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TEST OF PERSONAL INTELLIGENCE 1.4 (TOPI 1.4) MANUAL

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Chapter 1: Introduction

Personal Intelligence

Personal intelligence is a newly-proposed intelligence that describes people's ability to problem-solve in the area of personality and personality-related information. The theory of personal intelligence describes the problem solving more specifically as taking place in four areas:

- Identifying clues to personality
- Forming models of personality
- Guiding choices with personality-related information, and
- Systematizing goals and plans (Mayer, 2008; Mayer, 2009)

We now recommend the Test of Personal Intelligence 1.4 (TOPI 1.4) as the preferred version of the full-length tests of personal intelligence developed in our laboratory, effective February, 2014. Researchers may also make use of a brief version, the TOPI-MINI-12 (Mayer, Panter, & Caruso, 2013). Although it is hard to estimate the longevity of a test, we anticipate that version 1.4 will remain the recommended version of the TOPI through 2017.

Rationale

We introduced the TOPI 1.4 in February 2014 after it became clear that a revision of the TOPI 1.2 (and the reformatted version, the TOPI 1.2Rf), reported in Mayer, Panter & Caruso, 2012) was overly long, that several segments of the test were not performing well or at all and that an updated version was advisable that discarded non-working items and clusters, and that combined clusters into scales in a better fashion.

Description

The TOPI 1.4 is a 96 item test made up entirely of multiple choice questions. In comparison with the TOPI 1.2 and 1.2Rf, there are no visual materials.

Availability and Scoring

The TOPI 1.4 is available chiefly for researchers at this time although we are beginning to engage in some limited consulting using the test. The scoring key for the test is proprietary and we therefore request that researchers using the test submit their data in an Excel file with variable names in the first row to be scored at UNH. (See Chapter 5 for a few more details).

Chapter 2: Test Description

General Description of the TOPI: Consistencies across Forms

There are several consistencies of the Test of Personal Intelligence across its versions that are worth noting at the outset. The invariant aspects of the test's form are shown in Figure 1. The overall test is divided into four areas of problem solving, from "Recognizing Information," to "Systematizing Plans." Within each such area are a set of "item clusters" designated by three-letter codes. The first two letters indicate one of the problem solving areas, such as "RV" for Recognizing Information (of a verbal nature about personality) and "SG" for Systematizing Goals. The third letter indicates the specific item cluster within the problem solving area (see Figure 1).

The overall number of clusters used depends upon the specific TOPI version but has generally varied from 13 to 18. The precise number of clusters within an area also varies and the cluster labels tend to be lettered alphabetically. By the time of the TOPI 1.4, however, certain gaps appeared in the lettering as poorly-performing clusters were deleted.

Within every item cluster are between 4 and 16 test items. All items are multiple choice and each one has four alternatives labeled "a" "b" "c" and "d." Correct answers are identified with reference to relevant research in the field of personality psychology.

In the actual test-taking sequence, item clusters are ordered across the four areas, e.g., the test taker takes "PART A" which includes RVA, FMA, GCA and SGA, and then moves on to "PART B" which includes RVB (omitted in the TOPI 1.4), FMB, and so on, until all the clusters within an area and across the test have been presented. In later parts (e.g., PART D), certain areas may no longer be represented because the clusters from the area all were presented earlier.

