Introduction

During adolescence areas of the brain are constantly developing; in the pre frontal cortex structural changes take place. Research has found cognitive ability is more efficient after these changes have taken place (Choudhury, Charman, & Blakemore, 2008) suggesting that because executive function has not fully developed until reaching adulthood, it is important to test adolescents using an assessment which can correlate with their abilities. For this reason JEF-C (‘the Jansari assessment of Executive Functions – for Children’) was developed to assess executive function in children under 18 years, and to provide a more ecologically valid measure than existing tests of executive function, such as the Wechsler Intelligence Scale for Children (Jansari, et al, 2012). Research has found JEF-C to be successful in assessing executive function in children aged up to fifteen years. However, Jansari, et al (2012) found those aged sixteen to eighteen performed worse on this assessment compared to the younger age group, possibly due to the birthday party design of JEF-C being unsuitable for the older age group (Jansari et al, 2012).

JEF (‘the Jansari assessment of Executive Functions’) was originally developed as an ecologically valid measure to assess executive function in adults over eighteen years of age, however this virtual office design may be a more appropriate assessment for the sixteen to eighteen age group (Jansari, et al, 2004).

Methodology

Design:
A within participants design was used to identify the appropriate assessment for group one (16-18 years). A between participant design was also used to identify any developmental difference on JEF between group one and group two (24-36 years).

Participants:
All participants were recruited via opportunity sampling. Ten participants aged between 16 and 18 years were allocated to group one. Participants allocated to group two consisted of nine participants aged between 24 and 36 years.

Materials:
JEF is a virtual reality office environment on the laptop. A participant must navigate through the environment using the cursor and keyboard to complete tasks left for them at the start of the programme. The participants’ aim is to prepare for a meeting, overcoming any problems as and when they arise. The tasks are categorised into eight constructs and are marked by the researcher during the assessment using a standardised score sheet.

JEF-C is a children's version of the virtual reality assessment which takes place at a child's birthday party. Whilst navigating through the environment using the cursor and keyboard, the participants aim is to complete a set of tasks to prepare for a birthday party. Problems also arise which the participant must resolve. Tasks are categorised into eight constructs and marked during the assessment by the researcher using a standardised score sheet.

Method:
Group one carried out the Wechsler Abbreviated Scale of Intelligence (WASI) and the Behaviour Rating Inventory of Executive Function (BRIEF) to ascertain participants’ abilities according to existing tests and ensure there were no anomalies. This group then carried out JEF and JEF-C virtual reality assessments on separate days, one week apart. Group two carried out JEF virtual reality assessment on one occasion.

My Research Internship Story

- My career aspirations are to become a lecturer in Psychology as I enjoy teaching and research, and am passionate about psychology.
- I applied to become a research intern to gain valuable experience of working on important research, to lead to future opportunities and to expand my own research skills further.
- My experience as a research intern was positive. Although initially I faced recruitment issues and a large drop-out rate, I was able to overcome these hurdles by identifying alternative sources of participants. Recruitment of the 16-18 year group came from a local school which meant along with contributing to research findings, I was given the opportunity to teach research methods to Psychology A-level students using my internship research as an example. This improved my career prospects as I gained experience in teaching which led to securing a mentoring job at the school.
- I worked with Dr Ashok Jansari on this research and we spoke via email about what I needed to do for the project. I also met with members of his team to learn different measures required for testing, such as WASI, BRIEF, and BADS-C. This improved my ability to communicate effectively.
- Skills I have developed are Problem-solving; Independence; and Confidence in analysing and reporting statistics.
- I enjoyed this research internship and found the work, although challenging at times, very interesting. It has reinforced my idea of wanting to conduct research projects in the future to find out new information, and so I am now looking forward to starting a PhD in the near future.

To JEF or to JEF-C, That is the Question: Which New Virtual Reality Assessment of Executive Functions is Most Appropriate for Testing 18 Year Olds?

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Aims

- To investigate which virtual reality assessment, JEF or JEF-C, is more appropriate in testing executive function of 16-18 year olds.
- To further compare the performance of 16-18 year olds with those aged 24-36 years on the adult JEF, to identify any developmental difference.

Results

<table>
<thead>
<tr>
<th>Cognitive Construct</th>
<th>JEF</th>
<th>JEF-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy (%: Mean±SE)</td>
<td>90±5</td>
<td>85±6</td>
</tr>
</tbody>
</table>

Table 1: Participant characteristics: mean age (st.dev) and gender frequencies

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Group One</th>
<th>Group Two</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-18</td>
<td>28.82</td>
<td>30.33</td>
</tr>
<tr>
<td>18-24</td>
<td>25.64</td>
<td>27.35</td>
</tr>
<tr>
<td>24-36</td>
<td>29.82</td>
<td>31.33</td>
</tr>
</tbody>
</table>

Figure 1: JEF Vs JEF-C performance (under 18 years) as a function of task (Error bars represent one standard error)

Figure 2: JEF performance (under 18 Vs over 24 years) as a function of task (Error bars represent one standard error)

Table 2 shows a large gender bias with at least four times the number of females to males in both groups.

- The 16-18 year olds who carried out the WASI and BRIEF were within the normal range on both assessments.
- An independent samples t-test was carried out on the data. There was no significant difference between the performance of 16-18 year olds on JEF and JEF-C virtual reality assessments. However, there was a significant difference between three individual constructs (See figure 1).
- Analysis of data found no significant difference between performance of the two age groups, 16-18 and 24-36 years on JEF (See figure 2).

Conclusion

- Results indicate that it may be possible to use either version of the virtual reality assessment, JEF or JEF-C on individuals aged between 16-18 years.
- However scores were higher on six constructs for JEF-C as can be seen in figure 1, with Action-Based and Event-Based Prospective Memory being significantly higher. Thus from this sample it seems more appropriate to use the JEF-C assessment for this age group.
- Scores were also higher on JEF for the adult group (24-36 years) supporting the notion that the adolescent group (16-18 years) are possibly being more suited to JEF-C rather than JEF.

Future Plans

- Increasing the size of the sample in future may show a greater difference between performance on the two assessments and improve our understanding of the apparently subtle differences.
- Matching the adult group (24-36 years) on IQ measures such as WASI, and matching both groups on gender would allow controlling of variables.
- Issues with scoring criteria between the two assessments need further work to improve standardised scoring.

References


Executive Functions