more positively evaluated regarding memory and ability to testify. Hypothesis 2b, regarding AWID, was partially supported, as AWID were more negatively evaluated than TD adults, but as mentioned, not more positively than TD middle childhood in two measures. Overall, these findings suggest that jurors still have misconceptions and misunderstandings about the capabilities of PWID. Indeed, our exploratory analyses support this, as the presence of an ID lead to more non-evaluative answers, or “don’t know’s”. Clearly, whilst demonstrating accuracy in some areas, jurors’ perceptions of PWID can be erroneous or intentionally non-evaluative, suggesting that New Zealand juries really “don’t know” about the capacities of PWID.

## **4.2. Limitations, Strengths, Future Research**

# **Introduction**

## **Intellectual Disability and Unjust Injustice**

People with an intellectual disability (PWID) are a sizeable and vulnerable group (Brown et al., 2015). Globally, estimates intellectual disability’s (ID) prevalence range from 1-3% (World Health Organization [WHO] & The World Bank [WB], 2011; McKenzie et al., 2016; Armstrong et al., 2013), and in New Zealand, 2% of the population (≈100,000 people) have an ID (Statistics New Zealand, 2013; Intellectually Handicapped Children [IHC], 2017). This demographic, compared to the general population, is at an increased risk of social stigma and exclusion, discrimination, and abuse (Hughes et al., 2012). Consequently, PWID are more likely to be victims of crime (Fogden et al., 2016; WHO & WB, 2011), though also, in some categories (e.g., violent crime), perpetrators (cf. Nixon et al., 2017). Hence, PWID are more likely to depend on the efficacy of their respective justice systems (Brookbanks, 2019). Regularly, however, their needs are not being met.

PWID that are victims of crime are less likely to have their complaints investigated and taken to court (Brown & Lewis, 2013), and when they are, conviction rates are lower (Williams, 1995; Agnew et al., 2006). An explanation for this “paradox” (Brown & Lewis, 2013) is discrimination (Hehir, 2002; Miller et al., 2004) against PWID seeps into the courtroom, and juries have misconceptions of the competencies of PWID (Stobbs & Kebbell, 2003; Westcott & Jones, 1999; Henry et al., 2011b). Yet, PWID do have various deficits (American Psychiatric Association [APA], 2013; Brown et al., 2015), so understanding juror perception, and when they are accurate or erroneous, is critical to judicial outcomes. Accordingly, this study will examine how juror beliefs compare to the capabilities of PWID in the courtroom.

## **Understanding ID’s**

Whilst understanding ID goes beyond clinical definitions, these are a good starting point. ID is a neurodevelopmental disorder (APA, 2013) that originates during a person's development period (before 18 years of age), is intellectual (e.g., problem solving, abstract thinking) and adaptive (e.g., personal independence, communication) functioning deficits. These demonstrate in conceptual, social, and practical domains, and can range in severity (mild, moderate, severe, and profound) (APA, 2013; WHO, 2018). Typically, these deficits mean PWID have a mental age (MA) that is lower than peers of the same chronological age (CA) who are typically developing (TD), meaning their developmental level is analogous of younger peers (APA, 2013; Henry et al., 2011b). ID’s are lifelong (Armstrong et al., 2013), and mild ID is the most common (Boat & Wu, 2015) classification (85% of PWID) (Armstrong et al., 2013).

Theory is likewise useful for understanding ID’s, and two central developmental theories for PWID exist. The ‘developmental model’ (Zigler & Balla, 1982) assumes TD people’s cognitive development is approximately linear and increasing throughout their lives, and PWID progress similarly, but at a slower rate. Conversely, the ‘difference model’ (Ellis, 1969, as cited in Brown et al., 2015) assumes that PWID have qualitatively, cumulatively, and increasing differences in cognitive development compared to TD peers. Overall, there is evidence for both theories depending on the severity of the person’s ID. The development for people with milder ID’s has been shown to follow a ‘developmental model’ trajectory (Henry et al., 2011a), and people with severer forms of ID follow a ‘difference model’ trajectory (Brown et al., 2012). Despite their deficits (e.g., memory, and adaptive and social skills), however, PWID have been shown to be able to handle courtroom stressors (Agnew et al., 2006; Armstrong et al., 2013).

## **1.3. ID in the Courtroom**

PWID will be considered on their competency with factors important in the courtroom such as exhibiting good memory of events, testifying well, and not appearing suggestible. PWID are often worse at all the above compared to TD counterparts, and difficulties with these factors can compound and interact (Gudjonsson, 2003). For instance, should a PWID have poor memory, they are susceptible to confusion and vulnerable to leading questions by police/lawyers (Gudjonsson, 2003). Thus, their testimony may appear feebler (Bowles & Sharman, 2014).

Regardless, research on PWID has shown how able these people are. CWID have been shown to have as good, or better, memory capabilities as their MA match (Henry & Gudjonsson, 1999; Michel et al., 2000; Brown et al., 2015). However, suggestibility findings are mixed (e.g., Henry & Gudjonsson, 1999; Henry & Gudjonsson, 2007; Michel et al., 2000; Young et al., 2003) with better and worse capabilities to MA matches found, however, it appears suggestibility can be mitigated by improved, evidence-based, interviewing techniques for PWID (e.g., Bull, 2010; Bowles & Sharman, 2014). Likewise, evidence-based additions in the courtroom, such as expert evidence (Goodman-Delahunty, 2011) can mitigate the testimony pitfalls for PWID, and ensure their deficits are not the sole focus of their evidence.

Lastly, a note on the type of ID which is likely to be in court. Given most PWID have mild ID, this is the group jurors are more likely to encounter. Afterall, the rigours of trial proceedings are extensive for PWID (Stevenson, 2019), and potentially beyond the capacities of severer sufferers. Literature supporting this is minimal, however a study of Australian offenders found 88.4% of PWID in custody as having mild forms of ID (Cockram, 2005). Jurors will, thus, be less likely to encounter PWID with severer kinds of ID.

## **1.4. Jurors’ perceptions of PWID**

Given the ‘developmental model’, it should hold that PWID involved in court proceedings (as witnesses and/or defendants) have more deficits than their CA match, but be as capable as a TD person of the same MA. However, do jurors consider this? Jurors seldom have access to the literature regarding PWID, and as such, can inadvertently bring biases and misconceptions with them to court (Brookbanks, 1999; Patton & Keyes, 2006). Historically, for instance, AWID have erroneously been considered “eternal children" (Emerson et al., 1999; Brookbanks, 1999), which can manifest in the courtroom (Keyes et al., 1998). AWID have been shown to be seen by jurors as less credible than TD counterparts (Stevenson, 2019), though research in this area is extremely scarce. More research has been done on children, however, and jurors often perceive CWID as equally credible and competent witnesses than older CA peers who have the same MA (Peled et al., 2004; Brown & Lewis, 2013). This finding is reliant, however, on there being disclosure of, and information about, ID’s (e.g., Henry et al., 2011b; Brown & Lewis, 2013; Crane et al., 2020). Further, PWID are seen to be trustworthy (Brown & Lewis, 2013) and honest (Stobbs & Kebbell, 2003).

