

DO PROVERBS MEASURE ABSTRACT OR METAPHORICAL THINKING: EVIDENCE FROM HEALTHY GREEK-SPEAKING ADULTS

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ABSTRACT

The aim of the present study is to investigate whether proverbs depict abstract or metaphorical thinking. Proverbs were extensively used for the assessment of abstract thinking. However, recent research disputes the previous traditional hypothesis and claims that proverbs are related to metaphorical thinking rather than abstract thinking. Although, metaphorical thinking is part of abstract thinking is compatible with concrete/literal thinking. Factors such as chronological age of the participants, gender, years of education and hand preference found to affect the interpretation of proverbs. In the present study fifty (50) healthy adults participated. Two main tasks were administered to the participants; the first task was tested participants' mental (both verbal and practical) intelligence and the second task was a proverbs test, investigating the interpretation of specific Greek proverbs (N=25). Further information about participants' profile, such as gender, years of education and participants' chronological age were collected. The major findings suggest that intelligence and mainly lexical knowledge was exhibited as predictor variable in the accuracy scores on the proverbs test; while abstract thinking variables (i.e. reasoning, sequences, and analogy) were not found to correlate with accuracy on proverbs task. Participants' chronological age, gender and years of education did not seem to affect participants' performance. However, we should note that all participants were highly educated (university degree). Finally, proverb "transparency" has been found to affect participants' interpretations.

Keywords: Proverbs, metaphorical thinking, abstract thinking, lexical knowledge.

INTRODUCTION

Proverbs have been extensively researched in developmental disorders (for instance, autism: Landa & Goldberg 2005; Strandburg et al. 1993) and psychiatric disorders (for instance, schizophrenia: Langdon et al. 2002), but also in dementia (Alzheimer's: Papagno et al. 2003; Parkinson's dementia: Monetta & Pell 2007). Proverbs are often used to examine abstract thinking (Goldstein & Scherer 1941; Honeck & Temple 1994). Thus many intelligence tests (such as Wechsler, WAIS: Wechsler Adult Intelligence Scale; Finckh 1906; Hildreth 1939; Matarazzo 1972; Terman & Merrill 1973) include proverbs as indicators of abstract thinking. However, recent research disagrees with this correlation and argues that proverbs involve more metaphorical rather than abstract thinking (Barth & Küfferle 2001). Metaphors are part of abstract thinking; however it is not incompatible with concrete reasoning. On the contrary, abstract thinking is a cognitive ability that presupposes hypothetical reasoning. Thus, even when someone does not know the interpretation of a particular proverb, they can assume it and infer its meaning accurately by thinking abstractly, albeit giving a specific interpretation.

The findings from neuroimaging studies are not in consensus. Hence, some studies have shown that patients with right hemisphere lesions perform worse than patients with left hemisphere lesions, reinforcing the view that understanding proverbs is more a matter of processing of metaphorical/inferential thinking (i.e. in the right hemisphere and, in particular, in temporal lobe), rather than abstract thinking (i.e. frontal lobe processing) (Burgess & Chiarello 1996; Van Lancker 1997; Beeman & Chiarello 1998; McDonald 2000; Gainotti 2016). More specifically, patients with right hemisphere lesions tended to attribute the literal meaning of the proverbs. However, other studies do not confirm this right hemisphere activation and detect a bilateral activation (Lauro et al. 2008; Thoma & Daum 2006, for a review).

Other factors that influence the performance of healthy individuals in the interpretation of proverbs are verbal intelligence, level of education (years of education), age, and the "transparency" of proverbs. In particular, many proverbs tests are parts of a verbal intelligence test. Previous studies have found a positive correlation between verbal intelligence and accurate understanding/interpreting of metaphoric speech (Elmore & Gorham 1957). However, this opinion is not accepted by modern studies, in which verbal intelligence is primarily used as a screening test (Barth & Küfferle 2001; Uekermann, Thoma & Daum 2008; Jalal & Ramachandran 2014).

