

## How general is general information construct?

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**Abstract:** There is a small number of constructs in the field of differential psychology that have raised so much debate between psychologists and professionals in related disciplines as is the case of *general (verbal) information* construct. It seemed reasonable to test the validity of this construct measured with general information test in comparison with other measures of knowledge (cultural knowledge, vocabulary, knowledge of the most recent events, foreign language knowledge), and a standard verbal type *g* test. A sample of 376 candidates for state services was tested in a selection situation. Three analyses were conducted to determine the position of general information test in the space of other verbal competency measures. The first analysis questioned latent structure of the space of four tests having the same format and asking about the knowledge of international terms, general culture, knowledge of most recent events, and general information. The second analysis included the *g*-factor intelligence test so to see how the above described structure changes when this new test is introduced. The third analysis introduced an English language test. In all of the three component analyses only one eigenvalue was larger than 1 and it explained between 52 and 64% of variance. In all analyses general information test had the highest projection on the only significant latent dimension of these cognitive spaces. In other words, it can be concluded that the construct of general information is in the center of this hyperconus. That is why we consider measurement of general information knowledge, as well as the construct itself, to be an important question in psychological diagnostics. Thus, it is important to go further with the investigation of this construct because it does not seem that it is named *general information* by accident.

**Key words:** individual differences, knowledge level, general information, validity, component analysis, general intelligence

## Kako splošen je konstrukt splošne informiranosti?

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**Povzetek:** Malo konstruktov v polju diferencialne psihologije je zbudilo toliko zanimanja med psihologi, a tudi med strokovnjaki sorodnih področij, kakor konstrukt *splošne (besedne) informiranosti*. Zato se je zdelo razumno preveriti veljavnost tega konstrukta, merjenega s testom splošne informiranosti, v primerjavi z nekaterimi drugimi merami znanja (znanje o kulturi, besednjak, poznavanje najnovejših dogodkov, znanje tujega jezika) ter s standardnim testom faktorja *g*. Vzorec 376 kandidatov za državne službe je bil testiran v selekcijski situaciji. Opravljene so bile tri analize, ki naj določijo položaj testa splošne informiranosti v prostor, skupen z drugimi merami besednih kompetentnosti. Prva analiza je

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preverjala latentno strukturo prostora štirih testov enakega formata, ki so spraševali o znanju tujk, o splošni kulturi, poznavanju najnovejših dogodkov in splošni informiranosti. Druga analiza je dodatno vključevala tudi test faktorja *g* inteligentnosti, da bi se preverilo, ali se struktura, dobljena v prvi analizi, z dodanim faktorjem *g* spremeni. V tretji analizi je bil dodan test znanja angleškega jezika. V vseh treh analizah glavnih komponent se je le ena lastna vrednost pokazala višja kot ena, pojasnjujoč med 52 in 64% celotne variance. V vseh analizah je imel test splošne informiranosti najvišjo projekcijo na edino značilno latentno dimenzijo preučevanih kognitivnih prostorov. Zaključiti je mogoče, da je konstrukt splošne informiranosti v središču strukture in da je merjenje splošne informiranosti in obravnava tega konstrukta eno pomembnejših vprašanj v psihodiagnostiki. Potrebno bi bilo nadalje raziskati strukturo konstrukta, saj se zdi, da ni imenovan *splošna informiranost* po naključju.

**Ključne besede:** medosebne razlike, raven znanja, splošna informiranost, veljavnost, komponentna analiza, splošna inteligentnost

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There is a small number of constructs in the field of differential psychology that have raised so much debate between psychologists and professionals in related disciplines as is the case with *general (verbal) information* construct (Note: this term is used by Carroll (1993), while other authors – such as Lynn and Irwing (2002) – prefer the term *general knowledge*). Are we talking about one of the intelligence factors or is it primarily a measure of semantic memory? Is this general cultural knowledge – knowledge of world around us, general education – knowing a little of everything, but of nothing in particular, or can it be considered as one of the most important indicators of acculturation in terms of Cattell and Horn's investment theory of intelligence (Cattell, 1987; Horn & Cattell, 1966)? Regardless this debate, different forms of general information test are being ever more used in psychological practice. In Croatia, mainly in professional orientation and personnel selection, different versions of general information test have been used for over 15 years (Zarevski, 1988; 1991; 1993; 1995b). It is also interesting to consider this construct in the light of the "quiz-o-mania" present in various broadcasting agencies. If we analyze content of quiz-questions from a psychometric and conceptual perspective, it is clear that not even the authors of these questions are clear on the status of this construct.

Various general information tests are not explicitly related to institutionalized education and formal knowledge. They are a part of everyday life and are found in the media. General information tests are not a measure of academic achievement and they have satisfactory discriminant validity from the objective tests of school knowledge (Zarevski, 1987; Zarevski, 1995b). They have also satisfactory discriminant validity when compared to "classical" intelligence test, although they do share a considerable portion of variance, a portion that is often larger than it is between various intelligence tests (Zarevski, 1987).