## **The Present Study**

We explored hypotheses relating to measures (memory, suggestibility, and ability to testify in court) of credibility of child (pre-school [ages 3-5] and middle [ages 6-11] childhood) and adult witnesses among jurors, and the impact an ID have on these perceptions. We expect:

1. the trajectory of the ‘developmental model’ will replicate, and children will be evaluated more negatively than adults in our measures. Based on this model, the hierarchy of development should be in the order of: TD pre-schoolers, CWID, TD middle childhood, AWID, and TD adult.

2a) CWID will be evaluated more negatively in our measures than the TD middle childhood group.

2b) AWID will be evaluated more negatively in our measures than TD adults, but in accordance with the ‘developmental model’, be evaluated more positively than all child groups.

# **Method**

The survey was granted ethical approval by the School of Psychology Human Ethics Committee, under delegated approval from the Victoria University of Wellington Human Ethics Committee, application #0000027058.

## **2.1. Participants**

N=1915 participants began the survey, and N=1237 were excluded from the survey, with N=678 participants included in the study (35%). Participants needed to be eligible for jury service in New Zealand, and ineligible members (for full criteria, see Appendix B) were excluded. Checks (e.g., responding “don’t know” to >60% of the items) in the survey also excluded participants. Most participants (51.5%) identified as male, 47.9% identified as female, and 0.6% identified as non-binary. Participant ages were categorised in six groups (min=18-24; max=65+) with middle adulthood (35-44) being the modal response (20.5%). 95.87% of participants said they had been formally educated, and tertiary education was the modal response (56.78%). Over half of participants (60.2%) said they had children (see Appendix D for full demographics).

## **2.2. Materials**

Instructions, materials, and consents (see Appendix A) as well as debriefs were presented via Qualtrics. The questionnaire included several sub-sections, and all bar one (cf. demographic information; 5 items) were presented with a 6-point Likert scale (1 = strongly disagree, 6 = strongly agree; see Appendix B) making the choices intentionally forced, though a “don’t know” option was available. The subsections relevant to this study included memory (1 item), suggestibility (6 items), ability to testify in court (6 items). These asked about: pre-schoolers (3-5 years), children in middle childhood (6-11 years), adults (18+), CWID, and AWID.

## **2.3. Procedure**

Recruitment was done, and instruction, material, and consents were delivered, via Qualtrics. Participants expressed interested and were emailed a link with the survey’s invitation (see Appendix C). This directed them to a participant information page. After consenting to the research, participants were screened for their New Zealand jury service eligibility. Thereafter, eligible participants began the survey, which took approximately 25 minutes, and consisted of a 59-item questionnaire with Likert scale items, and free text responses (the latter are not used in this study). Upon completion, participants were debriefed on the survey’s purpose, and directed to resources, including information for finding our results.

## **2.4. Descriptive Statistics**

Each evaluative score (1-6) was included in our analyses. The “don’t know” responses are excluded for not being evaluative, and not informative of our hypotheses, and consist of a substantial (12.69%) percentage of responses. Full descriptive statistics are included in Appendix E. The averaged evaluations of CWID were lower in memory (*M*=2.98, *SD*=1.32) and ability to testify (*M=*3.41, *SD*=0.99) and higher in suggestibility (*M*=4.07, *SD*=1.03), a trend reflected in the pre-school (e.g., memory: *M*=2.66, *SD*=1.40; suggestibility: *M=*4.06, *SD*=1.03) groups. Moderate scores were typical of all measures for the middle childhood (e.g., memory: *M*=3.59, *SD*=1.33) and AWID (e.g., suggestibility: *M*=3.71, *SD*=1.02) groups. TD Adults had higher scores on ability to testify, and memory (*M*=5.24, *SD*=1.37), and moderate (*M=*3.08, *SD*=1.13) suggestibility scores.

## **2.5. Reliability**

Averaged-scale scores of the ability to testify and suggestibility items were analysed using Cronbach’s Alpha, Omega, and Coefficient H. Scores are reproduced in Appendix F. Using this reliability triad, rather than only the standard (Cronbach’s alpha), enables us to make less rigid assumptions, and provide higher estimates of reliability (McNeish, 2018). Further, this is efficacious given the assumptions of Cronbach’s alpha (e.g., tau equivalence, unidimensionality, uncorrelated errors, and normal distribution) are seldom met. Overall, our measures maintain good reliability. Except for the ability to testify for TD Adult’s item (α = .38), all items had a Cronbach’s Alpha near .70. All Omega’s were above .75, and all Coefficient H’s were above .80, except TD Adult’s ability to testify (H = .76). The memory measure only has one item, so no reliability score could be calculated.

## **2.6. Statistical Analyses**

Text, letter

Description automatically generatedAnalyses are conducted using R (v.1.4.1106) (R Core Team, 2021). For our main analysis we chose a Linear Mixed-Effects Regression (LMER), as our data is not independent, as each participant provided responses for each measure/category. To allow for this nesting of the data, we included a random intercept for participants. Figure 1 shows a mathematical representation of our model (Singer, 1998). We ran the LMER model with the *lme4* (Bates et al., 2015), and *lmerTest* (Kuznetsova et al., 2017) packages.

We noticed considerable amounts of “don’t know” (score=7) responses in our descriptive statistics. First, we will wrangle the data, with evaluative responses being recoded as ‘0’ and “don’t know” responses recoded as ‘1’. Then, the TD child groups will be coalesced to simplify our analyses. Thereafter, exploratory analyses will be conducted in a LMER. For each of the main and exploratory analyses, should significant effects occur, we will conduct post-hoc analyses of the differences between categories to compare the estimated marginal means (EMM) using the *emmeans* (Lenth, 2021) package. All replicable code is included in Appendix F.

# **3. Results**

## **3.1. Linear Mixed Model**

We fitted a LMER model in which the ratings given by participants were predicted by the evaluative measures/categories (memory, suggestibility, and ability to testify in court), the presence/absence of an ID in different age groups, and their interaction. Overall, the model explained a substantial amount of variance (conditional *R2*=.39). We found significant main effects for the target and groups, and we found several significant interactions (see Appendix G for full results). To ease interpretation of the two-way interaction, we visualize the results in Figure 2. Overall, we found a negative trend of suggestibility across age-groups, and potentially cubic slopes for both memory and ability to testify. We computed the EMM for the interaction term using a Tukey correction to adjust the p values for multiple comparisons (see Appendix H for the full table). Focussing on the theoretically predicted comparisons, we found significant (*p*<.001) increases in memory, ability to testify, and decreases in suggestibility across most measures in the expected hierarchical order. However, we found non-significant (*p*>.98) differences between AWID and TD middle childhood in ability to testify and memory, and three (CWID, TD pre-schoolers, and TD middle childhood) child groups in suggestibility.

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We fitted another LMER model in which the participants’ ratings were predicted by non-evaluative (the “don’t know’s”) answers for the groups (children and adults), the presence/absence of an ID in these groups, and their interaction. Overall, the model explained a substantial amount of the variance (conditional *R2*=.54). We found significant main effects for the target and groups, and significant interactions (see Appendix I for full results). Again, to streamline interpretation, we visualise the results in Figure 3. Overall, we found a positive trend between non-evaluative responses and the presence of an ID. We computed the EMM for the interaction term using a Tukey correction to adjust the p-values for multiple comparisons (see Appendix J for full table). Both the CWID and AWID, and the TD Child and TD Adult pairings yielded non-significant differences, but all other TD vs. ID pairings were significantly different (*p*<.001).

Chart, scatter chart

Description automatically generatedFigure 3.