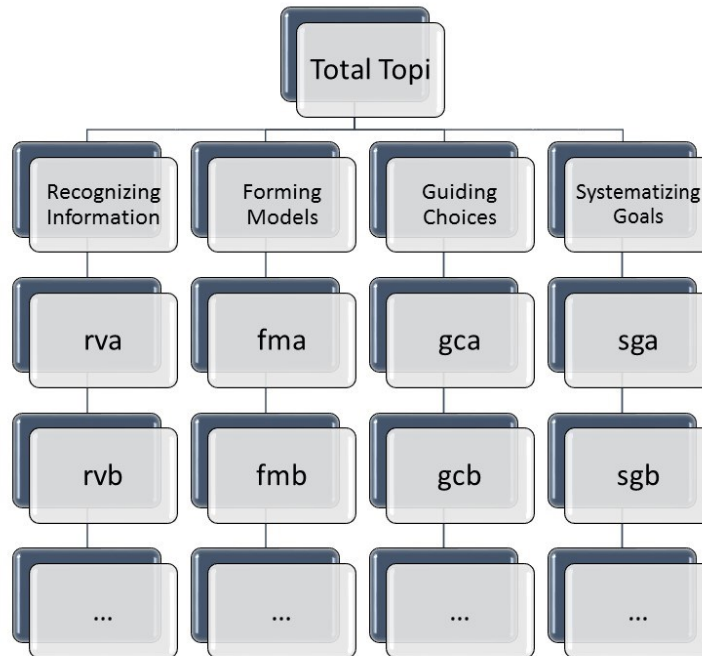


FIGURE 1. AN OVERVIEW OF THE GENERAL FEATURES OF THE TEST OF PERSONAL INTELLIGENCE

Comparison of the Text of the TOPI 1.4 to the TOPI 1.2 and 1.2Rf

The following are a list of changes made from the TOPI 1.2 to the TOPI 1.4:

- Introductory and concluding text refer to the TOPI 1.4 rather than to the TOPI 1.2Rf.
- Five scales were deleted including the three visual subscales faces, spaces, and pets (which failed to exhibit reliability in recent studies), and RVB and RVC, due to their very low reliability.
- Item sgc1 (the first item in “SGC”) was rewritten to eliminate overlap with sgb1 and sgc2.
- Two items were added: rva11 and sgc7. In addition, on some distributed forms, item rva12 may appear. *These new items should be omitted from scoring. We are treating the TOPI 1.4 as a strict subset of the TOPI 1.2 and 1.2Rf, excepting the rewrite of sgc1.*
- The number of clusters mention on the second slide is adjusted from 19 to “a number of sections”

Description of the Item Clusters of the TOPI 1.4

The specific item clusters on the TOPI 1.4 and the number of items on each task are listed below.

Table 2-1: Items and Clusters on the TOPI 1.4			
Task	Brief Description	Number of Items*	Number of scored items**
RVA	Recognizing inner motives	12	10
FMA	Related traits with opposite distractors, personified	5	5
GCA	Forward reasoning from traits	8	8
SGA	Goal alignment-simple correspondence	7	7
FMB	Related traits with unrelated distractors, personified	8	8
GCB	Trait inferences-Backward reasoning	8	8
SGB	Problematic goals: 1 In sets	6	6
FMC	Same-group trait-centered	6	6
GCC	From memories to motivation	9	9
SGC	Goal conflicts	7	6
RVD	Observing action-to-inner feeling patterns	4	4
FMD	Integrating models	9	9
GCD	Self models and choices	7	7
13 clusters		96 total	93 scored

*The master form of the TOPI 1.4 is distributed with items rva11, rva12 (in some forms) and sgc7. Newer forms may omit these three items—in which case RVA has 10 items and SGC has 6.

**The official TOPI 1.4 excludes items rva11, rva12, and sgc7 (where present)—items which appear on some test forms—from scoring. These items should be omitted from scoring to keep findings consistent with the comparison data reported in this manual.

Sample Items

The TOPI is made up of a number of multiple choice items. The first item of the RVA task is:

1. If a person wants to be with one or more people, talk to them, go out with them, and have a good time, the person is likely going to:
 - a. be in love
 - b. express warmth toward someone
 - c. meet a goal of excellence
 - *d. socialize

As a second example, the first item from the FMA task is:

1. A person is depressed and self-conscious. Most likely, she also could be described as:
 - a. calm and even-tempered
 - *b. anxious and impulsive
 - c. self-controlled
 - d. fairly thick-skinned

And the first item from the SGB area is:

1. A person wants to make friends. Which goal might cause him problems when he pursues new friendships?

- a. be a good friend to his friends
- *b. to be all things to all people
- c. to be myself
- d. to spend time meeting new people

(The correct answer in each case has an asterisk next to it).

Chapter 3: Comparison Samples

The Three Samples Who Took the TOPI 1.2, 1.2Rf or TOPI 1.4

The TOPI 1.2Rf itself was administered initially to 385 college students in the form of the TOPI 1.2 (Mayer, Caruso & Panter, 2012), and as the 1.2Rf in two additional samples that we will refer to here as West Point 2013 and Officer Candidate School 2013. Because the TOPI 1.4 is a subset of the TOPI 1.2Rf, we can consider it to have been administered to the same three samples. The samples are described in Table 3-1.