LITERATURE REVIEW

The metaphoric speech is a type of verbal communication. It lies beyond the literal meaning of the words and is intended to convey a meaning to another level, which is known in linguistics as pragmatics. In the past, proverbs were used as an indicator of abstract thinking as they are metaphorical and symbolic (Goldstein & Scherer 1941; Honeck & Temple 1994). However, more recent studies claim that proverbs measure metaphorical thinking (Barth & Küfferle, 2001). Metaphorical thinking is a way of organizing human thought and experience. The work of Lakoff & Johnson (1980/2003) demonstrates the use of proverbs as a means of estimating metaphorical thinking, which is not only a linguistic scheme but a way of organizing our thinking and reasoning. Thus interpreting proverbs is a mental function, through which man perceives the world around him and can understand abstract concepts. Recent studies argue that abstract thought is a higher cognitive process and it is abstract in nature and relates to hypothetical reasoning. However, it is not a prerequisite for understanding and interpreting the metaphor. On the other hand, metaphorical thinking, although it is part of abstract thinking, can coexist with the activation of specific reasoning. For this reason, when a person is unaware of a proverb they may think in an abstract and analogical way and give a specific interpretation (Gibbs & Beitel 1995). Therefore, an additional necessary mechanism for perception and interpretation of proverbs is analogy (Lakoff & Johnson 1980/2003). By analogy, the person tries to use pre-existing knowledge to interpret the current situation. Indeed, analogy seems to govern our whole thinking and are prevalent in our perceptual system (Lakoff & Johnson 1980/2003; Polya 1957).

Neuroimaging studies cannot, so far, resolve the aforementioned debate, since the studies do not agree in terms of the hemisphere activation (right vs. left) and in terms of lobe activation (frontal vs. temporal lobes). Many studies seem to agree that the interpretation of the proverbs is processed more affectively by the right hemisphere (Burgess & Chiarello 1996; Beeman & Chiarello 1998; McDonald 2000). Nonetheless, some studies do not confirm the clear involvement of the right hemisphere to proverb interpretation (Giora et al. 2000; Lee & Dapretto 2006). At this point we should note that research methodology which is used may

lead to different findings. Another important factor is the familiarity of the speaker with the accurate meaning of a proverb (Alverson 1994).

Other factors that seem to affect the accurate interpretation of a proverb are years of education, chronological age and “transparency” of the proverb. More specifically, the level of education of an individual is also an important factor in understanding and using proverbs (Nippold Uhden & Schwarz 1997; Uekermann et al. 2008; Wachholz & Yassuda 2011). In particular, it has been observed in a large number of studies that the years of education affect participants’ performance on proverbs. Thus, healthy individuals with higher education perform better in perception and interpretation of proverbs compared to those with less years of education. Chronological age is also an important factor for accurate proverb interpretation. In particular, it has been observed that in healthy individuals, younger participants perform better than older ones (Nippold et al. 1997; Uekermann et al. 2008). Although older participants are more familiar with proverbs (Kircher et al. 2007) it is observed that their performance decreases after the age of sixty due to normal cognitive decline (Nippold et al. 2007; Uekermann et al. 2008). However, a statistically significant decrease in the performance of healthy individuals is observed after the age of seventy (Wachholz & Yassuda 2011). Finally, the “transparency” of each proverb, i.e. how salient is the proverb and thus how easy to accurately infer its meaning, is an aspect that affects successful proverb interpretation, even though the proverb might be unknown to the individual. On the contrary, less “transparent” proverbs hamper the speaker to properly convey their meaning and make it difficult to manage specific metaphorical patterns (Papaioannou-Spyroulia 2010).

Research in Greek-speaking individuals is quite limited (Kosmidis et al. 2004; Oikonomou et al. 2004; Papaioannou-Spyroulia, 2010) and it aims to redefine the involvement metaphorical and abstract thinking in interpretation of proverbs. Similarly, the main objective of the present study is to explore this relation between proverbs and metaphorical or/and abstract thinking.

METHODOLOGY

Participants

In the present study participated fifty healthy individuals without any neurological or other pathology. The information collected included their chronological age, years of education, gender and hand preference. The age range was between 19 and 67 years with a mean age of 36.6 years (Standard Deviation= 15). Participants were divided into two age groups. More specifically, the first group included participants aged 18-39 years (N= 34); and the second group included participants aged 40-69 (N= 16). In terms of their years of education, we observe that all participants are university graduates (at least 16 years of education). Regarding the gender, most of the participants are women (62%). Almost all participants (96%) are right-handed.

Material

In the present study two offline tests were administered: (a) a verbal and practical intelligence test and (b) a proverbs interpretation test.

Verbal and Practical Intelligence test

The test examines participants’ verbal and practical intelligence (Giaglis et al. 2005; Giaglis et al. 2010; Kosmidis & Giaglis 2010). More specifically, lexical (vocabulary) knowledge and abstract thinking were tested. Vocabulary is highly correlated with general thinking,

intelligence and crystallized knowledge. On the contrary, abstract thinking is related to one's ability to solve original problems and depicts fluid intelligence. The present test consisted of seven sub-tests. In each sub-test, apart from the instructions, there was an example in order to familiarize the participant with the test.