# **4. Discussion**

## **4.1. Findings**

Overall, evidence was found in support of hypotheses 1,

## **4.1. Strengths**

1. the trajectory of the ‘developmental model’ will replicate, and children will be evaluated more negatively than adults in our measures. Based on this model, the hierarchy of development should be in the order of: TD pre-schoolers, CWID, TD middle childhood, AWID, and TD adult.

2a) CWID will be evaluated more negatively in our measures than the TD middle childhood group.

2b) AWID will be evaluated more negatively in our measures than TD adults, but in accordance with the ‘developmental model’, be evaluated more positively than all child groups.

## **4.1. Limitations**

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### **Appendix A: Participant Information**



***Your Beliefs About Memory, Disclosure, and Child Testimony***

**INFORMATION FOR PARTICIPANTS**

You are invited to participate in this survey by researchers from Victoria University of Wellington, Keele University, and the University of Cambridge. Please read this information before deciding whether or not to take part. If you decide to participate, thank you. If you decide not to participate, thank you for considering this request.

**Who am I?**

My name is Dr Deirdre Brown and I am an academic staff member in the School of Psychology at Victoria University of Wellington. This research is being conducted with the support of research assistants at the School of Psychology – Helen Pierce and Annabelle Wride – and by Dr Samantha Andrews from Keele University, and Professor Michael Lamb from University of Cambridge.

**What is the aim of the project?**

The purpose of this research is to gain a better understanding of jury-eligible New Zealanders’ beliefs about memory, how children come to make disclosures of abuse, and their ability to provide testimony about their experiences. To do this, we would like to know about your own beliefs. If you agree to take part you will complete a survey. This procedure involves filling out an online survey that will take approximately 25-30 minutes.

*Please note.* Child sexual abuse is a sensitive topic. Although all of the questions in this survey ask about beliefs and not personal experiences, some respondents may find the subject matter uncomfortable and/or mildly distressing.

As such, your participation is completely voluntary. You may choose not to participate. You may withdraw your participation at any time. To do this, you can just close your browser or navigate away from the page. The following agencies (see by clicking on link below) provide support for those affected by child maltreatment:

<https://www.kidshealth.org.nz/child-abuse-directory-information-and-support>

Alternatively, contact your GP if you have any concerns.   
This research has been approved by the Victoria University of Wellington Human Ethics Committee (reference #0000027058).

**What will happen to the information you give?**

This research is anonymous. No identifying information, such as your name or email address, will be collected, or provided to the researchers. All data (which are the numbers that you choose on the survey, or the answers you type to questions) are stored in a password protected electronic format. Your answers will remain completely anonymous and unidentifiable. Once you submit the survey, we will be unable to retract your responses because we will not be able to identify which survey was yours. Please do not include any personal identifiable information in your responses.

**What will the project produce?**

The data from this survey may contribute to publications in peer reviewed academic or professional journals, academic or professional conference presentations, student theses, professional development or training workshops, and educational materials prepared for the Courts.

**Researcher Contact Information**

If you have any questions, either now or in the future, please feel free to contact Mrs Helen Pierce, [Helen.Pierce@vuw.ac.nz](mailto:Helen.Pierce@vuw.ac.nz), or Dr Deirdre Brown, [Deirdre.Brown@vuw.ac.nz](mailto:Deirdre.Brown@vuw.ac.nz). If you would like to view a summary of the findings from the research, you can visit [www.applieddevelopmentallab.com](http://www.applieddevelopmentallab.com), from November 2019.

**Human Ethics Committee information**

This research has been reviewed by the School of Psychology Human Ethics Committee, under delegated authority to the Human Ethics Committee of Victoria University of Wellington. If you would like to discuss the study with someone who is not one of the research team, you may contact the convenor of the Human Ethics Committee at Victoria University of Wellington, Dr Judith Loveridge. Email [hec@vuw.ac.nz](mailto:hec@vuw.ac.nz) or telephone +64-4-463 6028

**ELECTRONIC CONSENT: Please select your choices below.**

* *I confirm that I have read and understand the Respondent Consent Page. (yes/no)*
* *I confirm that I am at least 18 years of age. (yes/no)*
* *I understand that this survey requires me to answer questions on a sensitive topic. (yes/no)*
* *I agree that data gathered in this study will be stored anonymously and securely, and may be used for future research. (yes/no)*
* *I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason. (yes/no)*
* *I agree to take part in this study. (yes/no)*

### **Appendix B: Survey Items**

*Note.* Included are the survey items relevant to this study, taken from a draft version of the survey which was created online using Qualtrics and so was formatted slightly differently to participants, and indeed, included more additional items (the full survey is available on request)



***Your Beliefs About Memory, Disclosure, and Child Testimony***

**Screening Questions RE jury eligibility.**

1. Are you currently serving as any of the following: A member of parliament; a judge, community magistrate or visiting justice; a member of the Parole Board; a barrister or solicitor with a current practicing certificate; a Justice of the Peace who hears cases in the District Court; the Governor-General? (Yes/No)
2. Are you a current employee of any of the following organisations: Department of Corrections; New Zealand Police; Ministry of Justice?
3. Have you been sentenced to imprisonment for life or for a term of 3 years or more, or to preventative detention; OR, in the last 5 years, have you been sentenced to imprisonment for a term of 3 months of more?
4. Have you ever been diagnosed with an intellectual disability?

**Section 1.**

**Demographic information.**

1. Age (18 – 24) (25 – 34) (35 – 44) (45 – 54) (55 – 64) (65+)
2. Gender (Male, Female, Non-Binary)
3. Ethnicity (Pākehā/NZ European, Māori, Pacific Peoples [please specify], Asian [please specify], Other Ethnicity [please specify])
4. Education (None, Secondary School Qualification, Tertiary Qualification [please specify your highest level of tertiary qualification])
5. Do you have children? (Yes, No – if yes, what is the age of your oldest child)

6 point Likert scale – 1 = strongly disagree, 2 = moderately disagree, 3 = slightly disagree, 4 = slightly agree, 5 = moderately agree, 6 = strongly agree.

Don’t know response also available.

**Section 4.**

**Memory.**

People in these groups can distinguish fantasy from reality.

1. Preschoolers (3 - 5 years)
2. Children in middle childhood (6 – 11 years)
3. Adults (18+)
4. Children with Intellectual Disability (ID)
5. Adults with Intellectual Disability (ID)

**Section 5.**

**Suggestibility.**

Suggestibility refers to the quality of being inclined to accept and act on the suggestions of others.

People in these groups are very suggestible.

1. Preschoolers (3 - 5 years)
2. Children in middle childhood (6 – 11 years)
3. Adults (18+)
4. Children with Intellectual Disability (ID)
5. Adults with Intellectual Disability (ID)

Questioning people in these groups in a warm and supportive manner is likely to increase inaccuracies in their descriptions of events.

1. Preschoolers (3 - 5 years)
2. Children in middle childhood (6 – 11 years)
3. Adults (18+)
4. Children with Intellectual Disability (ID)
5. Adults with Intellectual Disability (ID)

People in these groups are sometimes led by an adult into reporting that they have been sexually abused when they have not.

1. Preschoolers (3 - 5 years)
2. Children in middle childhood (6 – 11 years)
3. Adults (18+)
4. Children with Intellectual Disability (ID)
5. Adults with Intellectual Disability (ID)

By using repeated interviews, police can implant false memories and can cause people in these groups to make false accusations.