General information tests have some resemblance to vocabulary tests which often represent the best individual measure of intelligence – crystallized intelligence

to be precise (Jensen, 1980). At first, this might not seem logical since these tests, just as general information tests, measure acquired knowledge. But, what is more important, these tests indirectly measure the ability to acquire knowledge, and more specifically – the ability of inferring the word’s meaning on the basis of its context. Here we deal with learning the meaning of different terms, which is one of the most important aspects of mental efficiency. The more terms we are familiar with and the more successful we are in dealing with them, the more success we have in dealing with our knowledge. When considering heritability of *g*-factor Plomin (1997) states that sorting the results by age indicates that heritability increases from about .20 in infancy to about .40 in childhood to .60 or higher later in life. This increase in the heritability of *g* throughout the lifespan is interesting because it is counterintuitive in relation to the accumulation of life’s experiences. It is possible that heritability increases because individuals seek and create environments correlated with their genetic propensities. It seems that genetic propensities might be best considered as appetites rather than aptitudes, making some children “more hungry” for knowledge and more “able to digest it”. Bratko and Zarevski (1996) used a battery of different intelligence tests (verbal and spatial) and found a highest heritability index for general information test. In terms of aforementioned Plomin’s results this indirectly shows that general information test is in a way a measure of *g*.

Considering all these it seemed reasonable to test the validity of the general information construct in comparison with other measures of information and knowledge, foreign language knowledge and test of *g* operationalized in the classical intelligence manner.

## **Method**

### **Participants**

A sample of 376 candidates for state services was tested in November 2004. Candidates were between 25 and 35 years old. They were all university graduates. (Note: For confidentiality reasons authors and names of the tests, as well as their descriptive statistics, are not cited. We state indices of relative variability and correlation coefficients).

### **Instruments**

1. *g*-factor intelligence test - predominantly verbal, symbols used in some items can easily be verbally coded;
2. general cultural knowledge test (knowledge of world and domestic history, art and culture);
3. general information test (the most general knowledge in the technical areas,

- natural, social and humanistic sciences, medicine, world religion, business, sports and 20<sup>th</sup> century historical events);
4. vocabulary test (an international term is given and the task is to find its closest Croatian translations);
  5. test of knowledge of the most recent events in politics, culture, business, technologies, sport and entertainment (year 2004):
  6. English language test.

Tests numbered 2 to 5 were multiple choice type, offering a correct answer and four distractors. They all had 50 items, having about 30 % less items than *g*-factor intelligence test and English language test. All 6 tests were power tests, i.e. there was enough time for most of the candidates to solve the entire test. Candidates were told that wrong answers are not penalized.

## Results

First we checked the distribution of test results for all tests. Distribution of results of the intelligence test and general information test did not significantly differ from normal distribution. English language test was slightly negatively asymmetrical, while other test used (general cultural knowledge test, vocabulary test, test of knowledge of the recent events) were slightly positively asymmetrical. Therefore, these variables were normalized, and their intercorrelations were computed (Table 1).

Three analyses were conducted to determine the position of general information test in the space of other verbal competency measures. First analysis questioned latent structure of the space of 4 tests having the same format and questioning the knowledge of international terms, general culture, knowledge of most recent events, and general information knowledge. The second analysis included the *g*-factor intelligence test so to see how the above described structure changes when this new test is being introduced. For the same reasons, third analysis included the English language test. Results of these three analyses are shown in Table 2. In all of the three

Table 1. Pearson correlation coefficients between 6 variables ( $N = 376$ ).

general cultural knowledge test	general information test	knowledge of the most recent events	<i>g</i> -factor intelligence test	English language test	
0.628	0.486	0.380	0.398	0.483	vocabulary test
	0.586	0.416	0.304	0.336	general cultural knowledge test
		0.617	0.333	0.414	general information test
			0.206	0.323	knowledge of recent events
				0.449	<i>g</i> -factor intelligence test

Note: all coefficients are significant at the  $p < 0.01\%$

Table 2. Projections of the tests on the first principal component (I. PC) in the successive analyses, percentages of the variance explained with the first principal component and relative variability indices (RVI) of the tests (N = 376).

Test	I. PC	I. PC	I. PC	RVI
vocabulary test	0.778	0.778	0.790	32%
general cultural knowledge test	0.829	0.812	0.776	33%
general information test	0.847	0.831	0.806	34%
knowledge of recent events	0.774	0.710	0.676	46%
g-factor intelligence test		0.552	0.585	20%
English language test			0.681	19%
variance explained %	64.01	55.62	52.32	

component analyses only one Eigenvalue was larger than 1 and it explained between 52 % and 64 % of the variance.

Table 2 clearly shows that in all three analyses general information test had the highest projection on the only significant latent dimension of these cognitive spaces. The last column of the table confirms that is not the artefact of the relative variability. It is interesting to note that by introducing the “classical” measure of g this slight “dominance” of general information test is not lost. General cultural knowledge test has the next highest projection on the first principle component in first two of the analyses, while in the third analysis, when the English language test was introduced, second highest projection on the first principle component belongs to the vocabulary test. This is probably due to the fact that most of the international terms used have a Latin root, just as their English translations do.