Table 3-1: Sample Characteristics of the Three Groups Taking the TOPI 1.2/1.2Rf and 1.4

Sample	Sample Size			Age		Relevant Publication or Paper
	Total	Women	Men	Mean	Range	
College students	385	203	182	Unr.	Unr.	Study 3 from Mayer, Panter & Caruso, 2012
Military Cadets (West Point)	1114*	201	913	20.9	20-30	Mayer, J. D. & Skimmyhorn, W. L. (2013). TOPI data. Untitled. Unpublished raw data.
Officer Candidate School	263	49	214	25.5	23-33	Mayer, J. D. & Skimmyhorn, W. L. (2013). TOPI data. Untitled. Unpublished raw data.

*15 cadets were added to the sample late; some analyses in the document are based on an N of 1091.

Descriptive Statistics for the TOPI 1.4 across the Samples

We've reported the descriptive statistics of the TOPI 1.4 in Table 3-2. Generally speaking, the average test-taker gets about 75% of the items correct. There is, however, a considerable range in all the samples: the standard deviation is (again approximately) 15 points. The target number correct for a test like this is midway between chance responding (25%) and completely correct responding (100%), at 62.5%. As such the TOPI items are slightly easier than is desirable and as a consequence the distribution of test scores are negatively skewed.

Table 3-2: Mean Performance on the TOPI 1.4 across samples						
	<u>Sample 1</u> (JPA 3)		<u>Sample 2</u> West Point 2013 Testing		<u>Sample 3</u> Officer Candidates	
	Mean	SD	Mean	SD	Mean	SD
Overall TOPI 1.4 Test	76.96	13.31	77.55	10.49	72.10	17.35
Female	79.44	10.73	80.45	7.86	76.70	13.37
Male	74.20	15.29	76.92	10.88	71.05	63.74
Descriptive PI	80.35	12.03	79.20	11.04	76.39	16.45
Female	82.05	10.10	81.91	8.61	80.21	11.54
Male	78.46	13.68	78.61	11.42	75.51	17.29
Inferential PI	74.81	16.14	77.55	10.49	69.35	20.29
Female	77.79	13.26	79.78	9.86	74.50	16.41
Male	71.50	18.34	75.85	12.77	68.17	20.93

Chapter 4: Reliability and Validity of the TOPI 1.4

Test Reliability

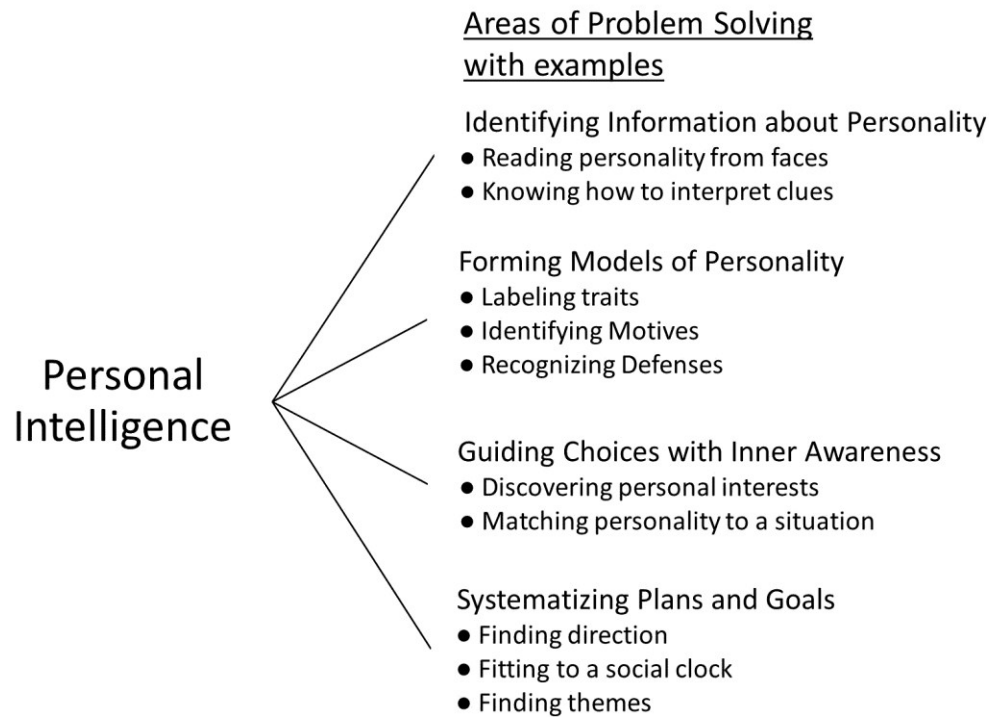
We've calculated the TOPI 1.4 reliability using coefficient alphas because of their familiarity to our test users. The reliabilities of the TOPI 1.4 for the three samples described in Chapter 3 are described in Table 4-1.

