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FABLES COMPREHENSION IN HEALTHY ADULTS: DOES IQ MATTER?

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Abstract

Understanding ambiguous texts has been widely accepted as an indicator of conceptual thinking efficiency. As a kind of ambiguous texts, fables are promising as a tool for measuring cognitive abilities, but rarely used in intelligence research. In this study, we aimed to reveal: 1) the degree to which healthy adults experience difficulties in fables comprehension; 2) the role that psychometric IQ plays in understanding fables' metaphorical meanings (gists). We hypothesized that: 1) the higher the level of psychometric IQ, the better the understanding of fables' gists; 2) the higher the level of fables understanding, the higher the ability to pair single fables in accordance to their gists. Twenty-four participants were presented with 3 sets of Aesop's fables and an IQ test. During in-depth interviews, they were asked to interpret the gist of each fable and pair any two of them within each set. It was shown that healthy adults experience major difficulties with understanding fables' gists at a highly generalized, abstract level. We found no correlation of psychometric IQ and fables understanding; and no correlation between comprehension depth and fables pairing. This suggests that 1) there is a lack of conceptual thinking in healthy adults and 2) the ability to understand a fable's gist is not reflected in the results of current psychometric tools but may require more advanced approaches.

Keywords: fables comprehension, IQ, conceptual thinking, metaphorical texts.

Introduction

The ability to detect and understand non-literal, metaphorical meaning of written texts and real-life situations is considered one of the key features of conceptual abstract thinking as the highest level of human cognitive abilities (Zeigarnick, 1962; Vygotsky, 2002; Vekker, 1976). Double-meaning, or ambiguous, texts (metaphors, proverbs, jokes) used in various psychological research could be understood both literally or metaphorically as stimulus triggering abstract thinking operations as well as revealing the "mechanics" of comprehension processes (Arestova, 2006; Ivanova, 2007; Shcherbakova, 2008, 2009; Avanesyan, 2013; Nikiforova & Shcherbakova, 2017).

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Fables as a special kind of ambiguous texts are widely used in psychotherapy (Magder, 1980; Erickson, 1991; Pearce, 1996; Peseschkian, 2012) as well as in studies related to moral development (Narvaez, Bentley, Gleason, & Samuels, 1998) and cross-cultural differences (Chia, 1995; Iwuji, 2014). At the same time, these texts are very rarely used for testing healthy adults as they are considered to have efficient abstract thinking operations based on their formal age and health status. Interestingly, this notion is not well supported as some recent studies have shown a lack of conceptual thinking even in healthy adults with relatively high IQ scores (Shcherbakova & Makarova, 2016). This raises a question about cognitive processes underlying the comprehension of the metaphorical meaning of ambiguous texts.

In this study, we aimed to reveal the role that psychometric IQ plays in understanding fables' metaphorical meanings (gists). We also aimed to reveal the degree to which healthy adults experience difficulties in fables comprehension. Thus, the present study was set up to test the following hypotheses:

1) most healthy adults are able to understand fables at conceptual abstract level; mistakes in understanding fables' gists are minor and do not affect the ability to elicit texts' generalized ideas;

2) the higher the level of fables understanding, the higher the ability to pair single fables according to their gists;

3) the higher the level of psychometric IQ, the better the understanding of fables' gists.

Methods and materials

Participants

Nineteen healthy adults (13 females, 20.3 ± 1.8 y.o.) participated in this study. All participants provided consent prior to participation.

Fables comprehension and scoring

We designed three sets of fables, each including three Aesop's fables (e. g., The Lion and the Dolphin, The Lion and the Mouse, The Ant and the Dove; all after Townsend, 2006). All fables were short and had no obvious religious connotations. Each of those nine fables was qualitatively analysed by three experts for its implicit metaphorical meaning (gist) and potential difficulties in comprehension. In each triad, two fables were similar to one another in terms of their gists, and the third one had just a formal plot resemblance with one of the first two.

