Cross-Domain Assessment of Individual Differences: The Unique Benefits of Public-Domain Measures

David M. Condon & William Revelle

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Cross-Domain Assessment of Individual Differences

Public-domain measures of individual differences can contribute substantially to cross-domain personality research!

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- health outcome items (PROMIS)
- measures of values, maladaptive personality, etc.
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Public-Domain Measures Meet the Needs of Cross-Domain Assessment

The benefits of public-domain status are particularly beneficial to cross-domain assessment due to the needs of this type of research:

1. Need to administer large sets of variables... esp relative to very short measures in personality and other areas
2. Need for large diverse samples... evaluations of structure with many scales/items require larger samples
3. Need for low-cost (non-proprietary) measures... (a) keep costs down and (b) allow for assessment in uncontrolled settings
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1. Administering large sets of variables

**Synthetic Aperture Personality Assessment** ("SAPA")
(Evans and Revelle, 2008, Revelle et al., 2010, Wilt et al., 2011, Condon & Revelle, 2014)

- The SAPA sampling procedure allows for evaluation of many variables in the same sample, as long as the sample is sufficiently large.
  - Each participant given a random subset of the items under study
  - Responses across participants combined to form large correlation matrices (data are “massively” MCAR)
2. Capturing large, diverse samples

≈150 unique participants per day; 160 items per participant

Participants by Country

![Participants by Country map]

Top Countries by Participants

<table>
<thead>
<tr>
<th>Country</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>44,324</td>
</tr>
<tr>
<td>Canada</td>
<td>2,847</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1,906</td>
</tr>
<tr>
<td>Australia</td>
<td>1,463</td>
</tr>
<tr>
<td>Germany</td>
<td>848</td>
</tr>
<tr>
<td>India</td>
<td>745</td>
</tr>
<tr>
<td>Sweden</td>
<td>430</td>
</tr>
<tr>
<td>Philippines</td>
<td>421</td>
</tr>
<tr>
<td>Norway</td>
<td>390</td>
</tr>
<tr>
<td>Mexico</td>
<td>348</td>
</tr>
</tbody>
</table>

$r = 0.78$ betw Ps and census using 3 digit ZIP prefix

Participants by US ZIP Code

![Participants by US ZIP Code map]

Age & Gender

Age mean = 26; median = 22
64% female
3. Making use of non-proprietary measures

- **Affective Domain: 696 unique IPIP items**
  - IPIP Big Five Factor Markers (100 items; Goldberg, 1999)
  - IPIP-NEO (300 items; Goldberg, 1999)
  - Big Five Aspect Scales (100 items; DeYoung et al., 2007)
  - Six factor HEXACO scales (240 items; Ashton et al., 2007)
  - Questionnaire Big Six scales (48 items; Thalmayer et al., 2010)
  - IPIP-Multidimensional Personality Questionnaire (127 items; Goldberg, 1999)
  - EPQ-R (79 items - lie scale omitted; Eysenck et al., 1985)
  - Plasticity/Stability scales (40 items; DeYoung, 2010)

- **Cognitive Domain: 60 items**
  - International Cognitive Ability Resource (60 items; Condon & Revelle, 2014)

- **Conative Domain: 351 items**
  - Six factor O*NET Interest Profiler scales (60 items; Rounds et al. 2010)
  - Eight factor Oregon Vocational Interest scales (92 items; Pozzebon et al., 2010)
  - 33 avocational interest scales (199 items; Goldberg, 2010)

- **300+ “criterion” variables**
Evaluate issues of structure across domains
Evaluate issues of differential predictive utility