1. Preschoolers (3 - 5 years)
2. Children in middle childhood (6 – 11 years)
3. Adults (18+)
4. Children with Intellectual Disability (ID)
5. Adults with Intellectual Disability (ID)

Therapists can implant false memories and cause false accusations among people in these groups.

1. Preschoolers (3 - 5 years)
2. Children in middle childhood (6 – 11 years)
3. Adults (18+)
4. Children with Intellectual Disability (ID)
5. Adults with Intellectual Disability (ID)

**Section 6.**

**Ability to testify in court.**

People in these groups can distinguish between the truth and a lie.

1. Preschoolers (3 - 5 years)
2. Children in middle childhood (6 – 11 years)
3. Adults (18+)
4. Children with Intellectual Disability (ID)
5. Adults with Intellectual Disability (ID)

People in these groups can give detailed accounts of their own experiences.

1. Preschoolers (3 - 5 years)
2. Children in middle childhood (6 – 11 years)
3. Adults (18+)
4. Children with Intellectual Disability (ID)
5. Adults with Intellectual Disability (ID)

When people in these groups talk about their experiences, they will give accurate information.

1. Preschoolers (3 - 5 years)
2. Children in middle childhood (6 – 11 years)
3. Adults (18+)
4. Children with Intellectual Disability (ID)
5. Adults with Intellectual Disability (ID)

People in these groups are able to describe their experiences in a way that means someone else can understand what happened.

1. Preschoolers (3 - 5 years)
2. Children in middle childhood (6 – 11 years)
3. Adults (18+)
4. Children with Intellectual Disability (ID)
5. Adults with Intellectual Disability (ID)

People in these groups need to be asked lots of questions for others to find out what happened to them.

1. Preschoolers (3 - 5 years)
2. Children in middle childhood (6 – 11 years)
3. Adults (18+)
4. Children with Intellectual Disability (ID)
5. Adults with Intellectual Disability (ID)

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Debriefing Page**

Thank you for taking the time to participate in this survey: Your beliefs about memory, disclosure and children’s testimony.

The purpose of this research is to gain a better understanding of the general population’s beliefs about how memory works, how children respond to and talk about maltreatment, and how able they are to provide testimony about their experiences. Your responses will be incredibly helpful and informative, in identifying what the general population know about these issues, and any misconceptions that may need to be addressed when cases of child abuse are tried in court.

If you have been affected by the nature of the questions asked in this survey in any way, help and support can be found at <https://www.kidshealth.org.nz/child-abuse-directory-information-and-support>

If you would like to stay updated with the project and the research findings, you can visit Dr Deirdre Brown’s research web page [www.applieddevelopmentallab.com](http://www.applieddevelopmentallab.com) after November 2019 to see a summary of the results.

**Researcher Contact Information**

If you have any questions or concerns about the survey, please contact Helen Pierce, [Helen.Pierce@vuw.ac.nz](mailto:Helen.Pierce@vuw.ac.nz), or Dr Deirdre Brown, [Deirdre.Brown@vuw.ac.nz](mailto:Deirdre.Brown@vuw.ac.nz) .

### **Appendix C: Email to Potential Participants**

|  |
| --- |
|  |
| |  | | --- | |  | | **#**  **Minutes** | |  | | **$.00** | |  | | **$#** Daily Sweeps    **$#** Weekly Sweeps    **$#** Monthly Sweeps | | | |   A picture containing text, clipart  Description automatically generatedName,  You have a new survey:  Consumer Opinion Survey      You are invited to participate in a Consumer Opinion Survey! If you experience problems with this survey, please reference project #1075 when contacting us. |
| Any questions? [Contact Us](http://www.clearvoicesurveys.com/Contact.aspx?projectid=102275) and please reference project number 102275.  Thank you from the Survey team. |

If you prefer to no longer hear from Surveys, please [unsubscribe.](http://hosted.clearvoicesurveysmail.com/OptOut.aspx?91fa9db4e4ad4c6e971c74e41ea2d4c9)

### Table Description automatically generated**Appendix D: Demographic Table**

### Table Description automatically generated**Appendix E: Descriptive Table**

### Table Description automatically generated with low confidence**Appendix E: Reliability Table**

### **Appendix F: Full Replicable Code from R Studio**

df <- read\_sav("Your Beliefs About Memory, Disclosure, and Child Testimony\_April 8, 2019\_12.05.sav")

## Select the variables relevant to my study  
  
df1 <- df %>%  
 dplyr::select("Q35\_1", "Q35\_2", "Q35\_5", "Q35\_9", "Q35\_12", "Q48\_1", "Q48\_2", "Q48\_5", "Q48\_9", "Q48\_12", "Q49\_1", "Q49\_2", "Q49\_5", "Q49\_9", "Q49\_12", "Q50\_1", "Q50\_2", "Q50\_5", "Q50\_9", "Q50\_12", "Q51\_1", "Q51\_2", "Q51\_5", "Q51\_9", "Q51\_12", "Q52\_1", "Q52\_2", "Q52\_5", "Q52\_9", "Q52\_12", "Q59\_1", "Q59\_2", "Q59\_5", "Q59\_9", "Q59\_12", "Q60\_1", "Q60\_2", "Q60\_5", "Q60\_9", "Q60\_12", "Q61\_1", "Q61\_2", "Q61\_5", "Q61\_9", "Q61\_12", "Q62\_1", "Q62\_2", "Q62\_5", "Q62\_9", "Q62\_12", "Q63\_1", "Q63\_2", "Q63\_5", "Q63\_9", "Q63\_12")  
  
## Rename the variables so they can be worked with  
  
df1 <- rename(df1, MemChild.TD.3to5 = Q35\_1, MemChild.TD.6to11 = Q35\_2, MemChild.ID = Q35\_5, MemAdult.TD = Q35\_9, MemAdult.ID = Q35\_12, SugChild1.TD.3to5 = Q48\_1, SugChild1.TD.6to11 = Q48\_2, SugChild1.ID = Q48\_5, SugAdult1.TD = Q48\_9, SugAdult1.ID = Q48\_12, SugChild2.TD.3to5 = Q49\_1, SugChild2.TD.6to11 = Q49\_2, SugChild2.ID = Q49\_5, SugAdult2.TD = Q49\_9, SugAdult2.ID = Q49\_12, SugChild3.TD.3to5 = Q50\_1, SugChild3.TD.6to11 = Q50\_2, SugChild3.ID = Q50\_5, SugAdult3.TD = Q50\_9, SugAdult3.ID = Q50\_12, SugChild4.TD.3to5 = Q51\_1, SugChild4.TD.6to11 = Q51\_2, SugChild4.ID = Q51\_5, SugAdult4.TD = Q51\_9, SugAdult4.ID = Q51\_12, SugChild5.TD.3to5 = Q52\_1, SugChild5.TD.6to11 = Q52\_2, SugChild5.ID = Q52\_5, SugAdult5.TD = Q52\_9, SugAdult5.ID = Q52\_12, TestChild1.TD.3to5 = Q59\_1, TestChild1.TD.6to11 = Q59\_2, TestChild1.ID = Q59\_5, TestAdult1.TD = Q59\_9, TestAdult1.ID = Q59\_12, TestChild2.TD.3to5 = Q60\_1, TestChild2.TD.6to11 = Q60\_2, TestChild2.ID = Q60\_5, TestAdult2.TD = Q60\_9, TestAdult2.ID = Q60\_12, TestChild3.TD.3to5 = Q61\_1, TestChild3.TD.6to11 = Q61\_2, TestChild3.ID = Q61\_5, TestAdult3.TD = Q61\_9, TestAdult3.ID = Q61\_12, TestChild4.TD.3to5 = Q62\_1, TestChild4.TD.6to11 = Q62\_2, TestChild4.ID = Q62\_5, TestAdult4.TD = Q62\_9, TestAdult4.ID = Q62\_12, TestChild5.TD.3to5 = Q63\_1, TestChild5.TD.6to11 = Q63\_2, TestChild5.ID = Q63\_5, TestAdult5.TD = Q63\_9, TestAdult5.ID = Q63\_12)  
  