Participants read each set of fables one after another; then, they were asked a number of questions on each fable's gist during a semi-structured in-depth interview that was aimed to test the comprehension depth and accuracy. Interpretation of each fable was scored 0, 1 or 2 depending on whether it was concrete (based on pre-conceptual thinking operations) or generalised (based on conceptual thinking operations). We used the following criteria:

0 score = literal comprehension. A participant retold the sequence of events in a concrete manner without interpretations or generalisations.

1 score = common sense level. A participant was able to phrase an everyday moral but the interpretation suffered from either an excessive subjectivity or a lack of accuracy in generalisation.

2 score = highly generalised level. The gist of a fable was accurate; it was phrased in terms of abstract ideas and described some basic laws of physical or social reality.

We also scored the quality of fables pairing within each set. Each pairing based on fables' gists was scored 1. Pairings based on minor characteristics of the texts (similar characters, etc.) were scored 0. In the statistical analysis we used two variables: comprehension depth (a sum of the scores for comprehension of all nine fables) and fables pairing (a sum of the scores for pairing in three sets). The maximum score for comprehension depth was 18 (9 fables × 2 score maximum). The maximum score for fable pairing was 3 (3 sets × 1 score maximum).

Raven's Standard Progressive Matrices Test (SPMT) (Raven, 2002)

SPMT is used for measuring fluid intelligence as a component of "g" factor. We used a standard procedure; the time limit was 20 minutes.

Procedure

Participants were tested individually. Each session lasted up to two hours and included the following stages: 1. SPMT solving; 2. reading the fables set by set and answering the questions of the semi-structured in-depth interview after reading each set. All interviews were audio-recorded and then transcribed verbatim.

Data analysis

Data of two participants were excluded from analysis due to not answering many of the experimental tasks. Thus, 17 completed protocols were used for statistics.

Distribution and correlation analyses for fables comprehension depth and fables pairing

First, we analysed the distribution of scores "0", "1", "2" for comprehension depth and scores "0" and "1" for fables pairing. Then, we used Pearson chi-square and Kruskal–Wallis tests to check whether there was a correlation between the variables "comprehension depth" and "fables pairing".

Correlation analysis and analysis of variance between fables comprehension depth, fables pairing and SPMT scores

We used Pearson chi-square test to check whether there were any differences in SPMT scores between participants who achieved different scores for comprehension depth, and Pearson chi-square and Kruskal–Wallis tests to analyze the differences

in SPMT scores between participants who achieved "1" score for pairing in one, two or three fable sets. One-way ANOVA was applied to fulfil extended analysis of possible correlations between SPMT scores, comprehension depth and fables pairing. SPMT scores were a dependent variable, scores for comprehension depth and fables pairing were independent variables (between factor and within factor, respectively).

Results

Distribution and correlation analyses for fables comprehension depth and fables pairing

Out of all 153 interpretations (17 participants × 9 fables) 32.1% were scored "0", 61.4% were scored "1" and only 6.5% were scored "2" (see the diagram in Figure 1). The lowest score obtained for comprehension depth in all three fable sets was 2 and the highest one was 10.

Out of all 51 pairings (17 participants × 3 pairings) 65% were based on the texts' essential characteristics and were scored "1". There was only 1 participant out of 17 who paired the fables correctly in all three sets. The distribution of the participants who paired the fables with accordance to their gists in one, two or three sets is shown in Figure 2.

Pearson chi-square and Kruskal–Wallis tests revealed no significant differences ($p = .756$; $p = .201$, respectively) in the number of correct pairings between the groups of the participants who achieved different sums of scores for comprehension depth.