Verbal intelligence was tested through vocabulary, word stress test, and lexical decision test (*Find the word*); while abstract thinking was tested through categorizations, analogies, reasoning, and sequences. Specifically, in the first sub-test ("*Categories*"), the participant was asked to circle the word that did not fit the rest. The sub-test consisted of 5 questions. In the second sub-test, which also consisted of 5 sentences, the participant was asked to read a sentence and choose the correct answer to the second, through a series of given answers, thinking in terms of analogy, e.g. "*Tall is for short, whatever fat is for*". The correct answer was "*thin*". In the third type of sub-tests, which were related to reasoning and consisted of 5 sentences. Some information was given to the participant, and they were asked to answer a related question. The fourth sub-test was vocabulary. The participant was given a word and was asked to choose her synonym from a series of four words. The total number of words presented to the participant was forty. In the fifth test ("*Word Stress Test*") the participant was asked to stress the words. The test consisted of two parts. Each part had 50 words, a total of 100 words for both trials. In the last sub-test ("*Lexical Decision Test*") there were 60 words and pseudowords. The participant had to choose between two words each time the real/ existent word. The words presented had an increased difficulty, starting with high-frequency words and ending with low-frequency words. The sub-test of sequences consisted of two parts and each part included five exercises. The participant saw a sequence of shapes, letters, or numbers was asked to complete the sequence accordingly. In the second part seeing a sequence of shapes he had to put them in the correct order.

The whole test was administered individually. The test was given in paper form and the participant completed the test on his own pace. The examiner was present to answer any questions but not to give the correct answer. In terms of scoring if the answer was correct, they received 1 point; while if the answer was incorrect, they received no points. The maximum total score was 225.

Proverbs test

The proverbs test was an offline test, designed by Kosmidis et al. (2004). The participant should explain orally the meaning of well-known Greek proverbs. The test was administered individually. The examiner reads the proverbs to the participant and they should explain the meaning. The examiner recorded the answers in an answer sheet. The answers are evaluated on the basis of their accuracy. Thus, the answer which gave the general meaning correctly scored 2 points; the answer that gave a specific example or if there was a relevant, but not sufficient, generalization or understanding of the metaphor of the proverb was scored with 1 point; and finally the incorrect or irrelevant answer or a literal interpretation of the proverb was scored with no points.

RESULTS

Before presenting the actual scores of the groups, we run correlations and regression tests between the independent (age, gender, years of education, hand preference) and dependent variables (verbal and practical intelligence test and proverbs test). The correlations indicated that verbal intelligence was related to age ($r=.376$, $p=.007$) and years of education ($r=.396$, $p=.005$). The results have shown that as age and education increase, so does test performance.

However, no correlations were found between the aforementioned variables and abstract thinking.

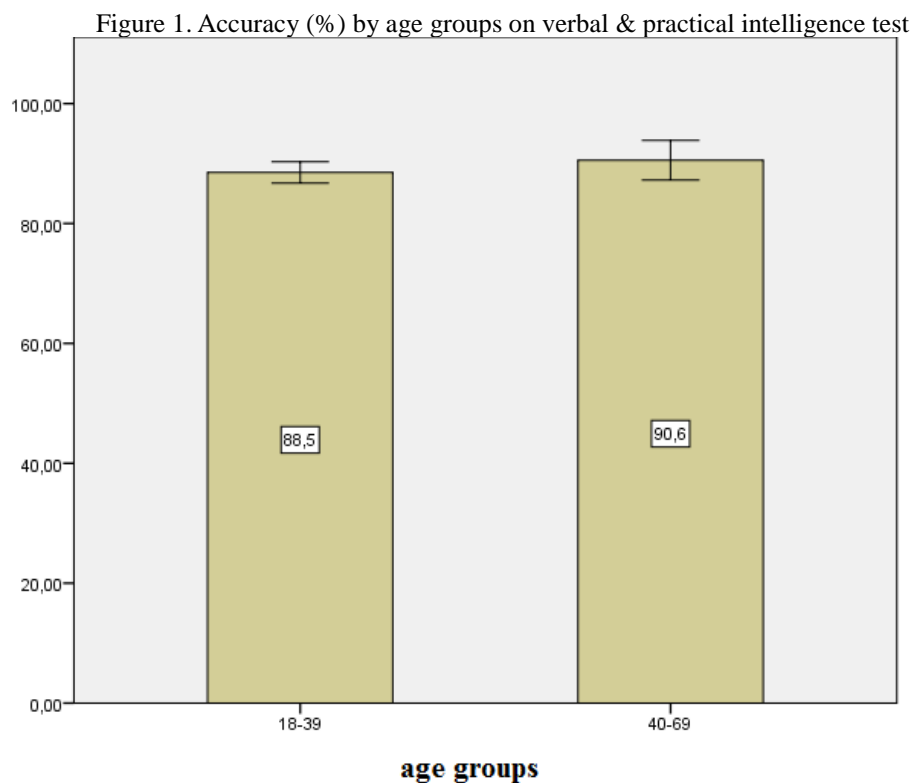
In the proverbs test, the only correlation was found between verbal intelligence and the accuracy on the test ($r=.638$, $p<.001$). Thus, the performance on the proverbs test improved as the performance on verbal intelligence test was higher. The result demonstrates the contribution of verbal intelligence to the interpretation of proverbs (Elmore & Gorham, 1957; Gorham, 1963).