## Amalgamate the 3 measures so they are further simplified  
  
id\_test\_child <- paste0("TestChild",1:5,".ID")  
id\_mem\_child <- paste0("MemChild.ID")  
id\_sug\_child <- paste0("SugChild",1:5,".ID")  
  
td\_test\_3\_5 <- paste0("TestChild",1:5,".TD.3to5")  
td\_mem\_3\_5 <- paste0("MemChild.TD.3to5")  
td\_sug\_3\_5 <- paste0("SugChild",1:5,".TD.3to5")  
  
td\_test\_6\_11 <- paste0("TestChild",1:5,".TD.6to11")  
td\_mem\_6\_11 <- paste0("MemChild.TD.6to11")  
td\_sug\_6\_11 <- paste0("SugChild",1:5,".TD.6to11")  
  
id\_test\_adult <- paste0("TestAdult",1:5,".ID")  
id\_mem\_adult <- paste0("MemAdult.ID")  
id\_sug\_adult <- paste0("SugAdult",1:5,".ID")  
  
td\_test\_adult <- paste0("TestAdult",1:5,".TD")  
td\_mem\_adult <- paste0("MemAdult.TD")  
td\_sug\_adult <- paste0("SugAdult",1:5,".TD")  
  
## Coalesce these measures into one simple value to make additional analyses easier to code  
  
short <-   
c(id\_test\_child, id\_mem\_child, id\_sug\_child, td\_test\_3\_5, td\_mem\_3\_5, td\_sug\_3\_5, td\_test\_6\_11, td\_mem\_6\_11, td\_sug\_6\_11, id\_test\_adult, id\_mem\_adult, id\_sug\_adult, td\_test\_adult, td\_mem\_adult, td\_sug\_adult)

## Select the demographic variables and rename them  
  
df2 <- df %>%  
 dplyr::select("Q6", "Q7", "Q9", "Q10")  
  
df2 <- rename(df2, Age = Q6, Gender = Q7, Education\_Level = Q9, Parent = Q10) %>%  
 mutate(Age = factor(Age,   
 levels = c(1,2,3,4,5,6),  
 labels = c("(18 – 24)", "(25 – 34)",  
 "(35 – 44)", "(45 – 54)", "(55 – 64)",  
 "(65+)")),  
 Gender = factor(Gender,   
 levels = c(1, 2, 3),  
 labels = c("Male", "Female", "Non-Binary")),  
 Education\_Level = factor(Education\_Level,  
 levels = c(1, 2, 3),  
 labels = c("None", "Secondary", "Tertiary")),  
 Parent = factor(Parent,  
 levels = c(1, 2),  
 labels = c("Yes", "No")))  
  
tabnz <- df2 %>%  
 select(Age, Gender, Education\_Level, Parent)  
  
df2\_described <-   
prettyR::describe(df2)

## Take out the DK responses

df1[,paste0(short, "\_bin")] <- lapply(df1[,short], function(x){  
 car::recode(x, "1 = 0; 2 = 0; 3 = 0; 4 = 0; 5 = 0; 6 = 0; 7 = 1")})

df1[,short] <- lapply(df1[,short], function(x){  
 car::recode(x, "1 = 1; 2 = 2; 3 = 3; 4 = 4; 5 = 5; 6 = 6; else = NA")})  
  
perc\_dn <-   
(sum(rowSums(df1[,paste0(short, "\_bin")])) / (nrow(df1[,paste0(short, "\_bin")]) \* ncol(df1[,paste0(short, "\_bin")]))) \* 100

## Descriptive Statistics  
  
df1$id\_test\_child <- rowMeans(df1[id\_test\_child], na.rm = T)  
df1$id\_mem\_child <- rowMeans(df1[id\_mem\_child], na.rm = T)  
df1$id\_sug\_child <- rowMeans(df1[id\_sug\_child], na.rm = T)  
  
df1$td\_test\_3\_5 <- rowMeans(df1[td\_test\_3\_5], na.rm = T)  
df1$td\_mem\_3\_5 <- rowMeans(df1[td\_mem\_3\_5], na.rm = T)  
df1$td\_sug\_3\_5 <- rowMeans(df1[td\_sug\_3\_5], na.rm = T)  
  
df1$td\_test\_6\_11 <- rowMeans(df1[td\_test\_6\_11], na.rm = T)  
df1$td\_mem\_6\_11 <- rowMeans(df1[td\_mem\_6\_11], na.rm = T)  
df1$td\_sug\_6\_11 <- rowMeans(df1[td\_sug\_6\_11], na.rm = T)  
  
df1$id\_test\_adult <- rowMeans(df1[id\_test\_adult], na.rm = T)  
df1$id\_mem\_adult <- rowMeans(df1[id\_mem\_adult], na.rm = T)  
df1$id\_sug\_adult <- rowMeans(df1[id\_sug\_adult], na.rm = T)  
  
df1$td\_test\_adult <- rowMeans(df1[td\_test\_adult], na.rm = T)  
df1$td\_mem\_adult <- rowMeans(df1[td\_mem\_adult], na.rm = T)  
df1$td\_sug\_adult <- rowMeans(df1[td\_sug\_adult], na.rm = T)  
  
domain\_list <- list("id\_mem\_child",  
 "id\_test\_child",   
 "id\_sug\_child",  
 "td\_mem\_3\_5",  
 "td\_test\_3\_5",  
 "td\_sug\_3\_5",  
 "td\_mem\_6\_11",  
 "td\_test\_6\_11",  
 "td\_sug\_6\_11",  
 "id\_mem\_adult",  
 "id\_test\_adult",  
 "id\_sug\_adult",  
 "td\_mem\_adult",  
 "td\_test\_adult",  
 "td\_sug\_adult")  
  
measure\_names <- c("Memory - CWID",  
 "Ability to Testify - CWID",  
 "Suggestibility - CWID",  
 "Memory - TD 3-5 year olds",  
 "Ability to Testify in Court - TD 3-5 year olds",  
 "Suggestibility - TD 3-5 year olds",  
 "Memory - TD 6-11 year olds",  
 "Ability to Testify in Court - TD 6-11 year olds",  
 "Suggestibility - TD 6-11 year olds",  
 "Memory - AWID",  
 "Ability to Testify - AWID",  
 "Suggestibility - AWID",  
 "Memory - TD Adult",  
 "Ability to Testify - TD Adult",  
 "Suggestibility - TD Adult"  
 )  
  
domain\_out <-   
lapply(domain\_list, function(x){  
 data.frame(Mean = round(mean(df1[[x]], na.rm = T), 2),  
 SD = round(sd(df1[[x]], na.rm = T), 2)  
 )  
 }) %>%  
 do.call(rbind, .) %>%  
 cbind(measure\_names, .)  
  