Creative Achievement Inventory

<table>
<thead>
<tr>
<th>Inventions &amp; Innovations</th>
<th>Scientific Discovery</th>
<th>Visual Arts (painting, sculpture, photography)</th>
<th>Humor</th>
</tr>
</thead>
<tbody>
<tr>
<td>I don't have much talent in this area.</td>
<td>I don't have much talent in this area.</td>
<td>I don't have much talent in this area.</td>
<td>I don't have much talent in this area.</td>
</tr>
<tr>
<td>I regularly find novel uses for household objects.</td>
<td>I often think about ways that scientific problems could be solved.</td>
<td>People have commented on my talent in this area.</td>
<td>People have often commented on my original sense of humor.</td>
</tr>
<tr>
<td>I have sketched out an invention and worked on its design flaws.</td>
<td>I have won a prize at a science fair or other local competition.</td>
<td>I have won a prize or prizes at a juried art show.</td>
<td>I have created jokes that are now regularly repeated by others.</td>
</tr>
<tr>
<td>I have created original software for a computer.</td>
<td>I have received a scholarship based on my work in science or medicine.</td>
<td>I have had a showing of my work(s) in a gallery.</td>
<td>I have written jokes for other people.</td>
</tr>
<tr>
<td>I have built a prototype of one of my designed inventions.</td>
<td>I have been author or coauthor of a study published in a scientific journal.</td>
<td>I have sold a piece of my work.</td>
<td></td>
</tr>
<tr>
<td>I have received orders for one of my inventions.</td>
<td>I have received a grant to pursue my work in science or medicine.</td>
<td>My work has been critiqued in local publications.</td>
<td></td>
</tr>
<tr>
<td>I have sought an investment for one of my inventions.</td>
<td>I have won an award for my achievements in science or medicine.</td>
<td>My work has been critiqued in national publications.</td>
<td></td>
</tr>
<tr>
<td>I have received a patent for one of my inventions.</td>
<td>My work has been cited by other scientists in books or articles.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have sold the rights to one or more of my inventions.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I own or operate a business based on one of my inventions (or have in the past).</td>
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</tbody>
</table>
### Creative Achievement Inventory: Scientific Discovery

I don’t have much talent in this area.

I often think about ways that scientific problems could be solved.

**I have won a prize at a science fair or other local competition.**

<table>
<thead>
<tr>
<th>1 time</th>
<th>2 times</th>
<th>3-5 times</th>
<th>6-9 times</th>
<th>10-19 times</th>
<th>20+ times</th>
</tr>
</thead>
</table>

**I have received a scholarship based on my work in science or medicine.**

<table>
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<tr>
<th>1 time</th>
<th>2 times</th>
<th>3-5 times</th>
<th>6-9 times</th>
<th>10-19 times</th>
<th>20+ times</th>
</tr>
</thead>
</table>

**I have been author or co-author of a study published in a scientific journal.**

<table>
<thead>
<tr>
<th>1 time</th>
<th>2 times</th>
<th>3-5 times</th>
<th>6-9 times</th>
<th>10-19 times</th>
<th>20+ times</th>
</tr>
</thead>
</table>

**I have received a grant to pursue my work in science or medicine.**

<table>
<thead>
<tr>
<th>1 time</th>
<th>2 times</th>
<th>3-5 times</th>
<th>6-9 times</th>
<th>10-19 times</th>
<th>20+ times</th>
</tr>
</thead>
</table>

**I have won an award for my achievements in science or medicine.**

<table>
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<tr>
<th>1 time</th>
<th>2 times</th>
<th>3-5 times</th>
<th>6-9 times</th>
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</table>

**My work has been cited by other scientists in books or articles.**

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## Predicting Creative Achievement by Domain

<table>
<thead>
<tr>
<th></th>
<th>Innovations</th>
<th>Music</th>
<th>TTVF</th>
<th>Science</th>
<th>Writing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Big Six</strong></td>
<td>0.075</td>
<td>0.036</td>
<td>0.067</td>
<td>0.038</td>
<td>0.085</td>
</tr>
<tr>
<td><strong>ICAR</strong></td>
<td><strong>0.038</strong></td>
<td>0.008</td>
<td>0.002</td>
<td><strong>0.031</strong></td>
<td>0.001</td>
</tr>
<tr>
<td><strong>Interests</strong></td>
<td>0.119</td>
<td>0.075</td>
<td>0.097</td>
<td>0.092</td>
<td>0.130</td>
</tr>
<tr>
<td><strong>Combined</strong></td>
<td>0.153</td>
<td>0.088</td>
<td>0.128</td>
<td>0.117</td>
<td>0.165</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Dance</th>
<th>Culinary</th>
<th>VizArts</th>
<th>Humor</th>
<th>Architecture</th>
</tr>
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<tbody>
<tr>
<td><strong>Big Six</strong></td>
<td>0.020</td>
<td>0.015</td>
<td>0.017</td>
<td>0.065</td>
<td>0.013</td>
</tr>
<tr>
<td><strong>ICAR</strong></td>
<td>0.000</td>
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<td>0.000</td>
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<tr>
<td><strong>Interests</strong></td>
<td>0.017</td>
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<td>0.093</td>
<td>0.044</td>
<td>0.023</td>
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<tr>
<td><strong>Combined</strong></td>
<td>0.028</td>
<td>0.023</td>
<td>0.098</td>
<td>0.079</td>
<td>0.028</td>
</tr>
</tbody>
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- Big Six, ICAR60, and interests are IRT scored.
- Creative achievement $n = 4,990$