Table 4-1: Reliability of the Personal Intelligence Scores and Factor Scales for the Three Comparison Samples

	JPA-3	West Point 2013	Officer Candidates
Total PIQ	.90	.86	.92
Descriptive PIQ	.72	.70	.83
Inferential PIQ	.86	.82	.90

Content Validity

The Test of Personality Intelligence is designed to have content validity relative to the theory of personal intelligence. Item-writing was developed to tap the four areas of problem-solving in personal intelligence. That is: identifying clues to personality, forming models of personality, guiding choices with information about personality, and systematizing goals and plans.



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Evidence for Structural Validity of the TOPI 1.4

We believe that the TOPI 1.4 has two factors, but we have more work to do on the test, and our two-factor approach is contingent on future research. We have analyzed the test over several samples, employing both SPSS and Mplus to do so. The following remarks reflect those analyses in the aggregate (the analyses are not all shown here).

Reasons for Caution about the Structure at this Time

We regard the TOPI's structure as speculative because of the test's design and in particular, our emphasis on item clusters as we developed the test. When we developed the test we were interested, most of all, in the question of whether personal intelligence existed. To determine that, one of our key aims was to create a diverse set of item clusters in order to ensure the *content* validity of the scale relative to the theory. We believe that the item clusters are sampled from the four areas of problem solving specified by the theory.

We had some hope that the item clusters might also correlate in a pattern that reflected four factors corresponding to the four areas of problem solving represented by the theory. There was, however, little evidence that item clusters within a given area were more correlated with one another than with scales on any other part of the test.

The Lack of a Mid-Level Structure for the Test

As we set out to further explore the test's structure one of our challenges was that without four area scores (e.g., identifying clues, forming models, etc.) forming a set of reliable scales, the only indicators left were item clusters. We had not designed the clusters with the intention that they would be used as indicators of latent variables. Moreover, because we were conducting item analyses and removing non-performing items, some of the clusters had become very small (e.g., 4 items) and commensurately low in reliability by the time of the TOPI 1.2 and TOPI 1.4.

In short, the TOPI has a diverse set of item clusters at its lowest level (above the item level). But the item clusters themselves vary in reliability as one would expect for clusters that range in number from 4 to 12 items in length. The reliabilities of the clusters range from (depending upon sample) as low as $r = .20$ or so, with the largest number of clusters very roughly speaking in the $r = .40$ to $.60$ range. The sometimes low reliability of the clusters, in turn, means that they may not always serve well as indicators of factors (Little, Cunningham, Shahar, & Widaman, 2002; MacCallum, Widaman, Zhang, & Hong, 1999; Sterba, 2011). For that reason, and also because our two factors are so highly correlated, we are treating the two-factor model tentatively at this time and are reluctant to make a definitive statement as to the test's structure at this time.