apa\_table(domain\_out, caption = "Means and standard deviations of measures in the study")

measure\_list <- list(id\_test\_child,   
 id\_sug\_child,  
 td\_test\_3\_5,  
 td\_sug\_3\_5,  
 td\_test\_6\_11,  
 td\_sug\_6\_11,  
 id\_test\_adult,  
 id\_sug\_adult,  
 td\_test\_adult,  
 td\_sug\_adult)  
  
measure\_names <- c("Ability to Testify - CWID",  
 "Suggestibility - CWID",  
 "Ability to Testify in Court - TD 3-5 year olds",  
 "Suggestibility - TD 3-5 year olds",  
 "Ability to Testify in Court - TD 6-11 year olds",  
 "Suggestibility - TD 6-11 year olds",  
 "Ability to Testify - AWID",  
 "Suggestibility - AWID",  
 "Ability to Testify - TD Adult",  
 "Suggestibility - TD Adult"  
 )  
  
rel\_list <-   
lapply(measure\_list, function(x){  
 scale\_out <- ufs::scaleStructure(df1[c(x)])  
 data.frame(alpha = scale\_out$output$cronbach.alpha,  
 omega = scale\_out$output$omega.psych,  
 H = scale\_out$output$coefficientH)  
 }) %>%  
 do.call(rbind, .) %>%  
 cbind(measure\_names, .)

apa\_table(rel\_list)

## LEMR (Linear Effects Mixed Regression)

df1$id <- paste0("id\_", 1:nrow(df1))  
  
df1\_long <- df1[c("id\_test\_child", "id\_mem\_child", "id\_sug\_child", "td\_test\_3\_5", "td\_mem\_3\_5", "td\_sug\_3\_5", "td\_test\_6\_11", "td\_mem\_6\_11", "td\_sug\_6\_11", "id\_test\_adult", "id\_mem\_adult", "id\_sug\_adult", "td\_test\_adult", "td\_mem\_adult", "td\_sug\_adult", "id")] %>%  
 pivot\_longer(., -id) %>%  
 separate(., "name", into = c("type", "cat", "age", "age2")) %>%  
 mutate(., target = paste0(type, age)) %>%  
 mutate(., target = factor(target, levels = c("td3", "idchild", "td6", "idadult", "tdadult")))

lmer\_out <- lmer("value ~ target \* cat + (1|id)", data = df1\_long)  
  
sjPlot::plot\_model(lmer\_out, type = "int") +  
 labs(title = "Jurors' Beliefs of Witnesses With and Without ID's",  
 x = "Measures",  
 y = "Averaged Scores") +  
 labs(color = "Measures") +  
 scale\_color\_manual(values = c("#989E21", "#F0AD32", "#7AF0F0"), labels = c("Memory", "Suggestability", "Ability to Testify")) +  
 scale\_x\_continuous(labels=c("td3" = "TD EC",  
 "idchild" = "CWID",  
 "td6" = "TD MC",  
 "idadult" = "AWID",  
 "tdadult" = "TD Adult"))

rep1 <- report::report(lmer\_out)  
  
# Get estimated marginal means from the emmeans package  
  
emdf <- emmeans::emmeans(lmer\_out, specs = pairwise ~ target:cat)

emdf1 <- emdf$contrasts %>%  
 data.frame() %>%  
 dplyr::select(., contrast, estimate, p.value) %>%  
 mutate(p.value = round(p.value, 3))  
  
report::report(emdf1)

## Analyse the DK responses  
  
df1$dn\_id <- rowMeans(df1[paste0(c(id\_test\_child, id\_mem\_child, id\_sug\_child), "\_bin")])  
df1$dn\_td <- rowMeans(df1[paste0(c(td\_test\_3\_5, td\_mem\_3\_5, td\_sug\_3\_5, td\_test\_6\_11, td\_mem\_6\_11, td\_sug\_6\_11), "\_bin")])  
df1$dn\_id\_ad <- rowMeans(df1[paste0(c(id\_test\_adult, id\_mem\_adult, id\_sug\_adult), "\_bin")])  
df1$dn\_td\_ad <- rowMeans(df1[paste0(c(td\_test\_adult, td\_mem\_adult, td\_sug\_adult), "\_bin")])  
  
dn\_long <-   
 df1 %>%  
 select(., dn\_id, dn\_td, dn\_id\_ad, dn\_td\_ad, id) %>%  
 pivot\_longer(., -id)  
  
lmer\_out <- lmer(value ~ name + (1|id), dn\_long)  
  
lm\_out <- lm(value ~ name , dn\_long)  
  
sjPlot::plot\_model(lmer\_out, type = "pred")$name +  
 labs(title = "Graphical Summary Evaluation and Don't Know Scores for Each Age-Group",  
 x = "Coalesced Child and Adult Scores With and Without ID",  
 y = "Averaged Values") +  
 scale\_x\_continuous(labels=c("dn\_id" = "CWID",  
 "dn\_id\_ad" = "AWID",  
 "dn\_td" = "TD Children",  
 "dn\_td\_ad" = "TD Adults"))+  
 aes(color = "green") +  
 theme(legend.position = "none")

summary(lmer\_out)

summary(lm\_out)

emmeans::emmeans(lmer\_out, pairwise ~ name)

### **Appendix G: Full LMER Results For Main Analysis**

*Results, Comparisons, Main Effects, and Interactions of LMER Model*

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | | |
| *Fixed Effects (Predictors)* | *Estimates* | *CI* | *p* |
| (Intercept) / Baseline of TD Child 3 - 5 Memory | 2.66 | 2.58 – 2.75 | **<0.001** |
| CWID vs. TD Child 3 - 5 | 0.33 | 0.21 – 0.44 | **<0.001** |
| TD Child 6 – 11 vs. TD Child 3 - 5 | 0.93 | 0.82 – 1.04 | **<0.001** |
| AWID vs. TD Child 3 - 5 | 1.01 | 0.90 – 1.13 | **<0.001** |
| TD Adult vs. TD Child 3 - 5 | 2.58 | 2.47 – 2.69 | **<0.001** |
| Suggestibility | 1.40 | 1.29 – 1.50 | **<0.001** |
| Ability to Testify | 0.52 | 0.41 – 0.63 | **<0.001** |
| CWID \* Suggestibility | -0.32 | -.48 – -16 | **<0.001** |
| TD Child 6 – 11 \* Suggestibility | -0.97 | -1.12 – -82 | **<0.001** |
| AWID \* Suggestibility | -1.37 | -1.53 – -1.20 | **<0.001** |
| TD Adult \* Suggestibility | -3.56 | -3.72 – -3.41 | **<0.001** |
| CWID \* Ability to Testify | -.10 | -.26 – .06 | 0.202 |
| TD Child 6 - 11 \* Ability to Testify | -.29 | -.44 – -.14 | **<0.001** |
| AWID \* Ability to Testify | -.36 | -.52 – -.20 | **<0.001** |
| TD Adult \* Ability to Testify | -0.85 | -1.00 – .70 | **<0.001** |
| **Random Effects** | | | |
| σ2 | 1.01 | | |
| τ00 id | 0.20 | | |
| ICC | 0.16 | | |
| N id | 678 | | |
| Observations | 9434 | | |
| Marginal R2 / Conditional R2 | 0.274 / 0.393 | | |