Further correlations between the sub-tests of the intelligence task and the proverbs test have shown that vocabulary, word stress, and lexical decision were significantly correlated with the test of proverbs ($r=.650$, $p<.001$; $r=.564$, $p<.001$; $r=.382$, $p=.006$; respectively). Thus, the higher the participant scored on the vocabulary test, the higher scored on the proverbs test, the word stress test and the lexical decision test.

Regression tests have depicted that the accuracy on the verbal and practical intelligence test predicts the performance on the proverbs test ($R^2=.484$, $F(1,48)=45.040$, $p<.001$, $\beta=.696$). Similarly, lexical knowledge (scores on vocabulary test) is the most important predictor; since it predicts the accurate interpretation of the proverbs ($R^2=.422$, $F(1,48)=35.048$, $p<.001$, $\beta=.650$).

Verbal and Practical Intelligence test

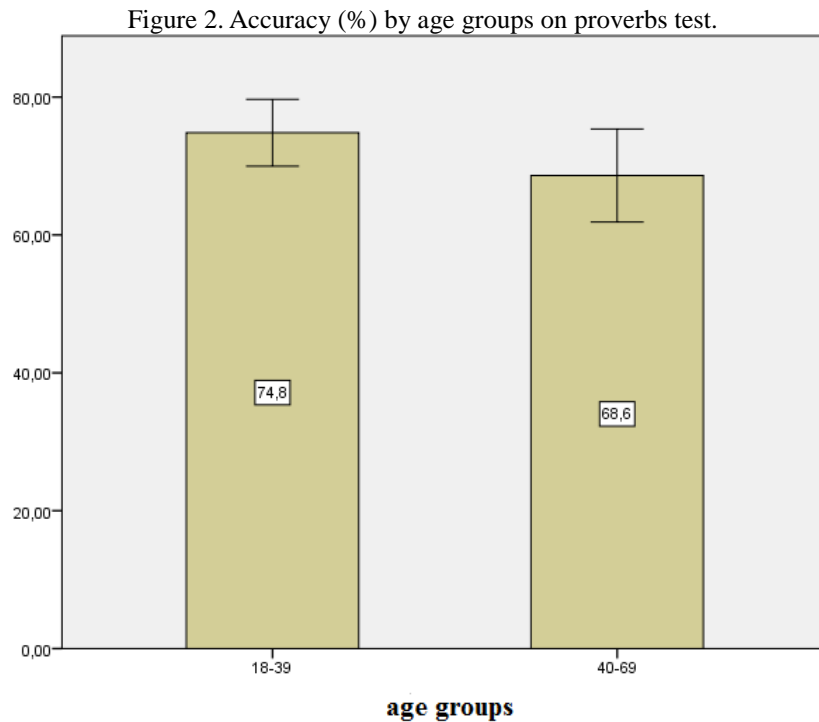
The results in the verbal and practical intelligence test have showed that no differences were found between the age groups ($t(48) = -1.225$, $p=.227$). Thus, we conclude that the participants' performance on the mental test did not differ by age (see Figure 1).



In terms of gender, no differences were observed between the two groups ($t(48)=-.120$, $p=.905$); females have scored 89.2% and males 89.1%.

Proverbs test

In the proverbs test, the results revealed that no differences were found between the groups when divided by age ($t(48) = 1.511, p = .137$; see Figure 2).