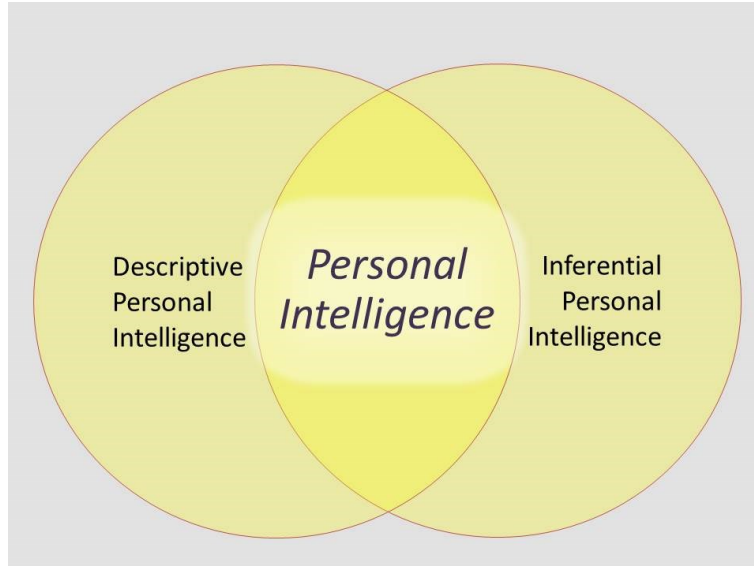
Best Model To-Date

With those reservations in mind, over a series of samples, the clearest factor structure for the test appears to involve two highly correlated abilities. A representative set of factor loadings is shown in Table 4-2 for the 2013 sample collected at West Point. SPSS principal axis factoring is shown, and more specifically, results from the pattern matrix after an Oblimin rotation. Loadings less than $.20$ are blanked out.

Table 4-2: Factor Pattern Matrix for the 2-Sample Solution in the West Point 2013 Sample

	West Point 2013 N=1114*	
	I	II
SET 1		
FMD integrating info.	.61	
GCD motivating choices	.49	
RVD inferring inner states	.57	
SGB problematic goals	.52	
SGC goal conflicts	.65	
FMC traits in general	.42	
GCB trait inferences	.37	.20
GCC choosing memories	.47	.23
SET 2		
FMA traits in a person		.48
RVA labeling goals		.37
SGA goal correspondence		.65
FMB traits in a person II		.42
GCA traits to reactions	.38	.26

As we interpret the results from this analysis, the first, Descriptive-PI factor (*note*: this is Factor II in the table), involves the ability to understand patterns of personality—to connect clues about personality to what a person is like, to know which traits go together in a person, and to identify configurations of behaviors that go together. The second, Inferential-PI (which appears as Factor I in the Table), involves combining complex information about a person to understand how they might be motivated, feel, or act. Inferential PI involves being able to combine reputational data with what a person says about herself into a single model of the person, or to make predictions of how the person might behave.



Although the two factors appear to be present, as Table 4-3 indicates, the factors are highly correlated.

Table 4-3 Obtained and Estimated Correlations between Factors across samples

	Sample 1		Sample 2		Sample 3	
	Obtained	Estimated	Obtained	Estimated	Obtained	Estimated
Correlation	.63	.66 ^a	.59	.87 ^b	.74	Not done ^c

a. Mplus exploratory analysis [file: Abigail's Mplus 1.4 exploratory and confirmatory/jpa-St3 2 factor 1 13 14 wo rvb rvc.out]

b. Mplus confirmatory analysis [file: Abigail's Mplus 1.4 exploratory and confirmatory/wp cfa 2 factor 1 28 14.out. This analysis was on the first 1091 participants.

c. In a further confirmatory analysis with a new sample, Mplus estimated the correlation at .92.

As can be seen, at present the TOPI 1.4 does a limited job of separating the two factors. They are so highly correlated that use of the single overall PI score may be warranted under many conditions. Therefore although for now we are reporting three scores from the TOPI 1.4, the overall score and the two factor scores, researchers may choose to use only the overall score.

Criterion Validity

Interrelations among the TOPI 1.2, 1.2Rf and 1.4

The TOPI 1.4 produces scores extremely similar to those on the longer earlier TOPI 1.2 and 1.2Rf. When we score the TOPI 1.4 items that appeared on the TOPI 1.2 in the JPA Study 3 sample (N =380), the two correlated $r = .97$; in the West Point 2014 sample, the comparable value was $r(1114) = .98$ and for officers in Officer Candidate School, the value is $r(260) = .99$. In

all samples, the overall PI scores produced by the TOPI 1.2, 1.2Rf, and 1.4 are almost indistinguishable. The TOPI 1.4 has the additional advantage of producing reliable if overly-correlated subscale scores.

Relations with Criteria

For that reason, the correlations between the overall TOPI 1.2 and criteria reported in JPA-3 reflect what, essentially will be the TOPI 1.4 correlations given the $r = .97$ correlation between the 1.4 and the 1.2. The central criterion correlations are shown in Table 4-4.