### **Appendix H: EMM Results in Full for Analysis 1**

*Full Results of EMM for main analysis, all Measure Comparisons Included*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Comparisons |  |  | Estimate |  |  |  | *p* value |
| TD Child (Preschool) Memory - CWID Memory |  |  | -.33 |  |  |  | <.001 |
|  |  |  |  |  |  |  |  |
| TD Child (Preschool) Memory - TD Child (Middle Childhood) Memory |  |  | -.93 |  |  |  | <.001 |
|  |  |  |  |  |  |  |  |
| TD Child (Preschool) Memory - AWID Memory |  |  | -1.01 |  |  |  | <.001 |
|  |  |  |  |  |  |  |  |
| TD Child (Preschool) Memory - TD Adult Memory |  |  | -2.58 |  |  |  | <.001 |
|  |  |  |  |  |  |  |  |
| TD Child (Preschool) Memory - TD Child (Preschool) Suggestibility |  |  | -1.40 |  |  |  | <.001 |
| TD Child (Preschool) Memory - CWID Suggestibility |  |  | -1.41 |  |  |  | <.001 |
| TD Child (Preschool) Memory - TD Child (Middle Childhood) Suggestibility |  |  | -1.36 |  |  |  | <.001 |
| TD Child (Preschool) Memory - AWID Suggestibility |  |  | -1.04 |  |  |  | <.001 |
| TD Child (Preschool) Memory - TD Adult Suggestibility |  |  | -.41 |  |  |  | <.001 |
| TD Child (Preschool) Memory - TD Child (Preschool) Ability to Testify |  |  | -.52 |  |  |  | <.001 |
| TD Child (Preschool) Memory - CWID Ability to Testify |  |  | -.74 |  |  |  | <.001 |
| TD Child (Preschool) Memory - TD Child (Middle Childhood) Ability to Testify |  |  | -1.16 |  |  |  | <.001 |
| TD Child (Preschool) Memory - AWID Ability to Testify |  |  | -1.17 |  |  |  | <.001 |
| TD Child (Preschool) Memory - TD Adult Ability to Testify |  |  | -2.25 |  |  |  | <.001 |
| CWID Memory - TD Child (Middle Childhood) Memory |  |  | -.60 |  |  |  | <.001 |
| CWID Memory - AWID Memory |  |  | -.69 |  |  |  | <.001 |
| CWID Memory - TD Adult Memory |  |  | -2.25 |  |  |  | <.001 |
| CWID Memory - TD Child (Preschool) Suggestibility |  |  | -1.07 |  |  |  | <.001 |
| CWID Memory - CWID Suggestibility |  |  | -1.08 |  |  |  | <.001 |
| CWID Memory - TD Child (Middle Childhood) Suggestibility |  |  | -1.03 |  |  |  | <.001 |
| CWID Memory - AWID Suggestibility |  |  | -.72 |  |  |  | <.001 |
| CWID Memory - TD Adult Suggestibility |  |  | -.09 |  |  |  | .98 |
| CWID Memory - TD Child (Preschool) Ability to Testify |  |  | -.19 |  |  |  | .06 |
| CWID Memory - CWID Ability to Testify |  |  | -.42 |  |  |  | <.001 |
| CWID Memory - TD Child (Middle Childhood) Ability to Testify |  |  | -.83 |  |  |  | <.001 |
| CWID Memory - AWID Ability to Testify |  |  | -.85 |  |  |  | <.001 |
| CWID Memory - TD Adult Ability to Testify |  |  | -1.93 |  |  |  | <.001 |
| TD Child (Middle Childhood) Memory - AWID Memory |  |  | -.08 |  |  |  | .99 |
| TD Child (Middle Childhood) Memory - TD Adult Memory |  |  | -1.65 |  |  |  | <.001 |
| TD Child (Middle Childhood) Memory - TD Child (Preschool) Suggestibility |  |  | -.47 |  |  |  | <.001 |
| TD Child (Middle Childhood) Memory - CWID Suggestibility |  |  | -.48 |  |  |  | <.001 |
| TD Child (Middle Childhood) Memory - TD Child (Middle Childhood) Suggestibility |  |  | -.43 |  |  |  | <.001 |
| TD Child (Middle Childhood) Memory - AWID Suggestibility |  |  | -.11 |  |  |  | .79 |
| TD Child (Middle Childhood) Memory - TD Adult Suggestibility |  |  | .52 |  |  |  | <.001 |
| TD Child (Middle Childhood) Memory - TD Child (Preschool) Ability to Testify |  |  | .41 |  |  |  | <.001 |
| TD Child (Middle Childhood) Memory - CWID Ability to Testify |  |  | .19 |  |  |  | .06 |
| TD Child (Middle Childhood) Memory - TD Child (Middle Childhood) Ability to Testify |  |  | -.23 |  |  |  | <.001 |
| TD Child (Middle Childhood) Memory - AWID Ability to Testify |  |  | -.24 |  |  |  | <.001 |
| TD Child (Middle Childhood) Memory - TD Adult Ability to Testify |  |  | -1.32 |  |  |  | <.001 |
| AWID Memory - TD Adult Memory |  |  | -1.57 |  |  |  | <.001 |
| AWID Memory - TD Child (Preschool) Suggestibility |  |  | -.38 |  |  |  | <.001 |
| AWID Memory - CWID Suggestibility |  |  | -.39 |  |  |  | <.001 |
| AWID Memory - TD Child (Middle Childhood) Suggestibility |  |  | -.34 |  |  |  | <.001 |
| AWID Memory - AWID Suggestibility |  |  | -.03 |  |  |  | 1.00 |
| AWID Memory - TD Adult Suggestibility |  |  | .60 |  |  |  | <.001 |
| AWID Memory - TD Child (Preschool) Ability to Testify |  |  | .49 |  |  |  | <.001 |
| AWID Memory - CWID Ability to Testify |  |  | .27 |  |  |  | <.001 |
| AWID Memory - TD Child (Middle Childhood) Ability to Testify |  |  | -.15 |  |  |  | .48 |
| AWID Memory - AWID Ability to Testify |  |  | -.16 |  |  |  | .36 |
| AWID Memory - TD Adult Ability to Testify |  |  | -1.24 |  |  |  | <.001 |
| TD Adult Memory - TD Child (Preschool) Suggestibility |  |  | 1.18 |  |  |  | <.001 |
| TD Adult Memory - CWID Suggestibility |  |  | 1.17 |  |  |  | <.001 |
| TD Adult Memory - TD Child (Middle Childhood) Suggestibility |  |  | 1.22 |  |  |  | <.001 |
| TD Adult Memory - AWID Suggestibility |  |  | 1.54 |  |  |  | <.001 |
| TD Adult Memory - TD Adult Suggestibility |  |  | 2.17 |  |  |  | <.001 |
| TD Adult Memory - TD Child (Preschool) Ability to Testify |  |  | 2.06 |  |  |  | <.001 |
| TD Adult Memory - CWID Ability to Testify |  |  | 1.84 |  |  |  | <.001 |
| TD Adult Memory - TD Child (Middle Childhood) Ability to Testify |  |  | 1.42 |  |  |  | <.001 |
| TD Adult Memory - AWID Ability to Testify |  |  | 1.41 |  |  |  | <.001 |
| TD Adult Memory - TD Adult Ability to Testify |  |  | .33 |  |  |  | <.001 |
| TD Child (Preschool) Suggestibility - CWID Suggestibility |  |  | -.01 |  |  |  | >.99 |
| TD Child (Preschool) Suggestibility - TD Child (Middle Childhood) Suggestibility |  |  | .04 |  |  |  | >.99 |
| TD Child (Preschool) Suggestibility - AWID Suggestibility |  |  | .35 |  |  |  | <.001 |
| TD Child (Preschool) Suggestibility - TD Adult Suggestibility |  |  | .98 |  |  |  | <.001 |
| TD Child (Preschool) Suggestibility - TD Child (Preschool) Ability to Testify |  |  | .88 |  |  |  | <.001 |
| TD Child (Preschool) Suggestibility - CWID Ability to Testify |  |  | .66 |  |  |  | <.001 |
| TD Child (Preschool) Suggestibility - TD Child (Middle Childhood) Ability to Testify |  |  | .24 |  |  |  | <.001 |
| TD Child (Preschool) Suggestibility - AWID Ability to Testify |  |  | .22 |  |  |  | .01 |
| TD Child (Preschool) Suggestibility - TD Adult Ability to Testify |  |  | -.86 |  |  |  | <.001 |
| CWID Suggestibility - TD Child (Middle Childhood) Suggestibility |  |  | .05 |  |  |  | >.99 |
| CWID Suggestibility - AWID Suggestibility |  |  | .36 |  |  |  | <.001 |
| CWID Suggestibility - TD Adult Suggestibility |  |  | .99 |  |  |  | <.001 |
| CWID Suggestibility - TD Child (Preschool) Ability to Testify |  |  | .89 |  |  |  | <.001 |
| CWID Suggestibility - CWID Ability to Testify |  |  | .67 |  |  |  | <.001 |
| CWID Suggestibility - TD Child (Middle Childhood) Ability to Testify |  |  | .25 |  |  |  | <.001 |
| CWID Suggestibility - AWID Ability to Testify |  |  | .23 |  |  |  | .01 |
| CWID Suggestibility - TD Adult Ability to Testify |  |  | -.84 |  |  |  | <.001 |
| TD Child (Middle Childhood) Suggestibility - AWID Suggestibility |  |  | .31 |  |  |  | <.001 |
| TD Child (Middle Childhood) Suggestibility - TD Adult Suggestibility |  |  | .94 |  |  |  | <.001 |
| TD Child (Middle Childhood) Suggestibility - TD Child (Preschool) Ability to Testify |  |  | .84 |  |  |  | <.001 |
| TD Child (Middle Childhood) Suggestibility - CWID Ability to Testify |  |  | .62 |  |  |  | <.001 |
| TD Child (Middle Childhood) Suggestibility - TD Child (Middle Childhood) Ability to Testify |  |  | .20 |  |  |  | .02 |
| TD Child (Middle Childhood) Suggestibility - AWID Ability to Testify |  |  | .18 |  |  |  | .08 |
| TD Child (Middle Childhood) Suggestibility - TD Adult Ability to Testify |  |  | -.89 |  |  |  | <.001 |
| AWID Suggestibility - TD Adult Suggestibility |  |  | .63 |  |  |  | <.001 |
| AWID Suggestibility - TD Child (Preschool) Ability to Testify |  |  | .53 |  |  |  | <.001 |
| AWID Suggestibility - CWID Ability to Testify |  |  | .30 |  |  |  | <.001 |
| AWID Suggestibility - TD Child (Middle Childhood) Ability to Testify |  |  | -.11 |  |  |  | .79 |
| AWID Suggestibility - AWID Ability to Testify |  |  | -.13 |  |  |  | .67 |
| AWID Suggestibility - TD Adult Ability to Testify |  |  | -1.21 |  |  |  | <.001 |
| TD Adult Suggestibility - TD Child (Preschool) Ability to Testify |  |  | -.11 |  |  |  | .83 |
| TD Adult Suggestibility - CWID Ability to Testify |  |  | -.33 |  |  |  | <.001 |
| TD Adult Suggestibility - TD Child (Middle Childhood) Ability to Testify |  |  | -.75 |  |  |  | <.001 |
| TD Adult Suggestibility - AWID Ability to Testify |  |  | -.76 |  |  |  | <.001 |
| TD Adult Suggestibility - TD Adult Ability to Testify |  |  | -1.84 |  |  |  | <.001 |
| TD Child (Preschool) Ability to Testify - CWID Ability to Testify |  |  | -.22 |  |  |  | .01 |
| TD Child (Preschool) Ability to Testify - TD Child (Middle Childhood) Ability to Testify |  |  | -.64 |  |  |  | <.001 |
| TD Child (Preschool) Ability to Testify - AWID Ability to Testify |  |  | -.65 |  |  |  | <.001 |
| TD Child (Preschool) Ability to Testify - TD Adult Ability to Testify |  |  | -1.73 |  |  |  | <.001 |
| CWID Ability to Testify - TD Child (Middle Childhood) Ability to Testify |  |  | -.42 |  |  |  | <.001 |
| CWID Ability to Testify - AWID Ability to Testify |  |  | -.43 |  |  |  | <.001 |
| CWID Ability to Testify - TD Adult Ability to Testify |  |  | -1.51 |  |  |  | <.001 |
| TD Child (Middle Childhood) Ability to Testify - AWID Ability to Testify |  |  | -.01 |  |  |  | >.99 |
| TD Child (Middle Childhood) Ability to Testify - TD Adult Ability to Testify |  |  | -1.09 |  |  |  | <.001 |
| AWID Ability to Testify - TD Adult Ability to Testify |  |  | -1.08 |  |  |  | <.001 |