Similar to the previous test, gender does not affect participants' performance ($t(48) = .043, p = .966$); females have scored 72.8% and males 72.9%.

Finally, qualitative analyses have shown that some proverbs were easier to understand than others. In some of them participants either gave a wrong interpretation or they did not know the meaning of the proverb at all; however in most of the cases it was more often for the participants to give a wrong interpretation.

DISCUSSION

Summarizing the findings, correlations among the variables showed that mental ability, and more specifically, verbal intelligence, is related to age and education. Thus, older participants perform better than younger participants (in contrast to the literature, for a review see Uekermann et al. 2008); conceivably due to cognitive issues, such as inhibition; thus younger participants may be in a hurry of answering questions and did not paid so much attention. Nonetheless, we should not forget that according to bibliography, older individuals are more familiar with the meaning of the proverbs (Kircher et al. 2007). However the issue remains open for further discussion. Moreover, the more the years of education, the higher the participants' performance (Nippold et al. 1997; Uekermann et al. 2008; Wachholz & Yassuda 2011). However, it is worth mentioning that all participants in this study were highly educated; therefore the finding cannot be strongly supported and further research is needed.

In addition, it was found that mental ability was correlated with proverbs test and predicted participants' performance on it (48.4%); similar findings were also found in previous studies (Elmore & Gorham 1957; Gorham 1963). Further correlations have showed that verbal

intelligence (and especially vocabulary, word stress, and lexical decision) were related to participants' ability to correctly convey the meaning of the proverb. However, vocabulary appeared to be the strongest predictor (42.2%) of the accuracy on the proverbs test. By contrast, abstract thinking (reasoning, categories, sequences, and analogy) did not seem to be related to the performance on the proverbs test, as also reported in previous studies (Barth & Küfferle 2001; Uekermann et al. 2008; Jalal & Ramachandran 2014).

In respect to the participants' performance on the tests of verbal and practical intelligence and the interpretation of the proverbs, age and gender did not seem to affect participants' performance, which was expected, as age-related differences in participants' performance are observed after the age of 70 (Nippold et al. 1997; Kircher et al. 2007; Uekermann et al. 2008). Previous research has also shown that gender does not affect the performance of participants in proverbs (Papaioannou-Spyroulia 2010).

Qualitative analyzes have shown that some proverbs are more problematic than others; especially those which their meaning is not so "transparent". Thus, the participants gave a more general meaning/ interpretation to the proverb. It is noteworthy that the participants gave either a very general meaning or an incorrect one. Possibly, although participants have heard the proverbs many times and are familiar with them, they may have heard the proverb in the wrong context and have misunderstood its meaning; hence they misuse the proverb (Alverson 1994; Papaioannou-Spyroulia 2010). The results of the present study do not show a deficient use of metaphor and a reduced capacity for abstract thinking, but rather a difficulty in managing metaphors that may not be completely "transparent" (Papaioannou-Spyroulia, 2010; Jalal & Ramachandran, 2014). For this reason, some proverbs seemed to be challenging for healthy participants.

The years of education was not related to the accuracy on proverbs (as observed in previous studies; Nippold et al. 1997; Uekermann et al. 2008; Wachholz & Yassuda 2011), probably because all participants had high education (at least a university degree). Gender, according to our original hypotheses and existing literature (Papaioannou-Spyroulia 2010), did not appear to affect performance in any of the tasks.

To sum up, the findings of the present study showed that verbal intelligence, rather than abstract thinking, predicts participants' performance on the interpretation of proverbs. Finally, their difficulty to properly convey the meaning of some proverbs is not necessarily associated with a failure to think metaphorically, but with a difficulty in attributing the meaning of metaphors, which may be due to the "transparency" of the proverb and the familiarity of the speaker with each proverb.

CONCLUSIONS

The present study aimed to explore whether proverbs illustrate abstract or metaphorical thinking in healthy Greek-speaking adults. The major findings have shown that intelligence and specifically lexical knowledge predict the performance on proverbs. By contrast, abstract thinking factors (i.e. reasoning, sequences, and analogy) did not correlate with accuracy on proverbs task. Other factors, such as chronological age, gender and years of education did not affect participants' performance. Finally, proverb "transparency" has been found to affect participants' interpretations. From the findings of the present study, we may conclude that proverbs seem to depict metaphorical thinking rather than abstract thinking.

ACKNOWLEDGEMENTS

We would like to thank the individuals for their voluntary participation in the present study.

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