Correlation analysis and analysis of variance between fables comprehension depth, fables pairing and SPMT scores

The minimum raw score obtained for SPMT was 39 and the maximum score was 60. The contingency table for the scores for comprehension depth (the sums of

Figure 1

Distribution of the scores for comprehension depth

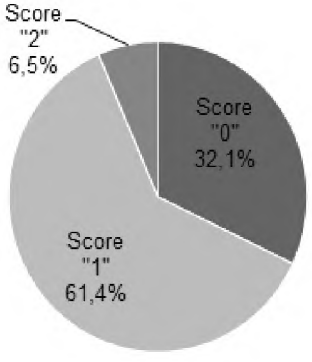
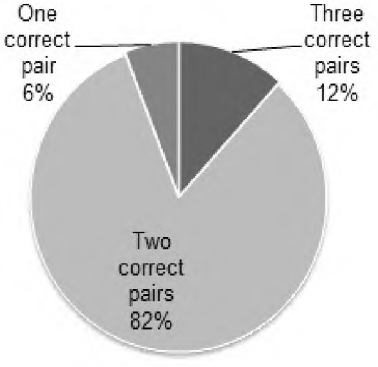


Figure 2

Distribution of the participants who got score "1" for fables pairing in one, two or three sets



the scores for comprehension within all three sets) and SPMT scores is presented below (Table 1).

Pearson chi-square test revealed no significant differences (p = .901) in SPMT scores between participants who obtained different scores for comprehension depth. We also analysed the possible differences in SPMT scores between participants who were either more or less successful in fables pairing. The contingency table for the scores for fables pairing and SPMT scores is shown in Table 2.

Pearson chi-square and Kruskal–Wallis tests showed no significant differences (p = .603; p = .067, respectively) in SPMT between participants who achieved "1" score for pairing in one, two or three fable sets. Levene's test proved the absence of any significant differences between dispersions of the scores for comprehension depth and fables pairing (p = .235). Thus, according to ANOVA results, no significant correlations (p = .123) between psychometric intelligence, comprehension depth and fables pairing were found.

Table 1

Contingency table for the variables "comprehension depth" and "SPMT scores"

		SPMT Scores													
		36	39	44	45	47	52	53	54	56	57	58	59	60	*Total*
Sum of scores	2	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	3	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	4	0	1	0	0	0	1	0	0	0	0	0	0	0	2
	5	0	0	0	0	0	0	0	0	0	1	0	0	0	1
	6	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	7	0	0	0	1	0	0	0	0	0	0	1	0	1	3
	8	1	0	1	0	0	0	1	0	0	1	0	0	0	4
	9	0	0	0	0	1	0	0	0	1	0	0	1	0	3
	10	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	Total	1	1	1	1	1	3	2	1	1	2	1	1	1	17

Table 2

Contingency table for the variables "fables pairing" and "SPMT scores"

	SPMT Scores														
		36	39	44	45	47	52	53	54	56	57	58	59	60	*Total*
Fables pairing	1	0	1	0	0	0	1	0	0	0	0	0	0	0	2
	2	1	0	1	1	1	2	2	1	1	2	1	1	0	14
	3	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Total	1	1	1	1	1	3	2	1	1	2	1	1	1	17

Discussion

The obtained results partly contradicted the hypotheses we tested in the present study. Firstly, it was shown that, in opposition to what we hypothesised, most healthy adults had low levels of conceptual thinking, which therefore resulted in various mistakes for understanding fables' gists. Answers scored "0" (more than one third (35.7%)) correspond to a pre-operational stage of thinking and a concrete operations stage which are common for the ages of 2–7 y.o. and 7–11 y.o., respectively (Piaget, 1951). Two thirds (58.8%) of the interpretations were scored "1", which corresponds to a partial understanding of a text's metaphorical meaning. And only minor amount (5.5%) of the interpretations was scored "2" based on a highly generalised phrasing of a fable's gist. These results are surprising when obtained in healthy adults who are supposed to have higher levels of conceptual thinking. However, it has to be taken into consideration that in most studies of fables comprehension researchers tend to focus on the way fables are understood by children and adolescents (Chia, 1995; Narvaez et al., 1998; Iwuji, 2014) and not by adults. Currently, there is no agreed consensus in the criteria for establishing "normality" for fables comprehension in the adult population. Therefore, we propose our research as a formative one, setting up an empirically obtained distribution of comprehension levels and providing a framework for further studies that should target investigations in both healthy and clinical populations.