## Discussion

Following its face and construct validity (eg. in Carroll’s synthesis of research of intelligence factors; Carroll, 1993) general information falls into a wide second order factor – crystallized intelligence. Zarevski (2002). states that crystallized intelligence can best be defined as the ability of easy acquiring and effective use of information. Thus, it seems logical that the amount of general information one has acquired over lifetime has an important role in determining the crystallized intelligence of this person. In terms of the development of general knowledge a certain intrinsically motivated intellectuality, as is the one to which Lloyd and Barenblatt (1984) refer, can not be excluded. Intrinsic intellectuality encourages acquiring of various material that is not instrumental to any external benefit. It is motivated with the one’s own satisfaction and in contrast with intellectual behaviour directed towards specific goal, such as

academic grades, diploma, specific knowledge and money.

The highest importance of general information construct is given by Lynn and Irwing (2002). They suggest that general information knowledge should be removed from its position in Carroll's hierarchical factor model of intelligence as one of a number of the first-order factors of which the second-order factor – crystallized intelligence – is composed. They consider general information knowledge to be sufficiently important to be regarded as a second-order factor with its own first order-factors representing the domains of general knowledge. The desirability of such a reconstructing of Carroll's model is also supported by the large sex difference in general knowledge which shows that general information knowledge must be a different kind of ability from the other Gc components on which sex differences are negligible or on which females have higher average abilities than males. In the case of general knowledge, males score higher in the most domains. Lynn and Irwing consider this second-order factor to be *semantic memory*.

What does this mean in the context of our paper? We are all surrounded by what we call general information, but we significantly differ from one another by our ability and interest in acquiring these information and our cognitive capability to use these information in the effective way. This means that measures of general information knowledge are not “clear” measures of cognition (in psychometric terms), but such result is expected. Namely, a narrowly defined (and measured) intelligence is never free of its relation with personality measures and motivation. What is questionable is the degree of this connection considering specific measures of intelligence.

Considering the effect of general information measure on the latent structure of six different measures of cognitive efficacy in processing predominantly verbal information it can be concluded that general information knowledge is in the center of this hyperconus. We consider measurement of general information knowledge, as well as the construct itself, to be an important question for scientific and applied psychology. Therefore, a summarized answer to the question in the title of this paper is: go further with the investigation of this construct because it does not seem to be accidental that it is named *general information*.

## References

- Bratko, D. & Zarevski, P. (1996). Genetic and environmental contributions to the individual differences in achievement on the general information test (GIT): A twin study. *Book of abstracts: 8<sup>th</sup> European Conference on Personality*, Ghent, Belgium.
- Carroll, J.B. (1993). *Human cognitive abilities: A survey of factor-analytic studies*. New York: Cambridge University Press
- Cattell, R.B. (1987). *Intelligence: Its structure, growth and action*. Amsterdam: North-Holland.
- Horn, L.J. & Cattell, R.B. (1966). Refinement and test of the theory of fluid and crystalized

- intelligences. *Journal of Educational Psychology*, 57, 253-270.
- Jensen, A.R. (1980). *Bias in mental testing*. New York: Free Press.
- Lloyd, J. & Barenblatt, L. (1984). Intrinsic intellectuality: Its relations to social class, intelligence, and achievement. *Journal of Personality and Social Psychology*. 46 (3), 646-654.
- Lynn, R. & Irwing, P. (2002). Sex differences in general knowledge, semantic memory and reasoning ability. *British Journal of Psychology*, 93, 545-556.
- Plomin, R. (2001). Genetics and behaviour. *Psychologist*, 14 (3), 134-139.
- Zarevski, P. (1987). Značaj količine općih informacija u trajnoj memoriji u okviru ukupnog modela kognitivnog funkcioniranja [The importance of the general information knowledge in the permanent memory in the model of cognitive functioning]. *Primijenjena psihologija*, 8, 215-226.
- Zarevski, P. (1988). *Test opće informiranosti – priručnik [Manual for General Information Test]*. Zagreb: Savez samoupravnih interesnih zajednica za zapošljavanje Hrvatske.
- Zarevski, P. (1991). *Test opće informiranosti za učenike četvrtih razreda srednjih škola (TOIM), Priručnik [Manual for General Information Test for 4<sup>th</sup> grade high-school students- TOIM]*. Zagreb: Zavod za zapošljavanje.
- Zarevski, P. (1993). *Test opće informiranosti (A i B forma), Priručnik i standardizacija za Test opće informiranosti (revidirano izdanje) [Manual and standardization for General Information Test (Forms A and B)]*. Zagreb: Ministarstvo rada, socijalne skrbi i obitelji, Zavod za zapošljavanje - Središnja služba Zagreb.
- Zarevski, P. (1995a). *Provjerite pamćenje [Test your memory]*. Jastrebarsko: Naklada Slap.
- Zarevski, P. (1995b). *Test opće obaviještenosti, Priručnik [Manual for General information test]*. Jastrebarsko: Naklada Slap.
- Zarevski, P. (2002). *Kristalizirana inteligencija [Crystallized intelligence]*. (Neobjavljen rukopis [unpublished manuscript]). Zagreb: Odsjek za psihologiju Filozofskog fakulteta u Zagrebu.