Table 4-4: Correlations between the TOPI 1.2 and criteria of interest from *Journal of Personality Assessment, Study 3*

	TOPI 1.2
Vocabulary	.39**
The Big Five Traits	
Extraversion	-.04
Agreeableness	.18**
Conscientiousness	.21**
Neuroticism	-.05
Openness to Experience	.11*
Psychological Mindedness	
Discussing Problems	.34**
Accessing Feelings	.19**
Figuring Out Others	.15**
Understanding Behaviors	.28**
Changing Oneself	.14**
Personality Disorder Symptom Scales	
Maladaptive Agreeableness	-.16**
Narcissistic Grandiosity	-.26**
Narcissism Personality Inventory	-.17**
Lifespace Index	
People Pleasing	-.21**
Rational Coaching	.04
Confirmed Controlling	-.43**
Reading Books	-.02
Reading the Mind in the Eyes	.53**

Interpersonal Competency Questionnaire	.06
Initiating Relationships	-.01
Providing Emotional Support	.17**
Asserting Influence	.04
Self-Disclosure	-.01
Conflict Resolution	.07
<hr/>	
MSCEIT^c Strategic EI	.69**
Understand Emotions	.68**
Changes	.63**
Blends	.60**
Manage Emotions	.55**
Emotion Management	.51**
Emotional Relations	.48**

Replications and Extensions in Progress

As of summer, 2014, we are analyzing further data from the samples above and from additional samples. Those data sets allow us to correlate the TOPI 1.4 with measures that include mental aptitude, the Big Five, and several real-life criteria. Our analyses are ongoing but it is safe to report at this time that the TOPI 1.4 correlates with measures of mental aptitude and the Big Five in a pattern that is very similar to what we have obtained in the past (e.g., Mayer, Skimmyhorn, Caruso & Panter, 2014).

Psychometric Strengths and Limitations of the TOPI 1.4: A Bulleted List

Summary of Strengths:

- The test is designed with good content validity for verbal-problem solving in the area of personal intelligence
- The test is reliable at the full scale level
- The test exhibits modest reliability at the factor scale level
- The test shows good evidence from criterion correlations for its validity

Summary of Limitations:

- The two subscale scores—Descriptive and Inferential personal intelligence—are “under development”

- Owing to the lack of mid-level structure of the test, the two factors are tentative at this time
- The two factors also correlate with one another at levels that are higher than is desirable
- The test items are easier than is desirable. This means that:
 - The distribution of test scores are negatively skewed
 - As a practical consequence, the test is:
 - Relatively accurate at distinguishing among poor performers
 - Less accurate at finding outstanding performers in the area

Chapter 5: Availability of the TOPI 1.4

We are now making the TOPI 1.4 available to researchers in an arrangement through the University of New Hampshire.

To protect the security and therefore the validity of the test, we are disseminating the test items to researchers, asking them to keep the test items secure.

Also for reasons of security, we are holding the scoring key at UNH and treating the key as proprietary information for the time being. For that reason, we are asking researchers who collect data to send it to us in an Excel or SPSS file using the variable names on the test.

For quick responses to scoring requests, please be sure to submit your data in the following manner:

- Remove any information that could be used to personally identify study participants from your Qualtrics or other survey before you forward it to us. (Participant IDs assigned for the study can be included).
- Label your subject identifier variable as “id”
- Use the variable names specified in the TOPI 1.4 test document (rva1, rva2, etc.)
- Code responses to the test as follows:
 - A=1
 - B=2
 - C=3
 - D=4
- Submit all columns in a numeric form (in Excel: ‘general format’ works fine)

At present, our scoring returns a full-scale score and two subscores, one for the descriptive and one for the inferential factor scales.

- We will then return scored data in an Excel file containing an N x 4 matrix including (1) the participant ID, (2) the total TOPI 1.4 score, and (3) scores on the descriptive and (4) on the inferential factor scales.

In addition, we can provide reliability data for the overall test for a researchers’ particular sample.

Please note that this arrangement means that we will not return item-level data at this time to researchers. We recognize that this means that other laboratories cannot conduct item analyses on the scale at this time.

In addition, we are collecting data as part of consulting activities supervised by David R. Caruso. Participants can take the TOPI 1.4 online and receive some feedback on their performance. Other data may be collected as part of norming and validation activity.

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