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**Appendix A**

Instructions and Sample Questions for Mental Rotation Task (MRT) (adapted from Vandenberg & Kuse, 1978)



**Appendix B**

Encoding Sheet and Test Sheet for Object Location Memory (OLM) Task



(Stimuli adapted from Boomgarden, Nardi, & Aronson, 2019). Participants will be given one minute to encode the objects on the encoding sheet and then will be presented with a test sheet composed of another array of 30 random open-source images of objects. On the test sheet 16 of the objects will be placed in different locations and participants will be instructed to indicate (in a multi-answer multiple-choice format) all objects that were moved. For scoring, any object that is correctly identified will count for one point while any object incorrectly identified will count as one subtracted point.

**Appendix C**

Spatial Anxiety Scale (SNS) Items (adapted from Lyons et al., 2018)

|  |  |
| --- | --- |
| Subscale  | Sample Item |
| M | Asked to imagine the 3-dimensional structure of a complex molecule using only a 2-dimensional picture for reference |
| M | Asked to determine how a series of pulleys will interact given only a 2-dimensional diagram |
| N | Finding your way to an appointment in an area of a city or town with which you are not familiar |
| N | Finding your way back to your hotel after becoming lost in a new city |
| I | Asked to recall the shade and pattern of a person's tie you met for the first time the previous evening |
| I | Asked to give a detailed description of a person's face whom you've only met once |

Note. This scale provides two items for each subscale from the Spatial Anxiety Scale: Mental Manipulation (M), Navigation (N), and Imagery (I). Instructions: “The items in the questionnaire below refer to situations and experiences that may cause tension, apprehension, or anxiety. For each item, mark the response that describes how much you would be made to feel anxious by it. Work quickly but be sure to think about each item.” Response options: ‘not at all’, ‘a little’, ‘a fair amount’, ‘much’, ‘very much’. Scoring: 0 (not at all) to 4 (very much); sum scores across the 8 items for each subscale.

**Appendix D**

Gender-Related Attributes Survey (GERAS) Items (adapted from Gruber et al., 2020)

|  |  |  |
| --- | --- | --- |
| Subscale  | Sample Item | Coded Value |
| P | Compassionate  | F+ |
| P | Tender  | F+ |
| P | Dominate  | M- |
| P | Brave  | M+ |
| C | To write a computer program  | M |
| C | To find an address for the first time  | M |
| C | To remember names and faces | F |
| C | Remembering events from your own life | F |
| IA | Watching action movies  | M |
| IA | To gossip  | F |
| IA | Rhythmic gymnastics  | F |
| IA | Doing certain sports (soccer, basketball, handball, etc.)  | M |

Note. Table provides four items for each subscale from the Gender-Related Attributes Survey: Personality (P), Cognition (C), and Interests and Activities (IA). Personality subsection instructions: “Please rate the following characteristics on a scale ranging from 1 to 7, according to how often you think these apply to you.” Personality subscale response options: ‘never’ to ‘always’. Scoring: 0 (never) to 6 (always); sum scores across the 20 items for this subscale. Cognition subsection instructions: “On a scale ranging from 1 (being very hard) to 7 (7 being very easy), how hard or easy would you say it would be for you to do the following tasks.” Cognition subscale response options: ‘hard’ to ‘easy’. Scoring: 0 (hard) to 6 (easy); sum scores across the 14 items for this subscale. Interests and Activities subsection instructions: “Please rate on a scale of 1 (not at all) to 7 (very much) how much you like the following activities.” Interests and Activities subscale response options: ‘not at all’ to ‘very much’. Scoring: 0 (not at all) to 6 (very much); sum scores across the 16 items for this subscale.

**Appendix E**

Survey of Spatial Representation and Activities (SSRA) (adapted from Terlecki & Newcombe, 2005)

**Section A**

1. Have you taken math or science related courses within the past year (select one)?

Yes / No

If so, how many of each type? Math: text field Science: text field

1. What kind of computer software do you own or use? (for each, indicate how many you frequently use)?
2. Word processing, Frequency: text field
3. Statistics programs, Frequency: text field
4. Games, Frequency: text field
5. Art/drawing, frequency: text field
6. Other? Text field
7. Do you participate in any extracurricular sports? (indicate all that apply, if none, enter zero)

Professional sports: text field

College-level sports: text field

Intramural sports: text field

Other (please list)? text field

1. Do you own any video game systems? (indicate how many)

**Section B**

1. Do you own a computer? Yes / No
2. How long have you owned/been using a computer?
3. Less than a month
4. 1-6 months
5. 6 months to 1 year
6. 1 to 3 years
7. 3 or more years

For questions 3 through 8, please use the following rating scale:

1. Daily
2. Weekly
3. 1 to 2 times a month
4. 1 to 2 times in 6 months
5. 1 to 2 times a year
6. Once every few years or not much at all
7. How often do you use a computer?
8. How often do you purchase software?
9. How often do you use the internet?
10. How often do you use any game systems (Nintendo, Sega, Xbox, etc.)?
11. How often do you play boardgames?
12. How often do you use maps?

For questions 9 through 11, please use the following rating scale:

1. Very skilled
2. Moderately skilled
3. Not very skilled
4. No skill
5. How proficient or skilled do you believe you are at using maps?
6. How proficient or skilled do you believe you are at using computers?
7. How proficient or skilled do you believe you are at playing video games?

**Appendix F**

Child Activities Questionnaire (CAQ) Items (adapted from Cherney & Voyer, 2010)

|  |  |  |
| --- | --- | --- |
| Sample Item | Coded Value | Spatial or Non-Spatial |
| Play musical instruments | F | Spatial  |
| Puzzles  | F | Spatial  |
| Baby dolls | F | Non-spatial  |
| Barbie dolls and similar  | F | Non-spatial  |
| Coloring  | F | Non-spatial  |
| Crafts | F | Non-spatial  |
| Air hockey  | M | Spatial  |
| Baseball  | M | Spatial  |
| Blocks  | M | Spatial  |
| Ping pong | M | Spatial  |
| Videogames (2D) | M | Non-spatial  |
| Watching television  | M | Non-spatial  |

Note. Table provides six items from the Child Activities Questionnaire and includes masculine (M) and feminie (F) distinctions for each activity along with spatial or non-spatial distinctions.

Instructions: “This questionnaire aims to determine the activities that you enjoyed as a child. Accordingly, you should consider each of the activities listed below and indicate how frequently you practiced each of them as a child.” Response options: ‘not at all’ to ‘frequently’. Scoring: 0 (not at all) to 4 (frequently); responses will be totaled to provide an overall score that indicates the types of activities the participant engaged in most often.