### **Appendix I: Full LMER Results For Exploratory Analysis**

*Results, Comparisons, and Main Effects of LMER Model*

|  |  |  |  |
| --- | --- | --- | --- |
|  | **value** | | |
| *Predictors* | *Estimates* | *CI* | *p* |
| (Intercept) / Baseline of CWID | 0.22 | 0.20 – 0.24 | **<0.001** |
| AWID | 0.02 | -0.00 – 0.04 | 0.065 |
| TD Children | -0.15 | -0.17 – -0.13 | **<0.001** |
| TD Adults | -0.18 | -0.20 – -0.16 | **<0.001** |
| **Random Effects** | | | |
| σ2 | 0.03 | | |
| τ00 id | 0.03 | | |
| ICC | 0.48 | | |
| N id | 678 | | |
| Observations | 2712 | | |
| Marginal R2 / Conditional R2 | 0.108 / 0.536 | | |

### **Appendix J: EMM Results in Full for Analysis 2**

*Full Results of EMM for exploratory analysis*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Comparison |  |  | Estimate |  |  | *p* value |
| CWID – AWID |  |  | -0.02 |  |  | .25 |
| CWID – TD Child |  |  | 0.15 |  |  | <.001 |
| CWID – TD Adult |  |  | 0.18 |  |  | <.001 |
| TD Adult – TD Child |  |  | 0.17 |  |  | <.001 |
| AWID – TD Adult |  |  | 0.20 |  |  | <.001 |
| TD Child – TD Adult |  |  | 0.03 |  |  | .02 |