Secondly, the predictions about positive correlation between comprehension depth and fables pairing did not find any support. This suggestion was partially based on earlier studies, which reported correct fables pairing to be one of the indicators of correct understanding of each single text (Narvaez et al., 1998). The actual results showed no evidence for any correlation between these variables. Most of the participants (82%) paired the fables correctly in two out of three sets. Very few did not manage to do the correct pairing at all (12%) or managed to do this in all three sets (6%). This means that participants could understand every single fable on a highly generalised metaphorical level but experienced trouble using the fable's gist as a criterion for correct pairing, which probably indicates a lack of abstract thinking and metacognitive skills. Vice versa, they could also fail the understanding of a generalised meaning of any single fable within a set, but somehow perform a correct pairing on the basis of a gist which was not even previously explicated.

Another unexpected finding was also the lack of an observable correlation between psychometric IQ and fables understanding (neither "comprehension depth" variable, nor "fables pairing"). SPMT was designed not just for a non-verbal IQ measurement but for more general and broader purposes, basically, for testing eductive ability (Raven, 2000, p. 3). Thus, it is a relevant tool for measuring "g" factor which is expected to be observed in texts' comprehension process, too. However, relying on the results reported in the present paper, it might seem that fables comprehension is a relatively independent cognitive skill which has nothing to do with psychometric intelligence. At the same time, it is hard to assume that comprehension processes are isolated from other basic cognitive abilities. The ability to understand and explicitly phrase a fable's gist is more likely to require some

cognitive mechanisms, which cannot currently be measured directly with the use of common psychometric tools, but need more advanced approaches and research techniques specifically aimed at measuring conceptual abilities. This suggestion has already gained some support by the results obtained in other studies, showing the lack of correlation between IQ scores and efficiency of solving cognitive tasks of other types (Shcherbakova & Makarova, 2016; Shcherbakova & Nikiforova, 2016).

Conclusion

The present study is novel in the sense that it raises a question about the cognitive processes underlying the comprehension of the gists in fables. It aimed to test hypotheses about correlations between two aspects of fables comprehension and the level of psychometric IQ. The results showed no correlation between comprehension of each single fable and correct pairing of fables with similar gists, and also no correlations between fables comprehension and psychometric IQ. This finding was rather surprising and needs to be retested in further studies. The main limitation of the present study was the small sample but this is planned to be increased in the future and replicated. This study furthers the discourse of fables comprehension research and raises questions concerning the cognitive essence of fables comprehension processes and whether they can be revealed with existing psychometric tools, as well as the relevance of traditional views on psychometric intelligence as a predictor of general cognitive efficiency.

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Как здоровые взрослые понимают смысл притч: роль психометрического интеллекта

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Резюме

Понимание многозначных текстов считается одним из показателей сформированности понятийного мышления. Притчи как разновидность многозначных текстов представляют собой удобную модель для изучения когнитивных способностей человека, однако используются в исследованиях интеллекта достаточно редко. Настоящее исследование было направлено на то, чтобы 1) определить, насколько сложна задача понимания переносного смысла притч для взрослых здоровых людей; 2) выявить роль психометрического интеллекта в понимании переносного смысла притч. Мы предполагали, что: 1) более высокие показатели психометрического интеллекта связаны с более полным пониманием переносного смысла притч; 2) чем лучше понимание переносного смысла каждой отдельной притчи, тем более успешно происходит объединение притч на основе их смысловых признаков. Испытуемым (N = 24) после прохождения теста на психометрический интеллект предъявлялись три набора притч Эзопа. Затем в процессе глубинного интервью их просили объяснить смысл каждой притчи по отдельности и объединить любые две в рамках каждого набора. Было показано, что взрослые здоровые люди испытывают значительные трудности с пониманием переносного смысла притч на высоко обобщенном, абстрактном уровне. Не было обнаружено связей между 1) показателями психометрического интеллекта и полнотой понимания притч; 2) полнотой понимания каждой притчи по отдельности и успешностью объединения притч на основе смысловых признаков. Такие результаты могут быть связаны с недостатками существующих подходов к изучению когнитивных способностей и их непригодностью для диагностики процессов понимания.

Ключевые слова: понимание притч, интеллект, понятийное мышление, многозначные тексты.

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